

*Cooperative firms and the crisis: evidence
from some Italian mixed oligopolies*[♦]

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Abstract

We investigate how cooperative firms reacted to the current crisis. This allows us to compare the behavior of cooperative and conventional firms facing exogenous shifts in demand. After a short survey of a stream of theoretical literature, we analyze a large group of Italian production cooperatives in the periods 2003-2010 and 1994-2011 and we contrast co-ops behavior with the overall trend in the industries in which they operate. Our sample's evidence suggests that the cooperative's behavior has a stabilizing effect on employment with respect to shocks in output demand. Unlike profit-maximizers, cooperative firms seem to be adjusting pay more than employment when facing shocks. Production co-ops look better equipped than their profit-maximizing counterparts in tackling the long recession also because they have been very cautious in their profit policies over time. Unlike conventional firms, they have significantly increased their own equity during "good" years instead of distributing large dividends to their members.

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1. Introduction

One of the worse economic crises of all times has still to end. Since the dramatic fall in 2009, several economies are far from making up for the reduction in GDP and subsequent recession. Employment is suffering from the poor macroeconomic performance associated with the meager trend in aggregate demand. The unfolding of the deepest economic slump since the Great Depression raises many questions about factors acting countercyclically, especially as far as employment is concerned. Among these factors, one may reasonably include the characteristics of the employers. For instance, it is worth testing how firms of different ilk react to downturns like the ones still hitting many economies during this lasting recession.

Among firms that are supposed to care about goals other than profits, we shall consider the cooperative firms (sometimes defined as labor-managed or workers' firms). Their presence is important in many countries and their performance is still under scrutiny by many scholars and practitioners.¹ In many European countries we are actually observing a resurgence of interest in cooperative firms because they seem to perform better than conventional firms in responding to the long slump.

For example, in France the creation of new co-ops in the building industry achieved a faster pace in the last years. The top 100 French co-ops increased their sales by 4% and the number of employees from 674,000 to 750,000 (+ 11.2%).²

In Spain, one of the countries more deeply hit by the crisis, in the period 2008-2012, employment fell by 9.6% “only” in the co-ops, while the reduction was more than double in the rest of the economy (- 19.5%). Moreover, in the last five years Spanish cooperatives experienced a twenty percent increase in the number of their members.³

¹ See Perotin (2012) and Zamagni and Zamagni (2010) for recent overviews.

² <http://economiesocialequebec.ca/?module=document&uid=1623>
<http://www.lefigaro.fr/social/2012/01/12/09010-20120112ARTFIG00506-les-cooperatives-ont-resiste-a-la-crise.php>

³ <http://blogs.elpais.com/la-larga-marcha-de-la-ue/2012/06/las-cooperativas-resisten-mejor-la-crisis.html>

According to Cecop, the largest European association of national co-ops associations, the above trends seem to be observed also in other European countries, confirming that co-ops are affording the crisis better than conventional firms, especially as far as employment is concerned. Furthermore, no CECOP affiliated co-op has stopped its activity in the last years.⁴

In this paper we would like to detect and explain the reaction of co-ops' employment to positive and negative shocks in aggregate demand.

To start with, we notice that cooperative firms operate and cohabit with conventional firms in many markets. Hence, in the next section we briefly survey the theoretical insights of the literature on mixed oligopolies, i.e. industries in which pure⁵ cooperative firms (assumed to maximize net surplus per worker/member) and profit-making firms coexist and compete. The choice of focusing on this literature is dictated by the straightforward evidence that mixed markets are what we observe in the real world.

Given the ambiguity of testable predictions stemming from theory, in section 3 we switch to actual markets. Specifically, we investigate the trend of a large sample of Italian production cooperatives in the periods 2003-2010 and 1994-2011. The choice of this sample is not only motivated by the better quality of the available data with respect to other countries, but also by the fact that Italy accounts for the largest number of cooperative firms in Europe.⁶ We examine the time series of sales and

<http://www.economista.es/espana/noticias/4028943/06/12/Los-socios-de-las-cooperativas-crecen-un-20-impulsados-por-la-crisis.html>

⁴ http://www.cecop.coop/public_docs/RaportCriseEN.pdf

⁵ By pure cooperative firm we mean what Sertel (1982) called *workers' enterprise*; that is one in which "its members are all workers and its workers are all members of the firm".

