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Workers' Buyouts and Post-Transition Adjustment: Evidence from Italian Cooperatives

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Abstract

This study examines how workers' buyouts (WBOs) adjust during the first five fiscal years after ownership transition. We link 55 WBOs identified by Cooperazione Finanza Impresa to company accounts for 2015–2024 and compare them with non-WBO cooperatives using an observational matched event-time panel. The estimates describe conditional post-transition differences and do not identify a causal effect of employee ownership. WBOs show lower operating profitability in the early years, followed by relative improvement whose statistical strength varies across specifications and comparison designs. Initial sales and employment growth differences cluster around the restart, with employment results sensitive to the first-year accounting window. Debt relative to earnings before interest, taxes, depreciation and amortisation (EBITDA) is higher in some intermediate years, while WBOs consistently hold inventories longer. Post-buyout recovery is sequential and uneven: renewed activity may precede profitability recovery, while improved operating returns may coexist with persistent working-capital needs.

Keywords: Workers' buyouts; employee ownership; business recovery; cooperative enterprises; employment growth; working capital; inventory management; leverage; post-transition adjustment

1. Introduction

Workers' buyouts (WBOs) are a specific form of business transfer in which employees collectively acquire and reorganise an existing enterprise,

usually through a worker cooperative, when conventional ownership is unable or unwilling to continue. In this paper, WBOs are distinguished from employee stock-ownership plans or minority employee shareholdings, worker cooperatives founded de novo and management buyouts. Their defining feature is not employee ownership alone, but a change in control over an existing business and the assumption of entrepreneurial responsibility under inherited operating conditions.

This distinction makes WBOs relevant to entrepreneurship and small-business research. Employees inherit productive assets, firm-specific knowledge and commercial relationships, but may also inherit weak demand, liabilities and damaged stakeholder confidence. A WBO is therefore entrepreneurial continuity under constraint rather than ordinary new-firm entry. It may preserve jobs and productive capabilities when closure or conventional sale would threaten them (Pérotin, 2013, 2018; Vieta, Depedri and Carrano, 2017), but continuation is not financial recovery. Profitability, employment, sales, leverage and working capital may adjust at different speeds.

Italy offers an analytically useful setting in which to study this distinction. The Marcora framework and the associated cooperative-development and financial infrastructure make employee takeovers an institutionally recognised route to business continuity (Vieta, Depedri and Carrano, 2017; Bernardi et al., 2022; Lomuscio, Tortia and Cori, 2023). This support can reduce barriers to conversion, but it does not guarantee demand, adequate margins or sufficient liquidity. It may also affect which firms reach the post-buyout stage, since successful conversion requires worker mobilisation, advice, finance and a viable market. The Italian case therefore helps separate institutional enablement from the subsequent operating and financial adjustment of the reorganised firm.

The WBO literature says more about emergence, institutional support and survival than about performance after constitution. Italian studies describe the legal and cooperative setting and survival-related patterns, while broader employee-ownership evidence shows that outcomes depend on governance, participation and entry conditions, not ownership alone (Basterretxea and Storey, 2018; Mirabel, 2021). Recent evidence on active Italian WBOs is cross-sectional (Pippo, Pazzi and Lomuscio, 2026), and a structured review identifies post-constitution development as under-investigated (Di Stefano, Fratocchi and Picciotti, 2024). This paper addresses that gap longitudinally, asking whether profitability, growth, employment and operating-finance conditions improve together or follow uneven paths. The hypotheses are grounded in WBO and cooperative mechanisms, not a presumed ownership effect. Signalling and legitimacy are used only to interpret why later performance may matter to stakeholders; neither is tested.

Against this background, the study asks how WBO performance evolves during the first five full post-buyout years relative to non-WBO cooperative peers. We follow 55 Italian WBOs identified through Cooperazione Finanza Impresa (CFI), using AIDA accounts for 2015–2024 and a matched benchmark drawn from 94 eligible cooperatives. The event-time design distinguishes the WBO–peer gap in each year from changes in that gap. Because predecessor accounts and failed conversion attempts are unavailable, the estimates describe conditional post-transition differences among surviving and observable firms; they do not identify a causal effect of the buyout, the Marcora framework or employee ownership.

The evidence indicates uneven adjustment. Early operating-profitability disadvantages become less pronounced, although the strength and timing of improvement depend on the specification. Growth differences cluster near the restart, whereas inventory holding periods remain longer. The paper extends Italian WBO research from emergence and survival toward post-transition adjustment, using a cooperative benchmark and several outcomes rather than one success indicator. It does not measure jobs saved, stakeholder responses or the net benefits of public support. The findings provide a conditional profile of continuity, operating recovery, employment dynamics and financial pressure. Section 2 develops the hypotheses, Section 3 presents the methodology, Section 4 reports the results and Section 5 concludes.

2. Literature review and hypotheses

2.1 Workers' buyouts and entrepreneurial continuity

Employee ownership encompasses arrangements with different combinations of financial participation, decision rights and control (Ben-Ner and Jones, 1995; Kruse, Freeman and Blasi, 2010). Because residual claims and control rights vary across organisational forms (Hansmann, 1996), employee ownership should not be treated as a homogeneous organisational treatment. A cooperative WBO is a collective ownership transition involving an existing business: employees acquire control and assume responsibility for an inherited productive organisation, rather than merely receiving a minority financial stake. The transition may respond to distress, closure or succession problems, but its defining analytical feature is continuity through a change in who bears entrepreneurial responsibility.

This origin places WBOs at the intersection of employee ownership, cooperative organisation and crisis entrepreneurship. Early work on worker capitalism treated employee takeovers as a response to industrial decline and employment loss (Bradley and Gelb, 1983). The wider literature provides reasons to expect resilience, but not an unconditional performance advantage: Craig and Pencavel (1995) examine productivity, Lampel, Bhalla

and Jha (2014) organisational resilience, and Basterretxea and Storey (2018) the relationship between ownership, employment and management practices. These are relevant comparators, but do not resolve the problems of restarting a troubled business with inherited constraints.

