Cooperative Movement and Widespread Prosperity across Italian Regions

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Abstract

Our goal is to participate in the debate on regional well-being. To this end, we explore the relationship between prosperity and the cooperative movement at the regional level in Italy between 2010 and 2019. We summarize prosperity through an index originally proposed by Amartya Sen and we apply it to classify Italian regions. We then perform panel analyses showing that there is a positive and significant association between such an index and the cooperative presence. We detect that, and explain why, the cooperative movement contributes to the regional prosperity more through its employment than in terms of the added value it generates.

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1. Introduction

The main objective of this paper is exploring the relationship between prosperity and the size of the Italian cooperative movement appropriately summarized. The benchmark is provided by the Italian regions (*NUTS-2*) in the period 2010-19. To the best of our knowledge, this is the first attempt of measuring such a link, whatever the choice of the territorial level.

Cooperative firms are fairly natural candidates to be considered as organizations fuelling prosperity. They are featured by a democratic governance, they do not discriminate across workers and/or members and they are much rooted within their communities also because they do not delocalize abroad. According to Istat datasets, in 2015, including subsidiaries, the Italian cooperative companies account for about 1,215,000 employees (7.4% of total employment in the Italian private sector) and over 32 billion euros added value (4.4% of the total). Moreover, 99.6% of them and 84.7 of groups controlled by them, operate in a single region (Borzaga *et al.* 2019, OECD 2021).

Furthermore, the empirical evidence seems to suggest that co-ops pursue a combination of profits and employment and tend to be more resilient than profit-making firms during downturns by stabilizing employment while sacrificing profits. Furthermore, in the cooperative companies, profits are mostly plough-back to increase indivisible reserves or increase capital and such a strategy clearly strengthens their financial sustainability (Perotin 2012, Delbono and Reggiani 2013, Kruse 2016, Navarra 2016 and Caselli *et al*. 2021). This apparent countercyclical behaviour, by sustaining work places and then labour incomes, ends contrasting both unemployment and the potential income inequalities within the labour force. In addition, the pay-ratio within cooperative firms consortia and organizations is usually lower than within other organizational forms and this contributes to shrink income differentials among employees.

These are the reasons why we did prefer the term *movement* instead of *firms* in the title of this paper: cooperative associations, indeed, continue to play a key role not only in representing cooperative companies, but also in orienting them, promoting mergers and workers-buy-out and other related supporting initiatives (Zamagni and Zamagni 2011). Hence, one is reasonably induced to detect whether and how, in addition to possibly feed other dimensions of social cohesion and well-being, the cooperative presence is linked to some measure of widespread prosperity. A consolidated literature, at least since Putnam *et al.* (1993), highlights how social capital represents a factor of that significantly affects the population well-being and the quality of life. The cooperative enterprises may favor the cumulation of *social capital*, for instance by generating employment in disadvantaged areas and intercepting social needs of the most vulnerable parts of a population (e.g., Basterretxea and Storey, 2018, and Mazzola *et al.* 2018 who include the number of social cooperatives among the indicators of "territorial capital" in their analysis of the recent performance of Italian provinces, NUTS- III).

A measure of prosperity should capture an intuitive component of well-being, the one usually needed for a decent life in terms of freedom of choice in the access to resources. We sympathize with the *capability approach* (pioneered by Sen 1985 and 1986), where the individual well-being is defined as a function of the set of achievements (f*unctionings*), i.e., what one manages *to do or to be* in various life domains as well as the freedom one has in choosing among such achievements (*capabilities*). According to Sen (1985, p. 69), "the quality of life a person enjoys is not merely a matter of what he or she achieves, but also of what options the person has had the opportunity to choose from". Hence, well-being is a multidimensional phenomenon consisting of several functionings, but what ultimately matters in Sen's approach is the freedom of choosing among the many combinations of such subjective functionings. The Human Development Index (HDI), firstly elaborated by the United Nations in 1990, is based on Sen's theory. It considers three key capabilities to human development: a long and healthy life, knowledge and a *decent standard of living*. More precisely, "It is the

geometric mean of normalized indices of: life expectancy and health status, education as measured by expected years of schooling and the standard of living as measured by gross national income per capita. In doing so, the index uses the logarithm of income to reflect the diminishing importance of income with increasing level, but further important dimensions of capabilities such as inequality and empowerment are neglected" (Drometer, 2014, p. 53).

However, given the hard difficulty to come up with selecting a group of measurable capabilities, especially for sub-national layers of government, we shall follow here the so-called *equivalent income approach*, consisting in measuring well-being (also) in terms of an income metrics (Decancq *et al*. 2015). To this end, we shall borrow and adapt an index, originally proposed by Sen (1976), which incorporates both the real disposable income of households and a measure of inequality of its distribution. We shall label it Index of Widespread Prosperity (*IWP*).

The surge of interest towards well-being in a regional context is fairly recent (see OECD 2014, Tomaney, 2017). Actually, many countries exhibit notably large economic differences within their boundaries and such heterogeneity is obviously concealed in cross-country analyses. Various studies by (and within) OECD have shown that differences among regions belonging to the same country may be larger than differences between countries. In 2013, for example, regional differences in the employment rate in Italy ranged from 40% in Campania to 73% in the autonomous province of Bolzano. This range is as large as the one observed across all OECD countries (Veneri and Murtin, 2016). Moreover, it is worthwhile noting that when looking at inequality measures (e.g., Gini coefficient), regional inequality in income dimension may be relatively larger than in any other well-being dimension as jobs, housing, education, health, access to services, civic engagement, environment, safety: Pinar (2019, p. 41, Table 3). In other words, income inequality matters not only *per se*, but also once embedded into multidimensional indices of economic conditions.

The distribution of cooperative firms around the world too is drastically different across and within countries. Italy, which ranks top in international comparisons as for the economic impact of the cooperative presence, is no exception. Hence, a region-based breakdown of the Italian experience consistently follows.

Our main findings can be summarized as follows:

- There is a negative *correlation* between regional disposable real income and the inequality of its distribution.
- Our IWP *declines* almost everywhere between 2010 and 2019 and Southern regions exhibit a *lower* IWP than the ones in the Centre-North of the country.
- Controlling for some economic and demographic variables, there is a significantly *positive* association between the regional IWP and the size of the cooperative employment.

The rest of the paper is organized as follows. In section 2 we briefly frame our contribution within the most recent literature on regional well-being. In section 3 we provide a description of how real disposable income and its distribution jointly evolved across Italian regions. This is instrumental to the central question that we tackle in sections 4 and 5 where we present our analysis and comment the results. Section 6 concludes, hinting at some policy implications of our results. The Appendix contains some further in-depth research and robustness checks.