⁶ According to Cecop statistics, Italy leads the ranking with more than 40,000 co-ops followed by Spain (about 24,000) and France (about 21,000).

employment of a group of almost pure⁷ workers' enterprises and we contrast them with the overall trend in the industries where they operate.

Our empirical evidence allows us to argue that, facing exogenous shocks in aggregate demand, the cooperatives' behavior has a stabilizing effect on employment. Unlike conventional firms, workers' firms seem to be adjusting pay (at least to members) more than employment when facing exogenous shocks. This has a stabilizing effect on employment. These conclusions are consistent with similar findings emerging from recent applied research in this field.

Moreover, there is another reason why production co-ops seem better equipped in tackling the long recession than their profit-maximizing counterparts: co-ops have been very cautious in their profit policies over time. As we show in section 4 with the help of an 18-years long time series of a large sample of Italian co-ops, they have significantly increased their own equity during "good" years instead of distributing large dividends to their members. In the current "bad" years, such an attitude allows co-ops to protect workers and especially members more effectively than firms used to distribute substantial dividends to their stock-holders. Section 5 summarizes our main conclusions, some limitations of our empirical investigation and directions for further research.

2. Workers' Firms and Mixed Oligopolies

Since Ward (1958) seminal paper, most of the theoretical literature on cooperative firms has modeled them as agents maximizing surplus per worker/member.⁸ As we know, if the firm does not affect the wage rate, this amounts to maximize the profit per worker. If the working time per worker is fixed, under

⁷ The co-ops of our sample are almost pure as their average membership ratio (members/workers) is high but less than one.

⁸ To be more precise, the short run objective function of such firms is taken as revenue, net of fixed costs, per worker. Workers coincide with members of the co-op, which is the case Sertel (1982) defines as "workers' enterprise".

perfect competition, Ward proved that the co-op's supply function is decreasing in output price.

Such celebrated result is well-known as the “perverse effect” of the cooperative firm. A similar result has been proved also under *monopoly* by Gal-Or *et al.* (1980) and Ireland and Law (1982).⁹ We may summarize this stream of literature by saying that the cooperative behavior (i.e., maximization of profit per worker) in “extreme” market structures (perfect competition and monopoly) yields perverse effects.¹⁰

The empirical evidence supporting such perverse effects is basically negligible. However, workers' firms do not operate in perfectly competitive markets nor in monopolies but in oligopolistic mixed industries. Hence, if one aims at testing theoretical results in the currently *observable* industries, then one needs modeling *oligopolistic* markets in which cooperative producers interact with profit-maximizing firms. Therefore, models of mixed oligopoly are the appropriate frames to work with and to use for producing testable predictions.

A mixed oligopoly is a market where a homogeneous or differentiated good is supplied by a “small” number of firms and the objective function of at least one of them differs from that of the other firms.¹¹ To the best of our knowledge, the first model investigating the strategic interaction between a Profit-Maximizing Firm (PMF) and a Workers Firm (WF) has been proposed by Miyamoto (1982). He models a homogeneous duopoly where a PMF plays a Cournot game with a WF maximizing net income per worker. Miyamoto also provides a taxonomy of the comparative statics properties of the Cournot equilibrium of such mixed oligopoly.

⁹ See Bonin and Putterman (1987).

¹⁰ Hill and Waterson (1983) are probably the first to study an *oligopolistic* industry formed by workers firms only. However, they do not perform comparative statics exercises to find out the presence of perverse effects.

¹¹ See De Fraja and Delbono (1990) also for a survey of the early literature on concentrated markets in which profit-maximizing firms coexist with *welfare*-maximizing enterprises.

Especially in the early '90s, several papers have dealt with mixed oligopolies: for instance, Mai and Hwang (1989), Horowitz (1991), Cremer and Cremer (1992), Delbono and Rossini (1992), Okuguchi (1993). It may be easily checked that in these last papers the comparative statics properties of the Cournot equilibrium all fit quite squarely Miyamoto's taxonomy.