Evidence from broader employee-ownership settings reports relatively stable employment and lower exit risk (Blair, Kruse and Blasi, 2000; Park, Kruse and Sesil, 2004), but these studies mainly concern United States firms or employee stock ownership plans (ESOPs) and are not equivalent to crisis-driven cooperative WBOs. WBO-specific evidence shows that entry mode and institutional setting matter: Mirabel (2021) finds different survival prospects across French entry modes, while Bernardi et al. (2022) document the institutional, regional and sectoral pattern of Italian WBOs. Survival captures continuity, not necessarily profitability or financial resilience. Di Stefano et al. (2024) identify post-constitution development as less studied. The present study follows several outcomes over a common five-year window.

2.2. The Italian institutional context

The interpretation of a WBO depends on its institutional environment. Much of the Anglo-Saxon literature focuses on ESOPs or other arrangements introduced within ongoing firms, which may involve gradual participation rather than a takeover triggered by owner withdrawal or severe distress (Kruse, Freeman and Blasi, 2010; Kim and Ouimet, 2014). European research, including work on Spain, France and Italy, more often considers cooperative conversions supported by sectoral organisations, dedicated finance and public policy. These settings differ in governance, acquisition finance, labour-market conditions and stakeholder expectations; evidence from one arrangement cannot therefore be transferred mechanically to another.

Italy is instructive because employee takeovers are embedded in a recognised cooperative and policy infrastructure. The Marcora framework, cooperative-development funds and specialised intermediaries can facilitate the conversion of distressed firms into worker cooperatives and support employment continuity (Vieta, Depedri and Carrano, 2017; Bernardi et al., 2022; Lomuscio, Tortia and Cori, 2023). They do not remove weak demand, lost customers, leverage or the need to finance inventories. The framework may also generate selection: firms reaching the post-buyout stage reflect worker mobilisation, access to advice and finance, and some prospect of viability. Evidence of higher leverage among active Italian WBOs than among Italian SMEs reinforces the need to examine financial vulnerability alongside continuity (Pippo, Pazzi and Lomuscio, 2026).

Non-WBO cooperatives provide a relevant but incomplete benchmark because they share a broad legal and institutional environment. The comparison describes how WBOs adjust relative to cooperative peers; it does not isolate the causal effect of employee ownership or evaluate the Marcora framework. Peers may differ in age, distress history, managerial capacity, member composition, support and market position. Matching on observed post-transition characteristics cannot remove all heterogeneity and may condition on variables affected by the transition. The benchmark is therefore a structured comparison group, not a counterfactual closure or pre-buyout control.

2.3. Profitability recovery after the transition

A business emerging from distress may face weak orders, underused capacity, reorganisation costs, inherited liabilities and limited financial slack. Ben-Ner and Jun (1996) provide a theoretical basis for expecting adverse selection: in their bargaining model, relatively unprofitable firms are more likely to be sold to employees. Hueth and Marcoul (2015) likewise model worker buyouts as responses to investor exit in low-return environments with credit-rationing concerns. Italian evidence of financial vulnerability among active WBOs is consistent with this selection and financing perspective (Pippo, Pazzi and Lomuscio, 2026). These studies do not estimate our post-buyout gap, but they support expecting WBOs to enter the first full post-buyout year from a weaker position than established non-WBO cooperative peers. Retained capabilities may support recovery, but do not remove initial disruption. This motivates H1.

The initial disadvantage need not persist. A WBO preserves an existing productive organisation rather than liquidating it; retained capabilities and worker mobilisation can support reorganisation and restart (Vieta, Depedri and Carrano, 2017; Bernardi et al., 2022). Hueth and Marcoul (2015) show theoretically that cooperative monitoring can reduce credit rationing, although financing and cost constraints remain. Evidence that entry mode affects worker-firm survival (Mirabel, 2021), and that post-constitution development is under-studied (Di Stefano, Fratocchi and Picciotti, 2024), supports viewing recovery as a process, not an automatic consequence of conversion. H2 therefore predicts an improving WBO-peer profitability gap as disruption recedes, not immediate or complete convergence.

- H1. In the early post-buyout period, WBOs exhibit lower profitability than comparable non-WBO cooperative peers.
- H2. Conditional on survival and observability, WBO profitability improves relative to the cooperative benchmark during the subsequent post-buyout period.

H1 concerns the initial level of the WBO–peer profitability gap;

H2 concerns the subsequent change in that gap. The two hypotheses are logically distinct. WBOs may start from a disadvantage and subsequently improve without becoming as profitable as their peers, or they may show no systematic improvement despite remaining active. The empirical analysis therefore examines both annual gap levels and changes relative to the first full post-buyout year.

2.4. Employment and working capital during adjustment

Worker ownership gives employment a distinctive place in organisational objectives, although ownership, control, participation and employment are not interchangeable (Cornforth, 2004). Burdín and Dean (2009) document employment and wage responses in worker-managed firms, while Pérotin (2013) emphasises sustainable cooperative jobs. These contributions concern employment arrangements, not the counterfactual number of jobs saved by a WBO. In a restarting WBO, restoring production may require rebuilding the workforce from a low initial base, whereas established cooperative peers may already operate at a more stable employment level. This creates a specific economic reason to expect an early employment-growth difference, which motivates H3.

- H3. Employment growth is initially higher among WBOs than among comparable non-WBO cooperative peers.

The expected early difference should not be interpreted as evidence of superior long-run employment performance. A WBO may initially rehire or reconstitute its workforce as activity resumes, producing growth from a small base; the same pattern may also be affected by a short initial accounting period or a transitional denominator. Sales growth helps distinguish a broader restart from an employment-specific movement, and specifications excluding the earliest observation address the measurement concern. H3 therefore concerns an initial growth response, not employment preservation, job quality, participatory governance or the number of jobs that would have survived without the WBO.

Post-buyout adjustment also involves operating finance. A restarting firm may need inventory buffers to resume production, may face delayed customer payments while commercial relationships are rebuilt, or may rely on supplier credit when other funding is constrained (Cuñat, 2007; García-Appendini and Montoriol-Garriga, 2013). These mechanisms can generate working-capital differences even when sales and employment improve. As restart-related pressures recede, some of those differences may diminish, although the direction of any individual ratio is economically ambiguous: a longer payment period may reflect supportive credit or financial pressure,

while a shorter collection period may reflect stronger collection or reduced customer financing.