2. The related literature

We concentrate on one component of the (in)equality dimension featuring most definitions of well-being, i.e., the one dealing with the distribution of material resources across members of a community, (real) income ranking top among such resources. While assessing well-being or the standard of living, a focus on income distribution is by now common practice. This is the case with 4 of the 12 recommendations forcefully put forward by Stiglitz *et al.* (2009) in their influential

Report. Even at the sub-national level, some measures of income inequality enter overall evaluations of well-being within communities. The literature mostly related to our study can be roughly split in two overlapping streams. The first one deals with various measures of well-being only across *Italian* areas; the second one addresses similar issues within sets of regions across countries.

As for the first group, the only paper related to ours is Cannari and D'Alessio (2002). They consider 16 Italian areas (mostly coinciding with regions) in the period 1995-2000. Relying on periodical *Surveys of Household Income and Wealth* run by the Bank of Italy, they estimate, *inter alia,* the Gini index of household's disposable incomes which is then used to weight average incomes at the "regional" level (as in in the above Y). Ciani and Torrini (2019) use the same database as Cannari and D'Alessio (2002) to consider the time span between 2000 and 2016. They divide the country only in two macro areas and show that income inequality as measured by the Gini index is persistently greater in Southern Italy compared to the Centre-North area, although the gap seems to shrink in recent years (Ciani and Torrini, 2019, p. 11, Fig. 3a). Income distribution is also considered, for instance, by D'Urso *et al.* (2020), who focus on the measurement of well-being in Italian regions between 2010 and 2016, in Murias *et al.* (2012), who consider Italy and Spain mainly in 2005, and in Bertin *et al.* (2018) through selected opinions on 41 indicators of the Italian regions in 2012.

International samples of regions have been considered in other related empirical contributions, usually by building and estimating various indices of well-being still accommodating measures of income inequality, in addition to indicators of other dimensions aimed at catching the living conditions of communities. We mention, for instance, Palomino (2019) and Pinar (2019). Both rely upon the OECD Regional Well-being Database (*RWBD*), available only for the years 2000 and 2014, which provides figures also about disposable income dispersion across households. The sample includes 395 OECD regions, and 213 European regions, respectively. Veneri and Murtin (2016) also compare a group of 209 OECD regions in the period 2003-12 by

means of the *MDLS* (Multi-Dimensional Living Standards) index. They conclude that differences in households' disposable income within regions are greater than differences in the other two components of the index (jobs and health), but the regional disparities in the *MDLS* exceed those in households' disposable income.

Finally, it is worth mentioning Ezcurra (2009) and Bouvet (2010). The former investigates the relationship between income polarization and GDP growth in 61 EU regions between 1993 and 2003, reaching the conclusion that the association is negative. The latter considers a group of European regions between 1977 and 2003 to examine trends in income inequality. While interesting in many respects, both papers use GDP per capita to describe income distribution; this does not seem an advisable choice at the regional level. The discrepancy between the production's location and the geographic distribution of factor revenue recipients is indeed usually greater, the smaller the geographical units dividing a (not tiny) country. Hence, the use of GDP per capita instead of income casts some doubts on the interpretation of the resulting findings.

3. Widespread prosperity in Italian Regions

As we argue in the Introduction, we follow here the income equivalent approach. As for the choice of an appropriate measure of a key-component of well-being, let y_{it} be the average household disposable (real) income of the *i-th* population in year *t* and G_{it} be the value of the Gini index of the corresponding distribution. Let's then define

$$Y_{it} = y_{it} (1 - G_{it})$$

This can be interpreted as an Index of Widespread Prosperity, as it aims at catching an individually desirable attribute (high purchasing power as a proxy for prosperity), weighting negatively the dispersion around the average of such a power among households which belong to the relevant population. Y_{it} has been originally proposed

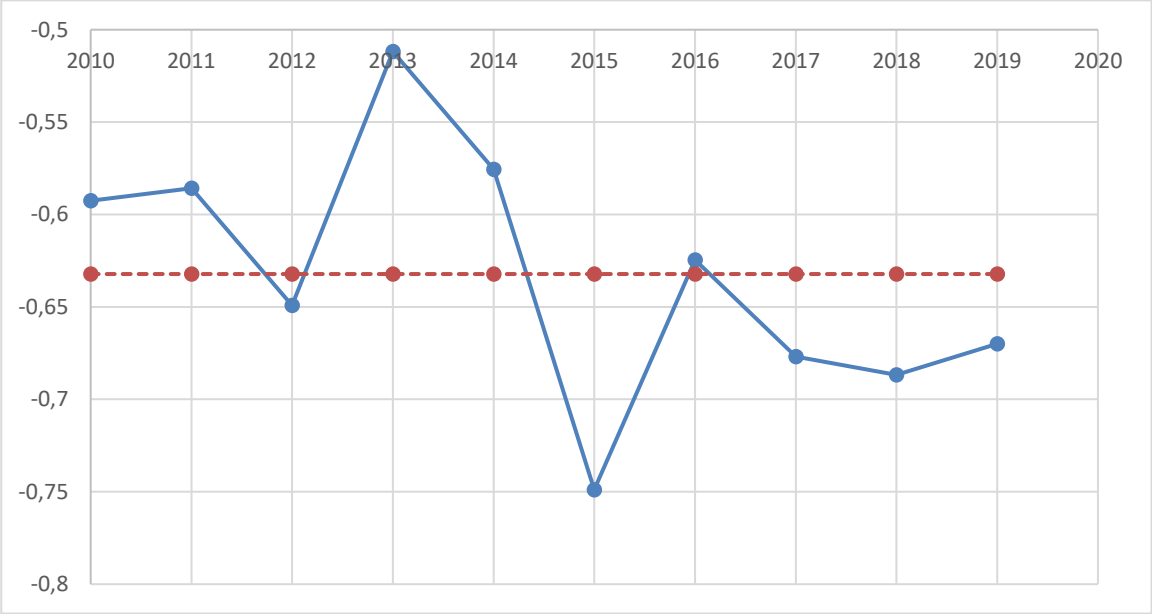
in Sen (1976) in a seminal analysis of real national income: under some regularity conditions on social preferences, it may be (cardinally) interpreted as a social welfare function, in which G_{it} measures the proportional loss in social welfare to be imputed to inequality in the income distribution. Of course, any index hinging on Sen's (1976) one can accommodate other indicators of, say, well-being, and variables other than real income, as well as measures of inequality of such variables different from the Gini one.

To proceed with a preliminary analysis of Y_{it}, we plot 20 regional pairs in the income-Gini space for 2010 and 2019 (Fig. 1A, A mnemonics for Appendix) and we also visualize the regional values of the 2010-19 averages (Fig. 2A). The data about regional income distributions are retrieved from official datasets (Eu-Silc, based too on households' surveys). Since the Eu-Silc data cover up to 2017, we have estimated incomes and Gini values for 2018 and 2019. As for G_i, we employed the last 5 available values of G_{it} (t = 2013-17) to obtain the two subsequent years via a linear regression. As for the regional average values of household disposable real incomes (y_i), we obtain the 2018 values by means of the yearly rate of change between 2018 and 2017 (source: Istat, *Regional accounts*) and then we replicate the same update by using the values of 2018 to derive the 2019 ones. Moreover, since the datasets provide separate figures for the two autonomous provinces of Bolzano and Trento (which the region Trentino-Alto Adige is divided into), we average their data using population sizes (15+) as weights. We use the Consumers Price Index (Istat, Foi(nt)), evaluated in 2015, to deflate incomes.