Among such properties, we are interested in stressing that in a mixed homogeneous oligopoly operating according to Cournot rules, perverse effects may or may not feature the WF equilibrium behavior, depending on the features of the short-run production function vis-à-vis the demand function.

The vast majority of the literature has focused on Cournot competition in homogenous markets and obtained ambiguous conclusions. Ambiguous results emerge also in mixed duopolies in which firms supply differentiated products and compete in *prices*. No general conclusion, indeed, is achieved about the perverse behavior of WF in response to exogenous shocks.¹²

In summary, perverse links between demand price shocks and supply (and hence employment) may or may not feature oligopolistic equilibria in mixed markets both under Cournot and Bertrand rules.

As we are interested in co-ops reactions to demand shocks, the relevant theoretical literature is then of little help. Hence, having reached such an uncomfortable conclusion, we shall switch to data by exploring *real* mixed oligopolies.

Our empirical analysis will show two results. First: co-ops act countercyclically as for their employment decisions. Second: co-ops succeed in smoothing employment also thanks to their equity policy.

¹² We have performed numerical simulations (available upon request) using a model of mixed duopoly with horizontal product differentiation and price competition under the assumptions of quadratic utility function and that the production function is increasing and concave. Numerical examples allow showing that perverse effects can take place for some ranges of the parameters. Hence, again, it may or may not occur that the WF adjusts its output counter-cyclically in response to demand shocks.

The first result has already been tested and confirmed in a group of empirical papers. By comparing the reactions to output demand shocks among PMFs and WFs, these studies conclude that there is *no* perverse supply effect in the behavior of WFs. This conclusion is shared by: Burdin and Dean (2009, 2010) looking at the Uruguay's economy; Craig and Pencavel (1992, 1995) as for the plywood industry of the US Pacific Northwest; Pencavel *et al.* (2006) as for the Italian economy in the period 1982-94. Moreover, these papers all show that facing demand shocks, conventional firms tend to adjust their employment levels, whereas co-ops tend to adjust pay (at least to members) so that in the latter ones the employment levels turn out to more stable than in the former ones.

As for our second result, there is a tiny related empirical literature. Zevi (2005) offers an excellent treatment of the topic, with special reference to the Italian legal and institutional framework, without going into an explicit empirical analysis. Navarra (2009) is the paper mostly related to our as for the high rate of profit plough-back in production co-ops. She shows evidence (from 6 years of balance sheets of 60 production co-ops operating in an Italian province) supporting the intuition that accumulating collectively-owned capital is a form of collective insurance.

As far as we know, our paper is the first one attempting to detect co-ops reactions to the current crisis and show the long-run relationship between their employment and equity strategies.

3. Evidence from a group of Italian production co-ops

First of all, we frame our sample within a stylized picture of the overall Italian cooperative economy. The alliance signed in 2011 among the three bigger Italian co-ops associations includes 43,000 firms with 12 million members¹³ and 1.1 million

¹³ Remember that consumers' co-ops are by far the ones with more members: for instance, consumers' and housing co-ops together account for almost 90% of all Legacoop co-ops' members (8.8 million in 2010).

workers. The total value of their sales in 2010 is about 127 billion (7.5% of Italian GDP).

We focus on *production cooperatives*. According to Zanotti (2012), their official number in 2008 is 31,378, i.e., 39.5% of overall Italian registered co-ops. The biggest Italian association of production co-ops is ANCPL (Associazione Nazionale Cooperative di Produzione e Lavoro), a branch of Legacoop. According to its last Social Report, in 2010 ANCPL is joined by almost 900 firms and 5 consortia. 24,000 workers – out of 36,000 – are also members of their own co-ops. This means that the membership ratio (members/workers) is about 68%, whereas it is much higher for the smaller production co-ops joining Confcooperative, the other major Italian association. In 2008, the average membership ratio for *all* Italian co-ops is almost 75%.