Inventory holding periods add a further operational dimension. Rebuilding production may require stocks, whereas slow turnover may tie up funds or reflect weak demand. Deloof (2003) links working-capital management to profitability, but inventory differences can also reflect product mix, production cycles and inherited practices. For this reason, receivables, payables, inventories and the aggregate cash-conversion cycle must be examined separately. The expectation behind H4 is not that every component moves in the same direction, but that restart-related employment-growth and operating-working-capital differences become less pronounced as the post-buyout period unfolds. This reasoning motivates H4.

- H4. Employment-growth differences and differences in operating working-capital conditions diminish as the post-buyout period unfolds.

The hypotheses rest on observable mechanisms: disruption, recovery, workforce reconstitution and operating-finance adjustment. Signalling theory helps interpret performance as information about a reorganised firm under uncertainty (Connelly et al., 2011); legitimacy theory highlights how continued performance may support perceptions of the WBO as viable and acceptable (Suchman, 1995). Neither theory generates a causal prediction for H1-H4. Because the data do not observe stakeholder beliefs, legitimacy judgements or contractual changes, these perspectives frame the implications rather than constitute theories tested here.

3. Methodology and analytical sample

3.1. Research design, data sources, and treated sample

We use an observational matched panel to compare Italian WBOs with non-WBO cooperatives after the ownership transition. Systematic predecessor accounts are unavailable, and matching characteristics are measured after the buyout. The design therefore estimates conditional post-transition differences, not a causal ownership effect.

The sampling frame is the public disclosure of Cooperazione Finanza Impresa (CFI), not a census of Italian WBOs. It identifies 69 events over 1972–2024, with the latest buyout in 2022. AIDA accounts cover 2015–2024. The main cohort comprises 55 buyouts completed from 2014 onwards, whose first full post-buyout year falls within that window; 14 earlier WBOs enter a separate older-cohort comparison. Inclusion requires a traceable post-buyout entity, so inference is conditional on survival and accounting observability (Table 1).

Table 1: CFI-disclosed WBO events and analytical cohorts

Buyout year	Events	Buyout year	Events	Buyout year	Events
1972	1	2011	2	2018	5
1979	1	2013	5	2019	5
1982	1	2014	13	2020	7
1993	1	2015	9	2021	4
1994	1	2016	5	2022	1
2008	1	2017	6		
2010	1				
Total CFI-disclosed events	69	Main cohort (2014-2022)	55	Older cohort (pre-2014)	14

Note: The table describes the CFI sampling frame, not the full population of Italian WBOs. The main cohort contains buyouts for which the first complete post-buyout accounts are observable between 2015 and 2024.

3.2. Event time and variable measurement

The buyout year is excluded because its accounts may cover a partial or transitional fiscal period. For firm *i*, event time is defined as

$$\tau_{it} = year_t - (buyout\ year_i + 1)$$

so that $\tau=0$ is the first full fiscal year after the buyout. The principal window covers $\tau=0,\ldots,4$. It is unbalanced because recent cohorts cannot be followed for five complete years.

Profitability is measured by return on assets (ROA: operating income/total assets), return on sales (ROS: operating income/sales) and return on equity (ROE: net income/equity), using the AIDA fields at their recorded precision. Sales and employment growth are annual log changes, requiring positive current and lagged values. Raw sales growth (TGR) and employment growth (EGR), each calculated as current/previous value minus one, remain in the descriptive tables. Although the buyout-year observation is excluded, first-post-buyout growth can still use a partial-year denominator; models excluding $\tau=0$ assess this problem.

Financial indicators comprise ln(total debt/EBITDA), defined only for positive debt and EBITDA; debt/total assets; and an indicator of non-positive EBITDA. EBITDA denotes earnings before interest, taxes, depreciation and amortisation. The logged debt ratio is not a number of repayment years. Labour cost per employee (LCE in the descriptive tables) is expressed in thousands of euros and is not itself a measure of efficiency or wages. The working-capital cycle (WCC), collection days (DSO), inventory days (DIO) and payment days (DPO) are AIDA indicators. They are analysed separately and on a common sample; the source measures do not form an exact additive identity.

Adjustment variables are capital intensity (tangible fixed assets/total assets), the current ratio (current assets/current liabilities), debt/equity and log sales. Missing values are not imputed. Each regression uses complete

cases for its outcome and covariates. Sensitivity checks restrict ROE to positive equity and winsorise debt/assets, raw growth, labour cost per employee and WCC at the first and ninety-ninth percentiles. Unlabelled main results are not winsorised. Table 2 distinguishes mechanically observable firm-years from outcome-specific data availability. Its first row reports calendar coverage; the remaining rows count non-missing observations.

Table 2: Outcome availability by event time in the matched panel

Variable	τ=0	τ=1	τ=2	τ=3	τ=4
Scheduled firm-years	55/55	55/55	54/54	50/50	43/43
ROA	55/54	54/51	50/51	48/46	41/39
ROS	48/50	51/49	49/50	48/44	41/38
ROE	50/47	50/44	47/44	45/42	38/36
Sales growth (annual log change)	25/40	52/50	50/49	48/44	41/34
Raw sales growth (TGR)	25/40	52/50	50/49	48/46	41/35
ln(Debt/EBITDA), positive debt and EBITDA	34/44	38/46	43/43	45/31	34/29
Labour cost per employee	53/40	54/39	50/32	48/29	41/23
Employment growth (annual log change)	26/31	52/37	50/32	48/27	41/22
Raw employment growth (EGR)	26/31	52/38	50/35	48/29	41/22
Working-capital cycle	27/37	28/37	27/32	24/27	21/21

Note: Each cell reports WBO/matched-peer observations before regression covariates are required. Scheduled counts reflect calendar coverage. Log growth and raw growth need a lagged denominator; the debt ratio additionally requires positive debt and EBITDA. Labour and working-capital data are incomplete. Estimation samples are smaller and are documented with each results table.