While in 2010 the scatter plot does not exhibit any clear pattern, in 2019 a negative association between the regional real income and the corresponding Gini index emerges quite clearly. Fig. 3 shows even more neatly that the correlation between regional real incomes and the Gini values of the corresponding distributions is persistently negative with an average value of - 0.63 in the decade (the horizontal dotted line). In absolute terms it modestly grows from 0.59 to 0.67. This relationship is not

surprising: a similar pattern has been detected also among countries in the wake of Kuznets's curve framework. In 2014, for instance, the correlation coefficient between average disposable income and *within-country* income inequality as measured by the Gini coefficient, is equal to − 0.79 in the European countries (Pinar 2019, p. 43, fn. 25).

Figure 3. Correlation between Gini index and regional average incomes, 2010-19



Source: our computation from Istat Regional Accounts Data

Figures 1A and 2A illustrate the regional diversities of both y and Gini. Table 1 summarizes their content for the extreme years, appending the percentage changes in regional incomes, Gini values, as well as in the value of Y, over the entire period.

While in 2019 the country as a whole has not recovered yet from pre-financial crisis levels (− 2.74% in real income, after the 2009 recession responsible of a fall of about 5% in Italian GDP) and the Gini index mildly moves up in the period, very different tendencies characterize the regional territories, both for the size of income contraction as well as for the variation in income dispersion.

Table 1. y_{it} and G_{it}; $\Delta\%$ changes in y_{it}, G_{it} and Y_{it}; t = 2010, 2019

	2010		2019		2010/2019		
	y_i	G_i	y_i	G_i	$\Delta\% y_i$	$\Delta\% G_i$	$\Delta\%Y_i$
Italy	32370	0,33	31483	0,343	-2,74	4,00	-4,66
Piedmont	34600	0,32	30966	0,314	-10,50	-1,88	-9,72
Valle d'Aosta	34608	0,282	30716	0,313	-11,25	11,13	-15,13
Liguria	31746	0,3	31263	0,314	-1,52	4,60	-3,46
Lombardy	37067	0,31	36322	0,329	-2,01	6,13	-4,71
Trentino-Alto Adige	38483	0,298	37097	0,310	-3,60	3,89	-5,19
Veneto	34637	0,288	35669	0,307	2,98	6,53	0,26
Friuli-Venezia Giulia	33431	0,285	34310	0,284	2,63	-0,28	2,75
Emilia-Romagna	37427	0,297	35411	0,290	-5,39	-2,29	-4,47
Tuscany	34442	0,304	33957	0,332	-1,41	9,21	-5,37
Umbria	32888	0,287	33536	0,291	1,97	1,25	1,46
Marche	34278	0,289	33128	0,299	-3,36	3,39	-4,69
Lazio	34270	0,345	32331	0,378	-5,66	9,68	-10,47
Abruzzo	26936	0,299	27900	0,315	3,58	5,35	1,21
Molise	27249	0,292	27242	0,321	-0,03	9,86	-4,09
Campania	26327	0,342	24912	0,362	-5,38	5,73	-8,19
Apulia	28306	0,33	27622	0,334	-2,42	1,21	-3,00
Basilicata	26731	0,344	25837	0,358	-3,34	4,19	-5,46
Calabria	25686	0,335	25421	0,382	-1,03	14,15	-8,09
Sicily	22643	0,364	22753	0,371	0,49	1,82	-0,56
Sardinia	29196	0,31	28099	0,346	-3,76	11,48	-8,72

Tables 2a, 2b and 2c collect some summary statistics of the three variables under exam and to be used in the next section. Overall, we have 200 observations for each variable, 20 of them for the cross-country dimension and 10 for the temporal one. Unsurprisingly, the Coefficient of Variation of *Y* exceeds the one of *y*, supporting our choice of the former instead of the latter to capture differences in regional prosperity. Looking at the last two columns of Table 2a, one realizes that the variability of Y, y and to a lesser extent Gini, is driven by the between-region standard deviation more than by the within-region one.

Table 2a. Summary statistics, Italian regional data, 2010-19

Variable	Obs	Mean	σ	Min.	Max.	σ Between	σ Within
y	200	29911	4241	21628	38483	4161	1269
Gini	200	0.316	0.028	0.262	0.396	0.025	0.013
Y	200	20533	3409	13635	27015	3384	873

In the next Tables we sharpen the understanding of differentials across and within regions. In Table 2b we disaggregate y, Gini and Y by their temporal dimension. In table 2.c we perform a similar exercise across regions.

We can see in Table 2b that the dynamics of Y shows a decline in the first years, until the recession of 2013, followed by a mild recovery between 2015 and 2019. The yearly standard deviation (last column) is basically stable.

Table 2b. Summary statistics, between-region data, 2010-19

	y		*Gini*		*Y*	
	mean	σ	mean	σ	mean	σ
2010	31547	4415	0,311	0,024	21796	3480
2011	30751	3975	0,314	0,024	21167	3198
2012	29144	3953	0,316	0,032	20019	3334
2013	28515	4115	0,308	0,027	19801	3294
2014	28479	4051	0,306	0,025	19836	3232
2015	29283	4039	0,318	0,029	20065	3391
2016	29769	4233	0,314	0,026	20495	3422
2017	30346	4033	0,321	0,026	20670	3283
2018	30551	4163	0,324	0,028	20734	3407
2019	30725	4149	0,327	0,029	20744	3415

Switching to the disaggregation by region, the means confirm the regional divide featuring the Italian economic system and the related prosperity levels. We can also

stress that the regional standard deviation varies considerably, suggesting that y and Y have experienced different patterns: more stable in Abruzzo and Tuscany, for instance, and more variable in Umbria and Valle d'Aosta.