Our sample is formed by cooperatives joining ANCPL; hence, it is made of almost 3% of all Italian production co-ops (registered at 2008) and it accounts for slightly more than 2% of all Italian co-ops (associated at 2011). Our sample includes some of the biggest Italian co-ops in terms of volume of business. For instance, the 10 biggest constructions co-ops joining ANCPL are ranked in the top 30 enterprises of the Italian constructions industry and belong to the top 50 Italian companies.¹⁴

Moreover, as for the statistical significance of our sample, notice that it includes co-ops employing, in 2006, very significant shares of the overall employment in Italian production cooperatives altogether: 23% in the constructions industry and 45% in the manufacturing industry.¹⁵

Firstly, we report data on sales and employment of ANCPL co-ops for the period 2003-2010. These figures are split into two sub-periods (2003-08 and 2008-10, i.e. before and after the crisis) and into three main clusters depending on the

¹⁴ Centro Studi Legacoop (2009).

¹⁵ Zanotti (2012), Table 12.

operating sector: *constructions* (315 firms and 5 consortia); *manufacturing* (460 firms); *design, engineering and consulting* (118 firms).¹⁶

We concentrate on real sales as an indicator of demand and we compare sales and employment (measured as the number of workers) to detect the presence of countercyclical trends in co-ops' behavior.

[TABLE 1 HERE]

For all the time series, we now compute both the overall and the average yearly percentage changes in sales and in employment in the pre-crisis period 2003-2008 and in the post-crisis period 2008-2010.

[TABLE 2 HERE]

It is quite apparent from Table 2 that employment does not fluctuate as much as sales. For instance, it turns out that in 2009, facing a dramatic fall in sales with respect to the previous year (- 13.28%), the overall number of workers of the co-ops in our sample slightly increases.

3.1 The pre-crisis period (2003-08)

This period has been featured by a significant growth in all sectors of our sample. However, the overall increase of 15.32% in sales (equivalent to almost 3% average yearly increase) is matched with a substantial stability of employment (+0.96%). There is an especially strong countercyclical movement of employment in the constructions industry, where an increase of almost 25% in sales is matched with a 6.8% reduction in the number of workers. In the Dec and in the manufacturing

¹⁶ The sizes of the three industries refer to 2010.

industries, sales and employment both increase throughout the period, but in the vast majority of the period employment grows much less than sales.

We may claim that at the *overall* sample level, co-ops' reaction to a positive trend in demand (and output) does not entail any significant change in the number of their workers.

3.1.2 Large firms

If we restrict our attention to medium and large co-ops (value of sales ≥ 10 million euro) joining Legacoop, we see that in the period 2004-2007, the trend in employment is again fairly countercyclical. In the *manufacturing* industry (30 co-ops), nominal sales go up by almost 16% and employment by just 2% (members increase by 1%). In the *constructions* sector (66 co-ops), employment is stable (but members increase by more than 8%) despite a 20% increase in nominal sales.¹⁷

3.2 The crisis period (2008-2010)

If we now look at the second column of Table 2 we realize that a significant countercyclical behavior occurred also during a period of falling output demand and sales.

In the constructions and manufacturing sectors employment falls to a much lower extent than sales. In the Dec sector, employment even increases despite an almost 10% reduction in sales.

In the overall sample, the picture is similar in the two sub-periods that we have considered. Between 2003 and 2008, employment was substantially stable despite a 15% *increase* in sales; between 2008 and 2010 employment is still substantially stable despite a 16% *reduction* in sales.

¹⁷ Centro Studi Legacoop (2009).

3.3 *The constructions industry*

We now focus on the constructions industry and we use non co-ops as a control sample. The constructions sector is the one in which co-ops are most significant in terms of sales: during the period 2003-2010, the average value of co-ops sales represented the 3.6% of the total industry sales.

Table 3 collects real sales and employment for co-ops and non co-ops.

[TABLE 3 HERE]

If we look at the period of growing industry sales (2003-07) we see the striking difference between co-ops and the other firms. While non co-ops display a neat cyclical trend as employment grows at 12% rate while real sales are growing at 13%, co-ops react to a 19.3% increase in real sales with almost 8% reduction in employment.

In the constructions industry, the trend in labor productivity does not explain the trend in co-ops employment. According to ISTAT official statistics,¹⁸ indeed, the labor productivity in the constructions sector declined by almost 2% in the period 2002-2009. Hence, it has been internal re-organization and greater co-ops workers' productivity (and pay¹⁹) the likely factors explaining how such firms succeeded in expanding so much their output with a decreasing level of employment in the period 2003-07.