3.3. Eligible comparison population and matching procedure

The AIDA search required non-WBO cooperative legal form and an ATECO industry represented among WBOs. ATECO is the Italian classification of economic activities. The 94 firms returned constitute the complete eligible AIDA population under these filters, not a subsample of a larger eligible cooperative pool: 24 are in mechanical/electronics/transport activities, 67 in construction and 3 in other represented industries. This is not a census of all Italian cooperatives.

Matching is one-to-one with replacement. Candidates must share the WBO's baseline calendar year ($\tau=0$) and macro-sector. Within each exact year-sector cell, selection minimises a weighted distance based on post-transition operating fragility, size and solvency; no caliper is imposed.

Fragility categories are EBITDA$\leq$0; positive EBITDA with interest expense/EBITDA equal to zero, between zero and 0.5 inclusive, or above 0.5. Positive-ratio conditions exclude missing values. Size uses quartiles of log sales calculated in the source database before restricting cooperative eligibility. The recorded Z' score is grouped below 1.8, from 1.8 to below 3.0, and at least 3.0. These are operational matching bins, not validated

bankruptcy-risk thresholds for this sample. Missing fragility and solvency are explicit categories; missing size makes the composite distance undefined. For WBO *i* and candidate control *j*, the distance is

$$d_{ij} = I(F_i \neq F_j) + 0.5 \times |Q_i - Q_j| + 0.5 \times I(Z_i \neq Z_j)$$

Here F, Q and Z denote fragility category, size quartile and solvency category. The minimum-distance control is selected; ties use the lowest firm identifier. For three WBOs, the distance is undefined and selection instead follows that identifier rule within the exact cell. These assignments are not evidence of a close financial match.

The 55 pairs use only 15 distinct controls (Table 3); the two most frequently selected appear 12 and 9 times. Outcome-specific main regressions use only 9–10 distinct controls. Replacement accommodates thin cells but concentrates the benchmark, making alternative control designs and firm-clustered inference essential.

Table 3: Eligible comparison population and matching diagnostics

Diagnostic	Value
WBOs in main cohort	55
Eligible AIDA cooperative controls	94
WBOs by sector: mechanical/construction/other	18/19/18
Eligible controls by sector	24/67/3
Matched WBO-control pairs	55
Distinct controls selected	15
Selected controls by sector	7/6/2
Maximum reuse of one control	12 pairs
Reuse of second most-used control	9 pairs
Unique evaluable minimum	36 WBOs
Multiple evaluable minimum-distance controls	16 WBOs
Incomplete composite distance because of missing size	3 WBOs
Exact composite match	6/52 evaluable pairs
Same fragility category	35/55 pairs
Same solvency category	28/55 pairs
Same size quartile	26/52 evaluable pairs

Note: For the three WBOs with an incomplete composite distance, selection is determined within the exact year-sector cell by the deterministic identifier rule. Reused controls must not be treated as independent firms in statistical inference.

3.4. Baseline comparability and balance

Table 4 reports baseline characteristics. Sector shares coincide by construction, but financial condition and size remain imperfectly balanced. WBOs more often have non-positive EBITDA, whereas the interest-burden ratio is lower among positive-EBITDA observations. Matching therefore defines a benchmark without establishing baseline equivalence.

Table 4: Post-matching baseline characteristics at τ=0

Characteristic	Matched peers	WBOs
Observations	55	55
Mechanical/electronics/transport	32.7%	32.7%
Construction	34.5%	34.5%
Other industries	32.7%	32.7%
Interest expense/EBITDA, if EBITDA >0, mean (SD)	0.288 (0.258), N=44	0.140 (0.206), N=34
EBITDA ≤0	18.5%, N=54	38.2%, N=55
Z′<1.8	47.5%	36.4%
1.8≤Z′<3.0	27.5%	27.3%
Z′≥3.0	25.0%	36.4%
Size quartile 1	42.6%	7.5%
Size quartile 2	3.7%	5.7%
Size quartile 3	16.7%	30.2%
Size quartile 4	37.0%	56.6%

Note: Percentages are calculated within group. Solvency categories use the 40 peers and 33 WBOs with observed Z′; size quartiles use the 54 peers and 53 WBOs with observed size. Peer observations are weighted implicitly by matching reuse.

Table 5 compares standardised mean differences before and after matching, using candidates in the exact year-sector cells for the pre-match benchmark. Balance improves for solvency and the ordinal size score but worsens for the conditional interest-burden ratio. Absolute imbalance in non-positive EBITDA falls by only 2.2%, with a sign reversal. Regression adjustment cannot eliminate the design's dependence on observed post-transition characteristics.

Table 5: Standardised mean differences before and after matching

Baseline characteristic	SMD before	SMD after	Change in absolute imbalance
EBITDA ≤0	-0.453	+0.443	+2.2%
Interest expense/EBITDA, if EBITDA >0	-0.414	-0.633	-52.7%
Z′<1.8	-0.554	-0.224	+59.6%
Z′≥3.0	+0.371	+0.245	+34.0%
Size-quartile score	+1.244	+0.756	+39.2%

Note: SMD is the WBO-minus-control mean difference divided by the square root of the average of the two group variances. The last column reports the percentage reduction in the absolute SMD; negative values indicate increased imbalance. The small absolute reduction for EBITDA ≤0 accompanies a sign reversal and should not be interpreted as baseline equivalence.

3.5. Analytical panel and descriptive statistics

The panel contains 257 scheduled WBO and 257 scheduled peer observations over τ=0–4. Table 6 reports means and standard deviations of these stacked observations, with repeated controls implicitly weighted by reuse. Conventional independent two-sample tests would misstate precision.

Actual regression samples, including distinct WBO and control counts, appear in each results table.