Table 2c. Summary statistics, within-region data, 2010-19

	y		*Gini*		*Y*	
	mean	σ	mean	σ	mean	σ
Piedmont	31336	1536	0,305	0,012	21776	822
Valle d'Aosta	31321	1473	0,292	0,014	22161	1064
Liguria	30467	1104	0,318	0,010	20769	921
Lombardy	35446	905	0,317	0,008	24205	661
Trentino-Alto Adige	36344	961	0,291	0,012	25752	648
Veneto	33770	1530	0,294	0,009	23824	883
Friuli-Venezia Giulia	32716	1211	0,279	0,009	23570	757
Emilia-Romagna	34970	1031	0,294	0,004	24676	763
Tuscany	33192	919	0,304	0,015	23097	505
Umbria	31505	1595	0,296	0,011	22167	1212
Marche	32421	1003	0,293	0,004	22917	678
Lazio	31542	1514	0,358	0,012	20231	956
Abruzzo	27051	728	0,310	0,006	18675	472
Molise	25251	1850	0,311	0,014	17411	1336
Campania	24776	881	0,354	0,017	16002	724
Apulia	26883	1058	0,318	0,013	18317	523
Basilicata	25234	1037	0,333	0,020	16823	504
Calabria	24619	985	0,350	0,021	15989	627
Sicily	22234	377	0,368	0,007	14052	317
Sardinia	27139	1376	0,328	0,019	18243	1276

The Southern regions (including islands) continue to experience *more uneven* distributions around a *lower* real income than the Centre-North ones. This is the conclusion reached also in Mussida and Parisi (2020) and Doran and Jordan (2013). However, in Doran and Jordan (2013, p. 27) the real gross value added per capita, instead of real income per capita, is used to measure living standards for each region. Hence, the abovementioned comments about this choice applies also to their findings.

The country as a whole performs quite poorly and, given the relative stability of the national Gini value, the driving factor seems to lay in the conspicuous fall in Italian GDP and real revenues observed after the financial crisis. Only a few regional territories experience (tiny) positive variations in Y_i, the greatest of those being Umbria. Fig. 4A(a) visualizes the decrease in the average regional Y between 2010 and 2013, followed by a modest recoupment. Such a pattern is accompanied by an increase over time in the standard deviation of Y. Figure 4A(b) illustrates the spatial distribution of Y underscoring the Italian regional heterogeneity. Our Figure 4A(b) echoes Fig. 2 in Ferrara and Nisticò (2015, p. 397) who elaborate an interesting multidimensional indicator of well-being.

In Figure 5A, we plot, for each region, the difference between its Y_i and the unweighted average value of all Y_i, in the two extreme years of our time frame. The territorial dualism (Centre-North vs South) is confirmed once again (there is a vast literature on the Italian dualism which we can hardly account for here: see, among others, Ciani and Torrini, 2019).

Moreover, it is worth underscoring a generalized increase in the size of differentials with respect to the average (whatever their sign) in the period.

The previous analysis of our prosperity indicator Y focuses on cross-section features as they are of great interest for the understanding of regional differentials. Furthermore, the dynamics of Y play a relevant role as well.

Our indicator of prosperity, as income and Gini, is distinguished by a strong time persistence with current values clearly affected by past values, as often stressed by the empirical literature. This time dependence will play a major role in the model presented in the following section.

4. Prosperity and co-ops: an empirical analysis

For the arguments provided in section 1, we conjecture the presence of a positive relation between the chosen index of regional widespread prosperity (*Y*) and the size of the cooperative movement in terms of employees or the added value obtained by cooperative organizations.

4.1 The dataset

We obtain novel data on the regional cooperative presence by elaborating the balance sheets from the *Bureau van Dijk-Aida* dataset, whereas we retrieve all the other data from Istat (*Labor Force Survey*, in Italian). As for the interpretation of figures about the cooperative employment, it is worth stressing that we collect data about employees of cooperative firms and cooperative groups which are registered in the various regions. Of course, some of them, especially the largest ones, employ labour force also outside the regional boundaries. This means that we shall emphasize the economic consequences of decisions taken in the corporate headquarters located in the relevant region, being obviously aware that they yield economic effects also elsewhere. However, the territorial gap between the company's location and the location of its employees is very small: in 2015, 99.6% of Italian cooperatives (and almost 85% of groups controlled by cooperatives) operate only in the region where they are registered (Borzaga *et al.* 2019, p. 10). Hence, we shall summarize the regional cooperative magnitude with the following variables, where *pop[n, m]* will indicates the population share in the (closed) interval between *n* and *m*.

Cooperative employment (CEM): cooperative employees out of *pop[15, 64*].

Cooperative Added Value (CAV): cooperative added value out of regional GDP.

To complete the construction of the dataset to be used, in addition to the one collected in Tables 2, the choice of the other relevant variables reflects a broadly consolidated empirical literature (for instance, Murias *et al.* 2012, Bertin *et al.* 2018, Pinar 2018, Palomino 2019, Mussida and Parisi 2020 and D'Urso *et al.* 2020). Indeed, various indicators capturing demographic factors (as the elderly dependence rate, life expectancy, mortality rates), the share of population with at least secondary or third education, the participation in the labour market ((un)employment rate, activity rates) and real GDP have been variously included into multidimensional indexes of well-being. Notice, however, that the measures of households' income distribution (averages and/or indices of dispersion) are included among the indicators of well-being, whereas in our analysis such measures are embedded into an index (Y_{it}) that needs to be analysed wrt other indicators, the cooperative presence being the candidate mostly under scrutiny. Here we select the following variables:

Activity Rate (AR): active *pop[15,64]* out of *pop[15 ,64*].

Education Rate (EDU): *pop[25,64]* with at least secondary education out of *pop[15, 64*].

Elderly Rate (ER): population 65+ out of *pop[15,64*].

Italian Gross Domestic Product yearly rate of growth (GDP).

Table 3a reports some descriptive statistics. As it is by now well established (e.g., OECD, 2021), the values of CEM exceed those of CAV. The broad range of variation of CEM as well as CAV reflects the presence of regions like Emilia-Romagna where the cooperative movement is deeply rooted, whereas it plays a marginal role in other territories. The range of AR is largely mirroring the North-South dualism. As for GDP, of course, only 10 observations are available. In the last two columns we detect a

similar pattern as the one observed in Table 2a: the between-region standard deviation largely exceeds the within-region one.

Table 3a. Summary statistics, Italian regional data, 2010-19

Variable	Obs	Mean	Std. Dev.	Min.	Max.	Std. Dev. Between	Std. Dev. Within
CEM	200	2.48	1.54	0.64	8.93	1.59	0.32
CAV	200	1.56	1.14	0.46	5.88	1.17	0.12
AR	200	64.32	7.99	46.30	74.61	8.04	1.49
EDU	200	29.83	3.21	22.59	36.55	3.08	1.16
ER	200	34.24	4.63	23.45	46.39	4.42	1.77
GDP	10	0.18	1.89	-4.33	2.54	0.00	1.99

Source. CEM and CAV: our computation of micro data from Bureau van Dijk; AR, EDU, ER, GDP: Istat *Labor Force Survey and* Istat online databases statbase.

In Table 3bA we report the correlation matrix among all variables included in Table 3a and Y. The high positive value between CEM and CAV suggests to consider them separately. Hence, our model will be analyzed consistently.