On the other hand, in the 2008-10 period, the difference in co-ops vis à vis conventional firms' behavior is negligible. Facing a 17.5% decline in sales, co-ops

¹⁸ ISTAT (various years).

¹⁹ "In periods of slack demand, workers' cooperatives may pay their members only a basic wage comparable to what it is paid in traditional firms. But in more prosperous periods, they often raise compensation with an additional variable, wage, paid as bonus, dividend or profit-sharing.", Logue and Yates (2005), pp. 3-4.

reduced employment by 3%; similarly, conventional firms reduce their employment of 2% in face of a 14% fall in sales.^{20 21}

4. What did co-ops actually do before, during and after the crisis?

Let us start with a few facts occurred during and after the explosion of the crisis. In the period 2008-2010, while the real Italian GDP fell by about 7%, the net growth rate of the number of co-ops remains significantly positive. This happens also thanks to the creation of new cooperative firms through workers' buyouts of conventional firms in turmoil (50 new production co-ops in the period).²² The number of bankruptcies among co-ops is significantly lower than the average (Zanotti 2012) also because of the *mutuality* operating among co-ops; co-ops joining the same association often help one another when needed. Such help takes sometimes the strong form of merging. In 2009, we witness 30 mergers among production co-ops (only 47 in the all period 2005-2008), mainly because "strong" co-ops have

²⁰ On the other hand in the manufacturing industry, in the period 2007-2010, co-ops behave much better as compared to the industry trend. While the fall in the number of their workers amounts to 1.8%, the overall decline of employment in the industry is 8.3%, corresponding to 419,000 workers in the period. It is worth remembering that workers operating in ANCPL co-ops account for less than 0.5% of total employment in this sector.

²¹ As a further check, we report figures from the production co-ops associated with *Confcooperative* (the second largest co-ops' association). According to a speech of The President (Reporter.it, 27/4/2012), in 2011 the co-ops were employing 11,700 workers (11,300 of them were also members). They had a stable value of nominal sales (1.3 billion) in the period 2008-11. More importantly, they apparently experienced an increase both in members (+ 4.6%) and in workers (+ 7.7%) in the same period. Hence, also these figures seem to confirm the pattern already observed within the ANCPL sample.

²² This phenomenon does not seem to apply only to Italy: for instance, as documented by the Financial Times (August 28, 2012, page 12), in the area of Richmond, USA, we witness a revival of co-ops creation. This is promoted by local authorities as part of a policy designed to contrast raising unemployment as a consequence of the crisis.

incorporated other co-ops in downturns. The success of these arrangements owes very much to the active role of the main co-ops' associations.

In 2009, more than 14% of new employees are hired by cooperative enterprises, which are altogether responsible of only 6.2% of the overall Italian employment in that year.

We noticed that in the period 2008-2010, facing a serious fall in sales (16.23%), the co-ops of our sample respond by reducing by less than 1% their employment without altering the number of members.²³ This means that cooperatives have managed the fall in demand by a small contraction in the number of non-member workers, probably by means of the interruption (no renewal) of short-term labor contracts and the block of turnover.

However, if we aim at explaining why co-ops seem surviving the crisis better than conventional firms, it is also worth understanding their decisions about profits and equity over time.

Table 4²⁴ describes the trend of (nominal values of) sales, profits and equity (= capital + indivisible reserves + operating profit) in the period 1994-2011.

[TABLE 4 HERE]

Equity has been growing over time (at an average yearly rate of about 7.89%)²⁵ because of the practices undertaken by the co-ops: capital has been periodically revalued according to fair accounting rules; the share of profits distributed via rebate

²³ Centro Studi Legacoop (2011).

²⁴ 2004 is the first year in which figures of the Consorzio Cooperative di Costruzione (about 900 million euro sales) are recorded in this time series. Notice that the time series for sales in Table 4 is different from the one reported in Table 1: although the sources overlap, the data have been collected with different criteria. Table 1 is based on annual social reports of ANCPL whereas Table 4 is based on balance sheets elaborated by ANCPL and Centro Ricerche economiche e Monitoraggio d'impresa (CRM).