Table 6: Descriptive statistics for the matched event-time panel

Variable	Matched peers: mean (SD)	N	WBOs: mean (SD)	N
ROA	0.023 (0.101)	241	0.012 (0.121)	248
ROS	0.031 (0.078)	231	0.013 (0.078)	237
ROE	0.056 (0.249)	213	0.026 (0.308)	230
Sales growth (log change)	-0.036 (0.490)	217	0.293 (0.732)	216
Raw sales growth (TGR)	0.070 (0.693)	220	1.513 (9.715)	216
ln(Debt/EBITDA)	2.295 (0.831)	193	2.323 (0.977)	194
Labour cost per employee (€000)	37.777 (33.220)	163	36.449 (20.307)	246
Employment growth (log change)	-0.006 (0.448)	149	0.098 (0.340)	217
Raw employment growth (EGR)	0.086 (0.888)	155	0.202 (0.842)	217
Working-capital cycle (days)	78.203 (148.444)	154	117.301 (122.325)	127
Tangible capital intensity	0.132 (0.155)	241	0.179 (0.160)	248
Current ratio	1.431 (0.703)	238	1.590 (0.662)	246
Debt-to-equity	2.768 (3.519)	181	0.410 (18.620)	203
Log sales	6.007 (2.338)	238	7.642 (1.327)	246

The extreme raw sales-growth distribution highlights the partial-year denominator problem. WBOs also exhibit a longer unconditional WCC and differences in scale and financial structure. These pooled summaries do not separate composition from within-firm adjustment.

Table 7 gives pairwise-complete correlations, using raw TGR and EGR rather than the log-growth outcomes. Profitability measures enter separate regressions. Correlations with firm size further motivate reporting otherwise identical specifications with and without financial covariates.

Table 7: Pairwise correlations in the matched panel

	ROA	ROS	ROE	TGR	lnD/EBITDA	LCE	EGR	WCC	CAP_INT	Current	D/E	Size
ROA	1											
ROS	0.818	1										
ROE	0.782	0.714	1									
TGR	-0.002	-0.001	0.059	1								
lnD/EBITDA	-0.736	-0.563	-0.494	0.017	1							
LCE	0.146	0.070	0.047	0.040	-0.202	1						
EGR	-0.007	0.118	0.045	0.082	-0.127	0.003	1					
WCC	0.025	0.096	-0.075	0.049	0.004	-0.115	0.122	1				
CAP_INT	-0.065	0.076	-0.126	-0.023	-0.154	-0.080	0.068	-0.078	1			
Current	0.275	0.314	0.135	-0.010	-0.380	0.123	0.088	0.165	-0.131	1		
D/E	0.049	0.061	-0.003	0.035	0.276	-0.003	0.017	-0.019	-0.062	-0.016	1	
Size	0.131	-0.055	0.098	0.046	0.102	0.353	0.082	-0.379	-0.016	0.061	0.020	1

Note: Pairwise-complete correlations. TGR and EGR denote the raw growth variables; CAP_INT denotes capital intensity.

3.6. Empirical specification

For each outcome Y_{it}, event-time indicators allow the WBO–peer gap to vary across the five post-buyout years. Let $D_{kit}=1(\tau_{it}=k)$, with $\tau=0$ omitted:

$$Y_{it} = \alpha + \beta WBO_i + \sum_{k=1}^{4} \gamma_k D_{kit} + \sum_{k=1}^{4} \delta_k (WBO_i \times D_{kit}) + X'_{it}\theta + \lambda_y + \lambda_a + \lambda_s + \varepsilon_{it}$$

WBO_i is a dummy equal to one for WBOs and zero for peers. Its coefficient β is the adjusted first-year WBO–peer gap, not the dummy itself. The γ_k coefficients describe changes among peers, while δ_k measures the additional WBO change relative to $\tau=0$. Thus $\beta+\delta_k$ is the annual gap and δ_k is its change from baseline. Table 8 distinguishes these quantities for profitability; Tables 9–10 report the other outcome gaps. Ratios are reported in percentage points where indicated, growth and logged debt in log points, and operating cycles in days.

X_{it} contains the four financial covariates defined above; λ_γ, λ_a and λ_s denote calendar-year, geographical-area and macro-sector effects. Since contemporaneous covariates may be consequences of adjustment, pooled OLS models with and without X use identical complete-case samples and the same estimator (Table 11 and Appendix Table A4).

Level models use Gaussian generalised estimating equations (GEE), an identity link and exchangeable working correlation. If GEE fails because the working correlation is numerically unstable, pooled ordinary least squares (POLS) is used; tables identify the estimator. Standard errors are clustered by original firm, so reused controls are not counted as independent firms. Tables report standard errors in parentheses and unadjusted two-sided significance as * below 10%, ** below 5% and *** below 1%. These conventions do not remove the uncertainty associated with the small effective control group.

Firm fixed-effects models examine within-firm differential changes (Appendix Table A3). WBO status and other time-invariant characteristics are absorbed; δ_k remains estimable. Reused controls have pair-specific stacked panel identifiers for the within transformation, while inference remains clustered by original firm. A separate linear POLS comparison (Appendix Table A2) imposes a constant differential slope to assess sensitivity to the functional form and earlier matching implementations; it does not replace the unrestricted annual-gap model.

H1 and H3 concern early profitability and employment-growth gaps; H2 concerns subsequent relative profitability changes. H4 requires evidence of attenuation in employment-growth and working-capital differences. Non-rejection of a late zero gap is not an equivalence test. Without systematic

pre-buyout observations, these models cannot establish parallel pre-trends or identify signalling and legitimacy mechanisms.

3.7. Sensitivity analyses and statistical inference

Table 11 compares ROA across estimators and control designs. The full-pool design admits all eligible cooperatives in each WBO's exact year-sector cell, weighting each WBO by one and each candidate by 1/n_cell. The ties design includes every minimum-distance control with weight 1/n_min. Weights are assigned before complete-case exclusions and are not re-normalised afterwards. Weighted POLS clusters by original firm. Eligibility does not imply contribution to every model: the full-pool ROA regression uses 31 distinct controls. Appendix Table A5 extends this check across outcomes.