4.2 The empirical analyses

We first to analyze and test the presence of a relation between Y and CAV and between Y and CEM by means of an independence test. We begin by dividing the Italian regions into two groups according to their *CAV* (summarized by the mean over the period) with respect to the median. Following the same criterion we classify regions with respect to the median *Y*. The resulting Table 4 (where $\bar{Y}$ and σ_Y are the mean and the standard deviation of *Y*, respectively, in the relevant groups between 2010 and 2019) shows that 8 low *CAV* regions out of 10 display also a low value of *Y* and 8 high *CAV* regions out of 10 feature also a high value of *Y*.

Very similar conclusions emerge with a taxonomy based on median *CEM*: 8 regions out of 10 share low values of *CEM* as well *Y* and 8 regions out of 10 share high values of both. Only four regions are located differently with respect to the classification based on median *CAV*.

Table 4. Italian regions wrt to *Y* and *CAV* and wrt to *Y* and *CEM*, 2010-2019

	Low *CAV*	High *CAV*	Low *CEM*	High *CEM*
Low *Y*	Abruzzo Basilicata Calabria Campania Lazio Molise Apulia Sicily $\bar{Y}$=17188 σ_Y=1789	Liguria Sardinia $\bar{Y}$ = 19506 σ_Y = 1263	Abruzzo Basilicata Calabria Campania Molise Apulia Sardinia Sicily $\bar{Y}$=16939 σ_Y=1456	Lazio Liguria $\bar{Y}$ = 20500 σ_Y = 269
High *Y*	Lombardy Valle d'Aosta $\bar{Y}$ = 23183 σ_Y = 1022	Emilia-Romagna Friuli-Venezia Giulia Marche Piedmont Tuscany Trentino Umbria Veneto $\bar{Y}$ = 23472 σ_Y = 1215	Marche Valle d'Aosta $\bar{Y}$ = 22539 σ_Y = 378	Emilia-Romagna Friuli-Venezia Giulia Lombardy Piedmont Tuscany Trentino Alto Adige Umbria Veneto $\bar{Y}$=23633 σ_Y = 1216

In either case, we can firmly reject the hypothesis of independence between regional widespread prosperity and either CAV or CEM. This descriptive result is confirmed by the statistics test $\chi^2_{\nu=1} = 7.20$, with associated probability $p(\chi^2) = 0.0073$, as well as by Fisher's exact test, with probability $p = 0.011$, which looks appropriate with fairly small samples as ours.

We now resort to a panel analysis allowing us to catch both the spatial and the temporal dimension of our data. Given the nature of our balanced panel, to test the aforementioned conjecture, we run the following linear fixed effects panel regression:

$$Y_{i\,t} = \alpha + Y_{i,t-1}\,\beta + X_{it}^{'}\,\delta + Z_{t}^{'}\,\lambda + \gamma_i + \varepsilon_{it} \qquad (1)$$

where X_{it} is the vector of variables at time t, Z_t is the vector of time-dependent, region-invariant variables, γ_i are regional fixed effects and ε_{it} is the residual component.

The dependent variable $Y_{it} = y_{it}\ (1 - G_{it})$ is central to our research and has been illustrated in previous sections (its summary statistics are in Tables 2).

The presence of $Y_{i,t-1}$ captures the alleged dynamics of Y, considering regional differentials. There are sturdy theoretical arguments supporting the inclusion of lagged values of Y. Hence, excluding lagged values would lead to a remarkable bias by omitted variable. Moreover, including them allows an acceptable solution to the autocorrelation problem featuring the dynamics of Y. Furthermore, including $Y_{i,t-1}$, which explains most of the variability of Y, helps us assessing the relevance of other variables.

Some region-specific characteristics, such as the ones belonging to one of three geographic subsets (North, Centre and South), are included in the regional fixed effects γ_i .

In addition, either to the Cooperative Employment (CEM) or the Cooperative Added Value (CAV), we also include the Activity Rate (AR), the Education Rate (EDU) and the Elderly Rate (ER) within X_{it} (see the descriptive statistics in Table 3A).

As for Z_t, we consider the Italian *real GDP yearly growth rate (GDP); the related statistics* are also summarized in Table 3A. We choose the national GDP data instead

of the regional ones to consider temporal dynamics regarding the nation as a whole during our time span (e.g., the 2013 recession).

To ease the interpretation of the variables *X* and *Z*, all the above series are multiplied by hundred.

We can hardly propose causal claims in view of the likely endogeneity and reverse causality featuring the relationship between prosperity and cooperative presence as modeled through equation (1).

Although it captures relevant factors as the cooperative presence, our specification is far from exhaustive, and it is then likely plagued by endogeneity problems from omitted variables. A further concern deals with the size of our time series (2010-19) which entails another potential source of endogeneity. While ten years is a fairly large time span with regard to the database quality, it nonetheless constitutes a short period in the analysis of the relationship between the considered phenomena.

We support the view according to which the cooperative presence enhances regional prosperity, but it may be argued also that a more prosperous territory is more favorable to the development of cooperative firms. This may apply, for instance, to the Italian Emilia-Romagna region (Caselli *et al*., 2021). Hence, we believe to be appropriate to describe and interpret the link between prosperity and cooperative presence as an association and not as a causal relationship.

5. Results

Our goal is evaluating the importance of our two summaries of the cooperative movement (CAV and CEM) with respect to Y. We postpone the estimate of equation (1) and we first explore their relationship with the two components of Y (y and G). Subsequently, we study some linear models with panel data and fixed effects for both y and G where, in addition to the lagged values of the dependent variable, we consider

separately CAV and CEM. The results are summarized in Table 5A and show that the cooperative presence matters relatively to y. Specifically, CEM plays a significant and stronger role than CAV. As for G, the relationship is not significant (estimates available upon request).

The equation (1) is firstly estimated in a simplified version in which CAV and CEM appear on their own. As one can see from Table 6A, in addition to the lagged value of Y, the cooperative presence is positively and significantly associated to Y through both CEM and CAV.

Moving to the extended version of (1), in Table 7 we report the OLS estimates of our linear fixed effects panel model (1), distinguishing the entire group of regions from the relative subsets of the 10 ones featured by a high *CEM*. Given the strong correlation between CAV and CEM, we analyze their impact separately, starting from CEM. The Hausman test for random effects vs fixed effects, reported in the last row of Table 7, indicates a strong preference for the fixed effects model to be used below. Notice that, while including lagged values of *Y* allows to tackle the presence of autocorrelation, we still have to deal with a strong heteroscedasticity requiring us to resort to robust standard errors that we calculate by means of the Arellano HAC estimator.

In the analysis of our 20 regions, the joint Welch's F test (reported in the last but one row of Table 7) rejects the presence of a unique intercept, highlighting significant regional fixed effects γ_i. Looking at the two subsets of regions featured by similar levels of *CEM*, the Welch's F test does not suggest any longer to reject the hypothesis of a common intercept and this looks consistent with dealing now with less heterogeneous groups of regions.