²⁵ In the same period, nominal sales and profits have evolved at an average yearly rate of +8.27% and -0.21%, respectively.

to members has been modest and often converted into an increase of the value of their shares; reserves have been augmented by the non distributed profits.

Thanks to this forward-looking strategy, co-ops are facing the crisis with a robust financial endowment. Non distributed profits created a sort of (partly intergenerational) insurance against recessions and this turns out to be beneficial first to members (giving up part of the pay in favor of workplace stability), but to a lower extent to non member workers too. Decisions about the financial structure of the firm seem to have acquired an insurance function, as a buffer against unpredicted negative contingencies.²⁶

Unsurprisingly, equity is fairly stable in the last three years of the time series, meaning that in face of the crisis and the fall in demand, co-ops have been using their financial endowment to protect employment. Such a concern for job security may explain why not only Italian, but also French and Mondragon co-ops have reinvested higher shares of their profits than they were legally required. The intuition may be further enhanced by the plot of the three series in Figure 1.²⁷

[FIGURE 1 HERE]

The said cooperative practice is greatly different from the one prevailing in conventional firms. Let us compare the rate of profit plough-back in largest co-ops and largest non-co-ops. In 2007 (but other years display similar patterns), almost all profits (92%) reaped by all biggest (with value of sales greater than 10 million euro) Legacoop co-ops have been devoted to strengthen reserves or increase capital. Less than 5% of profits are distributed in various forms to members. Quite differently, in

²⁶ We owe this interpretation to an anonymous referee.

²⁷ As a further check of our results, to control for the growing trend of the three variables, we estimated the linear regression of Sales, Equity and Profits with respect to time and we calculated the residuals of the three regressions. The values of the standard deviation of the residuals are 706,748 for Sales, 130,636 for Equity and 67,630 for Profits. This is confirming that facing large fluctuations in sales, co-ops react by strengthening their financial position through the equity policy described above.

the same year, according to the yearly Mediobanca report on the largest Italian companies, more than two thirds of profits have been distributed as dividends.²⁸

5. Concluding remarks

In this paper we have suggested that the appropriate theoretical frame to examine cooperative firms is provided by models of mixed oligopoly. This is because co-ops actually operate in markets where they compete with profit-oriented rivals. An exploration of such literature indicates that perverse effects - like those emerging under perfect competition or monopoly - need not to feature the equilibrium of oligopolistic mixed markets. This theory is then of little help in shading light on the main question we address in the paper, that is, how cooperatives react to demand shocks. In fact, theoretical models of mixed oligopoly yield ambiguous results as for the relationship between demand shocks, on the one hand, and output/employment reactions on the other. To answer our basic question, we then focus on data, by examining trends observed in some Italian oligopolistic markets.

We have collected statistical evidence from a large sample of Italian production cooperatives operating in mixed oligopolies. Using our dataset, we have been able to confirm the conclusions of previous empirical research, according to which co-ops seem to be more concerned with employment than conventional firms.²⁹ This ultimately results in a relative stabilization of co-ops' employment when facing shocks in output demand and this behavior yields a revenue-smoothing effect on workers and especially on members. Moreover, we have shown that the protection of employment in downturns is made possible also thanks to the prolonged plough-back of very large fractions of co-ops profits.

²⁸ Centro Studi Legacoop (2009). This comparison shows a difference between the strategies of two groups of firms that can be biased by the large gap in the size of the groups. We owe this remark to an anonymous referee.

²⁹ For instance, see Perotin (2012) for an excellent survey.

A promising extension of our research might entail gathering data for other European countries to ascertain the presence of trends similar to the one that we highlighted for a group of Italian co-ops.

Finally, given the slow timing of procurement procedures – especially in the constructions industry – it may well be that the full consequences of the recession on employment are lagged and may become fully manifest only since 2011. Hence, a longer post-crisis explosion period should be considered in future research to refine the assessment of the reaction of different firms to external shocks.

References

Associazione Nazionale Costruttori Edili (2011), Osservatorio congiunturale sull'industria delle costruzioni, Rome.