4. Empirical results

We examine whether the early difficulties of a workers' buyout give way to stronger operating performance, and whether the same adjustment is visible in employment and day-to-day financing. The comparison is with ordinary cooperatives, not with the predecessor firms or a hypothetical closure. Throughout, a 'gap' means the adjusted WBO outcome minus the peer outcome: a negative profitability gap indicates lower profitability, while a positive inventory-days gap indicates longer stock holding. Years 1–5 correspond to event times τ=0–4; year 1 is the first full fiscal year after the buyout. Changes in a gap measure relative improvement or deterioration, not the absolute change within WBOs.

4.1. Profitability after the restart

Table 8 distinguishes the profitability disadvantage at each date (Panel A) from its subsequent change (Panel B). WBOs have lower operating returns in the first two years. The second-year ROA shortfall is approximately 5.8 percentage points, a substantial difference in the operating income generated per unit of assets. ROS gives a similar picture, suggesting that the difficulty extends to operating margins rather than appearing only in the asset-based measure. ROE is less informative: its annual gaps are imprecise, and restricting the comparison to positive-equity observations does not resolve this problem (Appendix Table A1). H1 therefore receives support for operating profitability, but not uniformly across all measures of returns.

This starting position is economically plausible for businesses reorganised after distress. The Italian evidence assembled by Vieta, Depedri and Carrano (2017) places WBOs in the context of business rescue and employment continuity. Retaining a productive organisation does not

immediately restore its order book or the utilisation of its assets. In our data, however, these remain possible explanations for the early margin disadvantage: accounts do not separately identify disruption costs, capacity utilisation or lost customers.

The later pattern is more favourable. By the fifth year, the estimated ROA gap has improved by 7.7 percentage points relative to the first year. ROS also moves towards the cooperative benchmark. Evidence of this improvement is weaker in the unrestricted event-time model than in a model imposing a constant annual adjustment: the latter estimates an annual ROA improvement of about 2 percentage points on the corrected match (Appendix Table A2). H2 is thus supported more strongly under the linear restriction. The distinction is substantive: the data suggest recovery, but do not locate its timing precisely or establish that WBOs have reached the same profitability as peers.

Improving returns could make a reorganised firm a more credible counterparty. In the signalling framework reviewed by Connelly et al. (2011), however, observable information and the recipient's response are distinct parts of the argument. We observe the performance information, not changes in lenders' beliefs or customers' willingness to contract. The narrowing profitability gap is consistent with credibility rebuilding, but is also consistent with operational recovery from a depressed starting point.

Table 8: Profitability relative to matched cooperative peers

Panel A Annual WBO minus peer gaps

Outcome and estimation sample	**Year 1 τ=0**	**Year 2 τ=1**	**Year 3 τ=2**	**Year 4 τ=3**	**Year 5 τ=4**
ROA (p.p.) POLS; N=380; W/C=51/10	-5.67* (3.39)	-5.75*** (1.81)	-1.05 (2.00)	0.45 (1.47)	2.07 (2.89)
ROS (p.p.) POLS; N=373; W/C=51/10	-4.09* (2.30)	-3.47*** (1.27)	-0.82 (1.11)	1.51 (1.33)	0.59 (1.83)
ROE (p.p.) GEE; N=360; W/C=50/10	-11.13 (11.84)	-9.10 (9.08)	0.42 (10.22)	11.21 (10.36)	-0.52 (11.04)

Panel B Changes in the gap relative to year 1

Outcome and estimation sample	**To year 2**	**To year 3**	**To year 4**	**To year 5**
ROA (p.p.) POLS; N=380; W/C=51/10	-0.09 (3.58)	4.62 (3.96)	6.12* (3.29)	7.73* (3.89)
ROS (p.p.) POLS; N=373; W/C=51/10	0.61 (2.45)	3.27 (2.28)	5.59** (2.71)	4.67* (2.67)
ROE (p.p.) GEE; N=360; W/C=50/10	2.03 (8.41)	11.54 (9.60)	22.34** (8.99)	10.60 (9.70)

*Note: All estimates are percentage points. In Panel B, a positive coefficient means that WBO profitability improves relative to peers compared with year 1; it is not the profitability level in that year. Robust standard errors clustered by original firm are in parentheses. * p<0.10; ** p<0.05; *** p<0.01 (unadjusted, two-sided tests). N is the number of stacked firm-year observations; W/C counts distinct WBOs and controls actually used. All models include capital intensity, current ratio, debt/equity, log sales, and calendar-year, area and sector indicators unless stated otherwise. GEE denotes Gaussian exchangeable GEE; POLS is the fallback when GEE fails. Source: authors' calculations from CFI and AIDA.*

4.2. Growth and the employment commitment

A restart can combine low profitability with rapid growth: restoring production increases sales from a small base before it necessarily restores margins. Table 9, Panel A, shows this combination. Sales and employment growth are markedly higher in the first year, but the advantage subsequently diminishes. This should not be read as evidence that WBOs begin to shrink. A declining difference in growth rates can simply mean that the initial expansion slows towards the rate of the comparison firms.

The first-year comparison is also vulnerable to an accounting discontinuity, since its growth denominator may cover only part of the buyout year. Panel B therefore repeats the growth analysis after excluding that observation. Sales growth remains higher in the second year: the estimated difference corresponds to a roughly 43% higher year-on-year sales growth factor, not a 43% higher sales level. The evidence for an employment-growth advantage is no longer clear. Alternative raw and winsorised growth measures in Appendix Table A1 retain the pronounced initial spike, which is why changing the scale of the outcome alone does not settle the restart issue.

The employment result needs to be read against the right benchmark. Burdín and Dean (2009) document differences in wage and employment adjustment between worker cooperatives and capitalist firms. Here, both groups are cooperatives, so an employment-preservation motive may be shared rather than specific to WBOs. Moreover, preserving jobs is not equivalent to continually expanding headcount. The early employment differential provides only qualified support for H3: it is consistent with reconstituting the workforce, but is sensitive to the first-year observation and cannot establish that hiring was undertaken to gain legitimacy. Labour cost per employee also provides no convincing evidence of a distinct cost-cutting path. Without information on hours, occupational composition or output per worker, it cannot be treated as a direct productivity measure.