Table 7. Linear fixed effects panel model, Italian regions, 2010-19

Dependent variable: *Y*				
	all regions		10 regions high CEM	
AR	102	(67)	-72	(121)
CEM	451**	(187)	783**	(319)
EDU	-32	(58)	34	(90)
ER	-35	(64)	136	(121)
GDP	142***	(20)	102***	(20)
Y(-1)	0.62***	(0.06)	0.66***	(0.06)
R^2	0.98		0.95	
F statistic common intercept	$F_{v=19,58.8}$=1.87	p=0.04	$F_{v=9,32.4}$=1.98	p=0.07
Hausman test	$\chi^2_{v=5}$=53.68	p=0.00	$\chi^2_{v=7}$=40.46	p=0.00

Robust standard errors in brackets. *** p < 0.01; ** p < 0.05; * p < 0.10

The significant differences across Italian regions, often documented by other researches, emerge also in our analysis. This is also true regarding the relevance of their geographic position and the ordinary vs special type of their statutes, as jointly specified by *Y(-1)* and γ_i.

GDP and *Y(-1)* are the most relevant explanatory variables, which are positively and significantly associated to *Y*.

The relationship between GDP and Y is stable. Alternatively, to GDP, one may resort to time dummies as we do in Table 9A.; our main results are confirmed, but GDP looks more effective than time dummies[1].

[1] We thank an anonymous referee for drawing our attention on this point.

As we expect, *Y(-1)*, which greatly varies across territories, captures a relevant portion of the differentials measured by the regional fixed effects γ_i .

In addition to *GDP* and *Y(-1)*, the most important variable is *CEM*: an increasing cooperative employment is positively and significantly associated to increases in *Y*: a unitary increase in *CEM* raises *Y* by about 380 euros.

As for the other variables, no significant association is therefore detected: conditionally on the effects of *GDP*, *Y(-1)* and *CEM*, neither the education ratio, nor the elderly rate seem to affect the regional prosperity.

The same irrelevance is detected in the relationship between prosperity and the added value obtained within the cooperative boundaries: Table 8A shows the estimates of eq. (1) with CAV instead of CEM as a measure of the cooperative presence. We observe that only *GDP* and *Y(-1)* are significant, hinting at different roles for CEM and CAV. This can be related to the fact that a vast portion of cooperatives operate in labor-intensive sectors featured by a relatively low added value per worker. According to Istat datasets, in 2015, for instance, the average added value per worker was 45,605 euros in the overall Italian companies (excluding the financial sector), whereas in the cooperative subset of them it was 24,851 euros (Borzaga *et. al.* 2019, p. 11). Moreover, while the cooperative firms account for only 4% of private GDP in 2015 (Istat, 2019), their share of private employment is much larger (about 7%) and such a dichotomy is even more apparent in regions like the Italian Emilia-Romagna (Caselli *et al.*, 2021).

If we estimate the equation (1) by restricting the sample to the 10 regions with high *CEM* (listed in Table 4), we obtain the results reported in columns 3-4 of Table 7. The previous findings stemming from the panel regression within the complete sample are strengthened. We notice that the impact of cooperative employment on prosperity more than doubles compared to the nation-wide one: for the top 10 regions in terms of *CEM*, a unitary increase in *CEM* increases *Y* by almost 800 euros. This finding is consistent

with the tests performed relatively to Table 4 and indicates that the regions with the highest cooperative presence exhibit the highest levels of prosperity.

To complete the analysis of equation (1), we assess the robustness of our results in a dedicated section in the Appendix.

6. Concluding remarks

Let us summarize the track followed in this paper. We first analyze the regional patterns of our Index of Widespread Prosperity and show that Italian regions display wide differences in some economic spaces, including the distribution of prosperity across households. This amounts to confirming the conclusion reached by a vast literature using indices of well-being. Within an income-based approach to well-being, we initially detect that income inequality rises in almost all Italian regions, especially in the South, and the presence of a negative (and increasing over time) correlation between income levels and the Gini values. This evidence echoes some findings of the vast research stream on the macroeconomic relationship between growth and income inequality (see, for instance, Naguib, 2017, for an updated survey). Lastly, in the 2010-19 decade, the regional widespread prosperity declines almost everywhere, especially in the South.

We then focus on the contribution of the Italian cooperative movement to a key dimension of regional well-being as the one captured by *Y*. Within such a relatively narrow frame and in a limited time span, notwithstanding the simplicity of our model, our new findings look encouraging and arguably worth further investigation. Indeed, we detect a significant association between the size of the cooperative employment and our index of widespread prosperity. Such a relationship is not mitigated by standard economic and socio-demographic control variables entering our panel regression models. Regional communities hosting a large presence of the cooperative movement seem capable of thriving better than those lacking such a presence.

We then cautiously claim that the Italian cooperative movement can be considered one of the relevant factors of regional prosperity, also potentially capable of reducing regional divides, at least in terms of employment and income disparities within communities. Incidentally, however, we cannot be silent about cooperative firms qualified as *spurious*, i.e., fake. Indeed, the cooperative associations claim that some sectors (e.g., logistics) attract cooperatives created to underpay workers, circumvent rules and prone to frequent bankruptcies in order to avoid periodical controls by authorities and circumvent fiscal compliance. Such cooperatives, of course, not only stain the image of the entire cooperative movement, but should be treated as unfair players in the market competition.

Moreover, our findings suggest also a positive relationship between the size of the regional cooperative movement and the resilience of regional economic system with respect to severe shocks like the 2008 financial crisis. Hence, it will be worth detecting whether such a resilience endures also during and after the dramatic 2020 pandemics-driven recession. Indeed, since both the ability to absorb (resistance) and to bounce-back (recovery) are desirable features of territorial systems, a large cooperative presence might provide a comparative advantage to promote prosperity and protect it during and/or after downturns. (We investigate the role of cooperative companies regarding the resilience of Italian regional systems in Costa and Delbono, 2021).

Overall, the cooperative one seems a socially meritorious organizational form to be promoted and strengthened throughout national and regional policies. Of course, policies need to be place-based, to properly consider the differences across territories and sectors. Recent empirical evidence (e.g., Borzaga *et al.* 2019 and OECD 2021) confirms some weaknesses of cooperative enterprises like the difficult access to the credit market, especially for smaller co-ops, and a productivity gap wrt to profit-making competitors. Tailored-made policies designed to mitigate such handicaps might uplift communities' local welfare. The Italian National Recovery and Resilience

Plan originated by the NextgenerationEU may provide the appropriate frame to nurture such policies.

In particular, it seems desirable strengthening the sector of social cooperatives. Their role in softening the adverse consequences of the Covid-19 pandemic on the most fragile segments of the population has been, and still is, very important. As they accompany the public sector in providing key services within local welfare systems, the social cooperatives may also enhance relevant dimensions of prosperity well beyond the ones captured by our index.