Associazione Nazionale Cooperative di Produzione e Lavoro (various years), *Rapporto Sociale*, Legacoop, Rome.

Bonin, J., Putterman, L. (1987), *Economics of cooperatives and the labor-managed economy*, Harwood, New York.

Burdin, G., Dean, A. (2009), “New evidence on wages and employment in worker cooperatives compared with capitalist firms”, *Journal of Comparative Economics*, 37, 517-33.

Burdin, G., Dean, A. (2010), “Revisiting the objectives of worker cooperatives: An empirical assessment”, mimeo.

Centro Studi Legacoop (2009), *Aspetti quantitativi e qualitativi della cooperazione italiana*, Rome.

Centro Studi Legacoop (2011), *Legacoop in cifre*, Rome.

Craig, B., Pencavel, J. (1992), “The behavior of worker cooperatives: the plywood companies of the Pacific Northwest”, *American Economic Review*, 82, 1083-105.

- Craig, B., Pencavel, J. (1993), "The Objectives of Worker Cooperatives", *Journal of Comparative Economics*, 17, 288-308.
- Craig, B., Pencavel, J. (1995), "Participation and productivity: A comparison of worker cooperatives and conventional firms in the plywood industry", *Brookings Papers on Economic Activity*, 26, 121-74.
- Cremer, H., Cremer, H. (1992), "Duopoly with Employee-Controlled and Profit-Maximizing Firms: Bertrand vs Cournot Competition", *Journal of Comparative Economics*, 16, 241-58.
- De Fraja, G., Delbono, F. (1990), "Game Theoretic Models of Mixed Oligopoly", *Journal of Economic Surveys*, 4, 1-17.
- Delbono, F., Rossini, G. (1992), "Competition Policy vs Horizontal Merger with Public, Entrepreneurial and Labor-Managed Firms", *Journal of Comparative Economics*, 16, 226-40.
- Gal-Or, E., Landsberger, M., Subotnik, A. (1980), "Allocative and Distributional Effects of a Monopolistic Cooperative Firm in a Capitalist Economy", *Journal of Comparative Economics*, 4, 158-72.
- Hill, M., Waterson, M. (1983), "Labor-Managed Cournot Oligopoly and Industry Output", *Journal of Comparative Economics*, 7, 43-51.
- Horowitz, I. (1991), "On the Effects of Cournot Rivalry between Entrepreneurial and Cooperative Firms", *Journal of Comparative Economics*, 15, 115-21.
- Ireland, N., Law, P. (1982), *The Economics of Labor-Managed Enterprises*, St. Martin's, New York.
- ISTAT (various years), "Struttura e competitività del sistema delle imprese industriali", Rome.
- Logue, J., Yates, J. (2005), "Productivity in cooperatives and worker-owned enterprises: ownership and participation make a difference!", paper prepared for the International Labour Office.
- Mai, C., Hwang, H. (1989), "Export Subsidies and Oligopolistic Rivalry between Labor-Managed and Capitalist Economies", *Journal of Comparative Economics*, 13, 473-80.

Myiamoto, Y. (1982), "A Labour-Managed Firm's Reaction Function Reconsidered", Research Paper 218, Dept. of Economics, University of Warwick.

Navarra, C. (2009), "Collective accumulation of capital in Italian worker cooperatives between employment insurance and 'we-rationality': an empirical investigation", Euricse working paper.

Okuguchi, K. (1993), "Cournot Oligopoly with Profit-Maximizing and Labor-Managed Firms", *Keio Economic Studies*, 30, 27-38.

Pencavel, J., Pistaferri, L., Schivardi, F. (2006), "Wages, employment and capital in capitalist and worker-owned firms", *Industrial and Labor Relations Review*, 60, 23-44.

Perotin, V. (2012), "The Performance of Workers Cooperatives", in Battilani, P., Schroter, H. (eds), *The Cooperative Business Movement, 1950 to the Present*, Cambridge University Press.

Sertel, M. (1982), *Workers and Incentives*, North-Holland, Amsterdam.

Ward, B. (1958), "The firm in Illyria: market syndicalism", *American Economic Review*, 48, 566-89.