Table 9: Growth and labour costs

Panel A Principal matched comparisons

Outcome and estimation sample	Year 1 τ=0	Year 2 τ=1	Year 3 τ=2	Year 4 τ=3	Year 5 τ=4
Sales growth (log points) GEE; N=346; W/C=51/10	1.548*** (0.259)	0.320** (0.150)	0.190* (0.110)	0.161 (0.109)	0.161 (0.103)
Employment growth (log points) GEE; N=301; W/C=51/9	0.501*** (0.151)	0.092 (0.093)	-0.072 (0.059)	-0.010 (0.141)	-0.082 (0.108)
Labour cost per employee (€000) GEE; N=333; W/C=51/9	-0.4 (5.4)	-5.8 (4.5)	-10.1 (8.0)	-11.7 (9.5)	-8.7 (8.4)

Panel B Growth comparisons excluding year 1

Outcome and estimation sample	Year 1 τ=0	Year 2 τ=1	Year 3 τ=2	Year 4 τ=3	Year 5 τ=4
Sales growth (log points) GEE; N=297; W/C=50/10	—	0.359** (0.152)	0.220* (0.113)	0.190 (0.120)	0.171 (0.115)
Employment growth (log points) POLS; N=259; W/C=50/9	—	0.110 (0.088)	-0.050 (0.062)	0.005 (0.147)	-0.065 (0.106)

*Note: Growth is the annual change in the natural logarithm; costs are thousands of euros per employee. Positive growth gaps mean faster growth, not larger sales or employment levels. Panel B is re-estimated using years 2–5 only; the dash denotes an excluded year. Robust standard errors clustered by original firm are in parentheses. * p<0.10; ** p<0.05; *** p<0.01 (unadjusted, two-sided tests). N is the number of stacked firm-year observations; W/C counts distinct WBOs and controls actually used. All models include capital intensity, current ratio, debt/equity, log sales, and calendar-year, area and sector indicators unless stated otherwise. GEE denotes Gaussian exchangeable GEE; POLS is the fallback when GEE fails.*

4.3. Earnings recovery and financial exposure

Stronger operating performance need not immediately remove financial vulnerability. Table 10, Panel A, compares debt relative to earnings with debt relative to assets. The debt-to-EBITDA ratio is higher among WBOs in years 2 and 3, whereas the debt-to-assets differences are not clearly established. These measures answer different questions. A firm can have a similar balance-sheet debt share but a larger burden relative to the earnings available to service it. The findings therefore point more towards vulnerability in the earnings base than towards demonstrated excess leverage, although the separate regressions do not identify how much of the ratio difference comes from its numerator or denominator.

The debt-to-EBITDA comparison excludes firms with non-positive EBITDA. The third row addresses this limitation by examining non-positive EBITDA itself on a wider sample. The estimated difference changes sign during the window, with a lower probability among WBOs in year 4, but a sustained advantage is not established in year 5. Read together, the measures suggest that improved operating viability and financial consolidation need not occur at the same pace. They do not show that WBOs obtain cheaper

credit or that financiers have revised their assessment of employee ownership.

4.4. Inventory holding and commercial relationships

Table 10, Panel B, asks where working-capital differences arise. It uses the same observations for the aggregate cycle and its component indicators. The estimated aggregate cycle is longer among WBOs, but too imprecisely measured to establish a systematic difference. Winsorisation does not reveal differential adjustment in the cycle (Appendix Table A1). Inventory holding is more distinctive: WBOs hold inventories for roughly 45–55 additional days across the window. The difference persists, but its increase is not statistically established. The result is a longer inventory holding period, not evidence of a progressively worsening inventory problem.

Economically, longer holding periods can absorb funds before a sale generates cash, so operating-margin recovery may coexist with continuing financing needs. Deloof (2003) links inventory and receivables management to profitability in Belgian firms, providing a relevant working-capital interpretation rather than evidence about WBOs themselves. Our inventory result warrants attention to production and stock management, but cannot distinguish slow-moving inventories from deliberate buffers or differences in the production mix. Exact macro-sector matching does not eliminate all such differences. The component indicators also do not form an exact accounting identity in the source data; their coefficients cannot be added to explain the entire aggregate gap.

Commercial credit gives a different signal. Collection periods are shorter, with clearer differences in the later years, while payment periods show no precise disadvantage. Cuñat (2007) explains how suppliers may provide liquidity insurance as well as enforce payment, illustrating why payment duration is not a simple measure of confidence. Shorter collection periods could reflect effective collection or a limited ability to finance customers; the accounts do not distinguish them. Thus, neither an aggregate working-capital normalisation nor the restoration of stakeholder acceptance required by the stronger interpretation of H4 is demonstrated. Inventory duration is the clearer operational issue.

Table 10: Financial exposure and working capital

Panel A Debt and operating earnings

Outcome and estimation sample	Year 1 τ=0	Year 2 τ=1	Year 3 τ=2	Year 4 τ=3	Year 5 τ=4
Debt / EBITDA in logs (log points) POLS; N=317; W/C=49/9	0.328 (0.336)	0.499** (0.221)	0.430** (0.202)	0.307 (0.252)	-0.062 (0.238)
Debt / assets, winsorised (p.p.) GEE; N=380; W/C=51/10	-7.34 (5.09)	-2.56 (5.16)	-2.39 (5.74)	-8.92 (6.25)	-5.03 (6.56)
Probability of non-positive EBITDA (p.p.) GEE; N=380; W/C=51/10	11.31 (15.05)	9.70 (12.01)	-11.71 (12.23)	- 31.59** (14.39)	-9.46 (15.11)

*Note: The logged debt/EBITDA ratio requires positive debt and EBITDA. Debt/assets is winsorised at the pooled matched-panel 1st and 99th percentiles. The last row is a probability difference in percentage points, estimated with an identity link. Robust standard errors clustered by original firm are in parentheses. * p<0.10; ** p<0.05; *** p<0.01 (unadjusted, two-sided tests).*