Appendix

Figure 1A. Gini index and average income, Italian regions

2010 2019

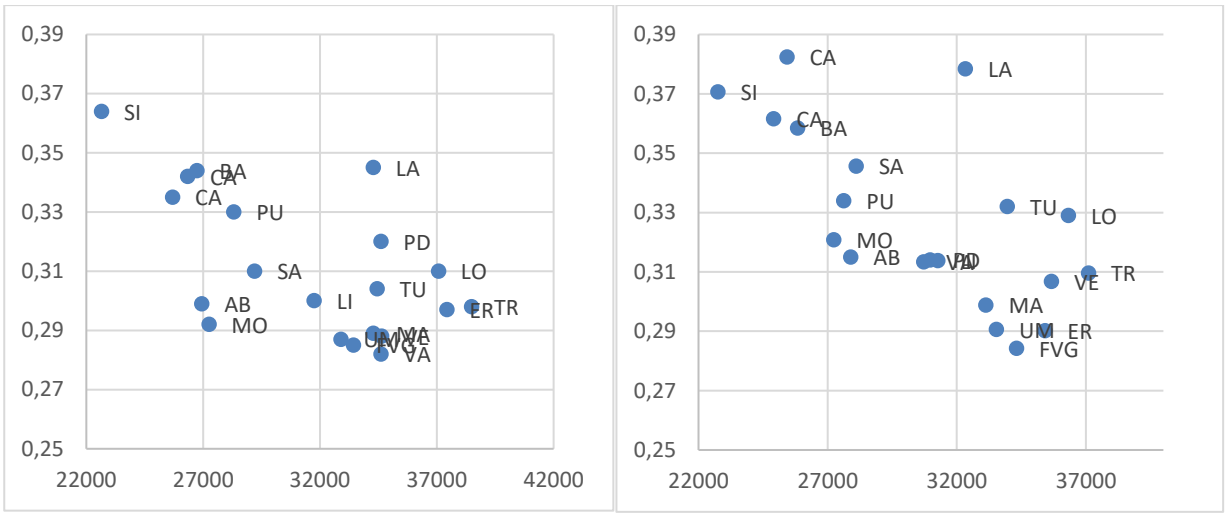
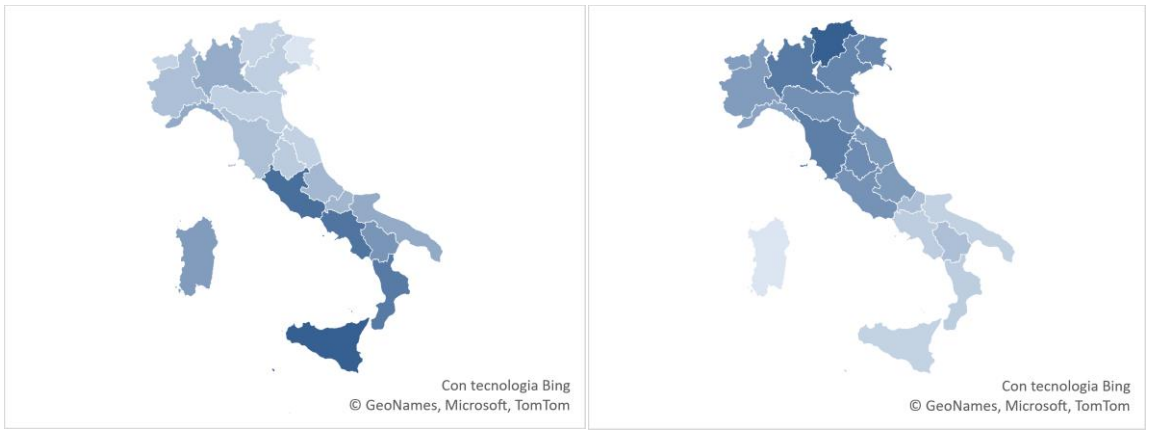
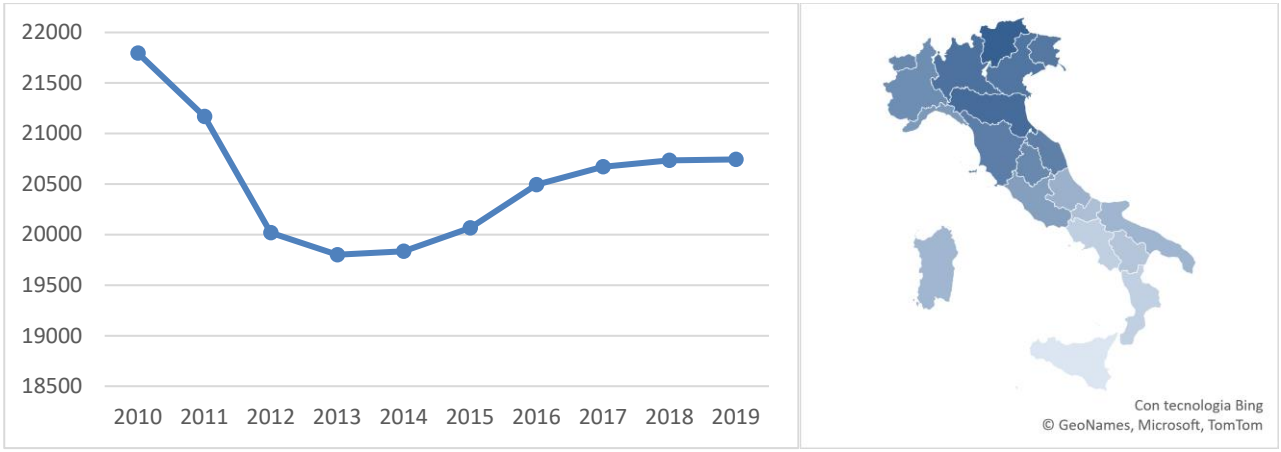


Figure 2A. Gini index (a) and average income (b), Italian regions, average 2010-19 (increases according to the color's intensity)



(a) (b)

Figure 4A. Average *Y*, 2010-19, time series and regional values (increases according to the color's intensity)



(a) (b)