Zamagni, S., Zamagni, V. (2010), *Cooperative Enterprise*, E. Elgar.

Zanotti, A. (2012), "The strength of an intersectorial network", in Zevi, A. *et al.* (eds), *Beyond the Crisis: Cooperatives, Work, Finance*, Cecop, Brussels.

Zevi, A. (2005), "Il finanziamento delle cooperative", in Mazzoli, E. and Zamagni, S. (eds), *Verso una nuova storia della cooperazione*, Il Mulino, Bologna.

Appendix: Tables and Figures

Table 1. Sales and Employment trends in ANCPL co-ops

Year	Tot		Con		Man		Dec	
	Sales	Employment	Sales	Employment	Sales	Employment	Sales	Employment
2003	7461	36550	4175	17000	3212	18800	74	750
2004	7895	34560	4440	15000	3378	18800	77	760
2005	8319	34980	4735	15200	3504	19000	80	780
2006	8556	35300	4842	15400	3631	19100	83	800
2007	8300	36664	4982	15660	3185	20040	133	964
2008	8604	36900	5218	15830	3253	20080	133	964
2009	7461	37014	4599	15950	2731	20060	131	990
2010	7207	36640	4304	15408	2783	19660	120	996

Source: ANCPL (various years). Tot: Total; Con: constructions; Man: manufacturing; Dec: design, engineering, consulting. Sales in million euro at 2002 prices.

Table 2. Overall and average yearly percentage changes over different periods: Sales and Employment

	Overall change		Average yearly changes	
	2003/2008	2008/2010	2003/2008	2008/2010
Sales (<i>Tot</i>)	15.32%	-16.23%	2.94%	-8.34%
Employment (<i>Tot</i>)	0.96%	-0.70%	0.24%	-0.35%
Sales (<i>Con</i>)	24.98%	-17.52%	4.58%	-9.14%
Employment (<i>Con</i>)	-6.80%	-2.67%	-1.27%	-1.32%
Sales (<i>Man</i>)	1.28%	-14.45%	0.47%	-7.07%
Employment (<i>Man</i>)	6.81%	-2.09%	1.34%	-1.05%
Sales (<i>Dec</i>)	79.73%	-9.77%	14.39%	-4.95%
Employment (<i>Dec</i>)	28.53%	3.32%	5.41%	1.65%

Source: ANCPL (various years).

Table 3. Co-ops and non co-ops in the constructions sector

Year	Co-ops				Non co-ops			
	Sales	Employment	% Sales	% Employment	Sales	Employment	% Sales	% Employment
2003	4175	17000			122596	1729158		
2004	4440	15000	6.35	-11.76	128025	1817684	4.43	5.12
2005	4735	15200	6.64	1.33	132250	1897348	3.30	4.38
2006	4842	15400	2.26	1.32	135874	1884871	2.74	-0.66
2007	4982	15660	2.89	1.69	138441	1939527	1.89	2.90
2008	5218	15830	4.74	1.09	136668	1953672	-1.28	0.73
2009	4599	15950	-11.86	0.76	125325	1927846	-8.30	-1.32
2010	4304	15408	-6.41	-3.40	117411	1914186	-6.31	-0.71

Source: ANCPL (various years), ANCE (2012), ISTAT (various years). Sales are in million euro at 2002 prices.

Table 4. Sales, profits and equity of ANCPL co-ops

Year	Sales	Profits	Equity
1994	3,035	93	1,363
1995	3,716	116	1,653
1996	3,897	76	1,589
1997	3,645	102	1,668
1998	4,624	116	2,076
1999	5,095	168	2,269
2000	5,753	190	2,511
2001	6,266	308	2,808
2002	6,665	125	3,005
2003	7,036	153	3,152
2004	9,300	208	3,395
2005	9,824	272	3,695
2006	9,976	267	3,959
2007	10,849	288	4,284
2008	11,750	229	4,669
2009	10,363	148	4,784
2010	10,675	88	4,759
2011	10,769	-1	4,792

Source: CRM with ANCPL Legacoop. Nominal values, million euro.

Figure 1. Sales, equity (left axis) and profits (right axis) of the ANCPL co-ops