Figure 5A. Differences between Y_i and average *Y*, 2010 and 2019

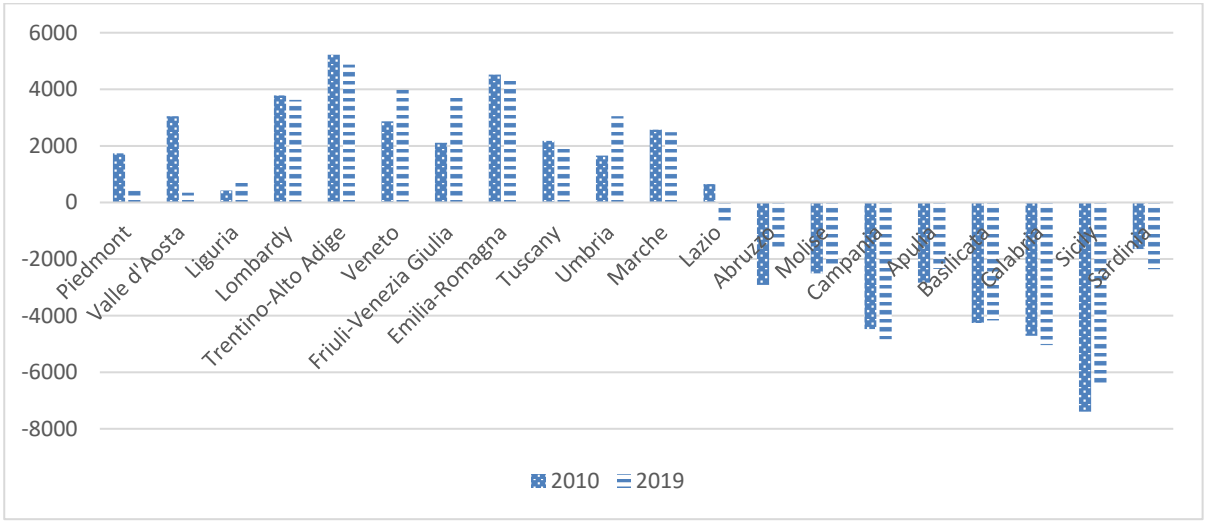


Table 3bA. Correlation matrix, Italian regional values 2010-19

AR	CEM	EDU	ER	CAV	GDP	Y	
1,00	0,57	0,24	0,59	0,49	0,06	0,89	AR
	1,00	0,15	0,29	0,95	0,03	0,58	CEM
		1,00	0,57	0,13	0,15	0,01	EDU
			1,00	0,26	0,18	0,37	ER
				1,00	0,02	0,53	CAV
					1,00	0,05	GDP
						1,00	Y

Table 5A. Linear fixed effects panel model, Italian regions, 2010-19, y

Dependent variable: real per capita income *y*				
	only CEM		only CAV	
CEM	1766***	(394)	-	
CAV	-		1918*	(1033)
y(-1)	0.57***	(0.05)	0.57***	(0.05)
R^2	0.96		0.96	

Robust standard errors in brackets. *** p < 0.01; ** p < 0.05; * p < 0.10

Table 6A. Linear fixed effects panel model, Italian regions, 2010-19, Y

Dependent variable: *Y*				
	only CEM		only CAV	
CEM	1090***	(327)	-	
CAV	-		1318*	(694)
Y(-1)	0.51***	(0.05)	0.51***	(0.05)
R^2	0.97		0.97	

Robust standard errors in brackets. *** p < 0.01; ** p < 0.05; * p < 0.10

Robustness analysis

The main goal of this section lies in a systematic analysis aiming at assessing the results of section 5. First of all, Table 8A reports the linear fixed effects panel model estimates where CAV substitutes CEM. As we argued in section 5, for all regions as well as for the top CAV ones, there seems to be no significant association between Y and CAV, while such an association persists between Y and both GDP and Y(-1).

Table 8A. Linear fixed effects panel model, Italian regions, 2010-19

Dependent variable: *Y*				
	all regions		10 regions high CAV	
AR	95	(62)	54	(117)
CAV	564	(421)	531	(389)
EDU	-30	(56)	63	(92)
ER	-14	(60)	24	(110)
GDP	142***	(21)	146***	(27)
Y(-1)	0.63***	(0.05)	0.69***	(0.07)
R^2	0.98		0.95	
F statistic common intercept	$F_{\nu=19,58.8}=1.81$	p=0.04	$F_{\nu=9,32.2}=1.42$	p=0.22
Hausman test	$\chi^2_{\nu=5}=51.18$	p=0.00	$\chi^2_{\nu=5}=21.09$	p=0.00

Robust standard errors in brackets. *** p < 0.01; ** p < 0.05; * p < 0.10

Second, we present in Table 9 the linear fixed effects panel model estimates for CEM (Table 9A(a)) and then for CAV (Table 9A(b)), where time dummies substitute GDP. The underlined conjecture is that the more general specification based on time

dummies might sharpen the results. As already stressed in section 5, the results in Table 9A do not seem to support this conjecture.

Table 9A. Linear fixed effects panel model, time dummies, Italian regions, 2010-19

(a) With CEM – cooperative employment

	Coefficient	*Std. Error*	*t ratio*	*p-value*	
Const	162,26	6223,30	0,03	0,9795	
CEM	551,60	230,58	2,39	0,0272	**
AR	170,74	99,82	1,71	0,1035	
EDU	7,74	74,31	0,10	0,9182	
ER	−52,68	118,86	−0,44	0,6626	
Y(-1)	0,46	0,08	5,43	<0,0001	***
dt_2	415,70	636,10	0,65	0,5213	
dt_3	−654,04	441,99	−1,48	0,1553	
dt_4	−248,54	432,11	−0,58	0,5719	
dt_5	−211,24	390,62	−0,54	0,5950	
dt_6	−66,34	270,34	−0,25	0,8088	
dt_7	116,74	181,08	0,65	0,5269	
dt_8	40,88	168,41	0,24	0,8108	
dt_9	13,81	72,33	0,19	0,8506	

(b) With CAV – cooperative added value

	Coefficient	*Std. Error*	*t ratio*	*p-value*	
const	3366,59	6118,97	0,55	0,5886	
CAV	772,57	395,82	1,95	0,0659	*
AR	140,00	90,94	1,54	0,1402	
EDU	23,21	76,08	0,31	0,7636	
ER	−92,17	128,37	−0,73	0,4815	
Y(-1)	0,46	0,08	5,78	<0,0001	***
dt_2	59,84	661,68	0,09	0,9289	
dt_3	−923,60	482,02	−1,92	0,0705	*
dt_4	−537,06	460,68	−1,17	0,2581	
dt_5	−452,96	401,70	−1,13	0,2735	
dt_6	−241,55	300,98	−0,80	0,4322	
dt_7	−2,26	196,62	−0,01	0,9909	
dt_8	−35,80	179,98	−0,20	0,8444	
dt_9	−22,89	72,58	−0,32	0,7560	

Furthermore, we wish to compare our specification with the two main alternative routes explored in this literature, i.e., the Pooled OLS and the First Differences. Our results are confirmed regarding the relevance of the lagged dependent variable as well as the GDP. As for the role of the cooperative variable, instead, the results are less stable and only partly support our findings.

Finally, the power of the cooperative employment emerges also within an alternative specification of equation (1) according to which the dependent variable Y_{it} is replaced by the difference Y_{it} - Y_{i2010}:

$$Y_{i\,t} - Y_{i2010} = \alpha + X_{it}^{'}\,\delta + Z_{t}^{'}\,\lambda + \gamma_i + \varepsilon_{it}$$

where *X* and *Z* are the same as in equation (1). Replicating the fixed effects panel regression as above, in addition to the presence of relevant fixed effects, we still detect a significant relationship only with *GDP* and *CEM*.

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