Panel B Working capital on a common estimation sample

Outcome and estimation sample	Year 1 τ=0	Year 2 τ=1	Year 3 τ=2	Year 4 τ=3	Year 5 τ=4
Working-capital cycle (days) POLS; N=280; W/C=37/10	61.8 (37.0)	47.0 (38.2)	37.4 (38.0)	41.4 (41.3)	61.6 (36.9)
Collection days (days) POLS; N=280; W/C=37/10	-34.8 (22.2)	-35.5* (20.4)	-59.7** (23.4)	-54.6** (23.4)	-43.9** (21.6)
Inventory days (days) GEE; N=280; W/C=37/10	45.1*** (10.4)	43.8*** (11.5)	47.9*** (10.7)	52.3*** (11.5)	55.5*** (10.7)
Payment days (days) POLS; N=280; W/C=37/10	8.2 (19.0)	7.0 (26.5)	26.8 (18.6)	24.0 (20.8)	19.2 (18.5)

*Note: All Panel B outcomes are in days and use the same 280 observations from 37 WBOs and 10 controls. A positive value means longer duration for WBOs. Collection, inventory and payment days are separate comparisons, not an additive decomposition of the aggregate cycle. Robust standard errors clustered by original firm are in parentheses. * p<0.10; ** p<0.05; *** p<0.01 (unadjusted, two-sided tests). N is the number of stacked firm-year observations; W/C counts distinct WBOs and controls actually used. All models include capital intensity, current ratio, debt/equity, log sales, and calendar-year, area and sector indicators unless stated otherwise. GEE denotes Gaussian exchangeable GEE; POLS is the fallback when GEE fails. The auxiliary debt/assets, EBITDA and component tests are exploratory; the main-outcome multiple-testing adjustment is in Table A9.*

4.5. How much depends on the comparison design

The principal qualification concerns the depth of the cooperative benchmark. The 94 eligible firms are the complete AIDA population identified under the study's cooperative-form and ATECO filters. Matching selects 15 distinct peers, and missing data reduce this to 9–10 in the principal regressions. Reusing peers does not create additional independent firms. Table 11 therefore asks whether the ROA recovery depends on the particular controls selected or on the regression specification.

Within-firm estimation gives a smaller, inconclusive ROA improvement; Appendix Table A3 shows this check for all outcomes.

Removing the financial covariates preserves the direction of recovery, and Table A4 isolates this conditioning choice by holding both the sample and estimator fixed. The estimated improvement also remains positive when all equally close peers are retained or when all eligible candidates in the year-sector cells are used. The latter comparison uses 31 controls for ROA, not all 94: eligibility does not ensure complete information for every outcome. Table A5 reports this enlarged-benchmark comparison for all principal outcomes. The recovery interpretation is consequently more stable in direction than in statistical strength.

Two checks examine alternative economic explanations. Against non-cooperative firms, the initial ROA disadvantage and subsequent relative improvement are not clearly present, although other outcomes still differ (Appendix Table A6). The apparent recovery is therefore specific to the cooperative benchmark, not a general ownership advantage. Separately, ordinary cooperatives experiencing distress also show subsequent improvement in margins and operating viability (Appendix Table A7). That exercise is based on very few firms, but warns against attributing all recovery to WBO-specific credibility rebuilding rather than post-distress adjustment.

The pre-2014 WBOs answer a different question. Appendix Table A8 compares their average outcomes with peers during 2015–2024, when they are already established survivors. It contains neither the same cohort as Table A5 nor successive years following a common restart. Its weakly negative average profitability differences do not validate complete long-run convergence, but selection and the very small control group also prevent it from overturning the recent-cohort dynamics. Finally, Table A9 records the joint and multiple-testing checks. These retain the early ROA and first-year growth differences as the clearest main-outcome evidence; the finer distinctions across dates remain less secure.

Table 11: Does the ROA recovery depend on the specification

Specification	**Year 1 gap**	**Year 5 gap**	**Change year 1 to 5**	**N W/C**
Matched POLS with covariates	-5.67* (3.39)	2.07 (2.89)	7.73* (3.89)	380 51/10
Same sample without covariates	-3.76 (3.32)	4.34 (2.95)	8.10** (3.64)	380 51/10
All minimum-distance peers	-5.40 (3.29)	2.42 (2.95)	7.82** (3.85)	494 51/18
All eligible year-sector candidates	-6.48** (3.07)	-0.92 (2.54)	5.56* (3.01)	1440 51/31
Within-firm fixed effects	Absorbed	Not identified	4.64 (5.15)	380 51/10
Non-cooperative peers	2.58 (4.10)	-0.17 (2.31)	-2.75 (4.11)	410 51/45

*Note: All estimates are percentage points. The change column is the directly estimated difference between the year-5 and year-1 gaps, not an annual slope. The first two rows use identical observations and POLS. Minimum-distance and full-pool rows use weighted POLS; total baseline peer weight per WBO is one before complete-case exclusions, without subsequent renormalisation. Within-firm effects use pair-specific panel copies and do not identify WBO level gaps. The non-cooperative specification uses GEE. Robust standard errors clustered by original firm are in parentheses. * p<0.10; ** p<0.05; *** p<0.01 (unadjusted, two-sided tests).*

4.6. Economic interpretation

The economic contribution is to distinguish restarting activity from rebuilding profitability and from releasing funds tied up in operations. In this sample, these processes do not move together. Rapid initial growth accompanies weak operating returns; later profitability comparisons are more favourable, while longer inventory holding remains. A static classification of WBOs as either successful or inefficient would miss this uneven adjustment.

For the theoretical argument, the results support only parts of the proposed sequence. H1 is most credible for operating returns; support for H2 depends on the specification; H3 is sensitive to the restart-year comparison; and H4 is not established as a general normalisation of operations or stakeholder relations. Suchman (1995) treats legitimacy as acceptance by relevant audiences, which cannot be inferred from accounting ratios alone. The findings identify performance developments that could matter to those audiences, while leaving their responses unobserved. They therefore inform what post-buyout support should monitor—earnings capacity and working-capital needs alongside employment—but do not establish the net benefit of support or the causal contribution of employee ownership.

Conclusions

This study examined how profitability, growth and operating-finance conditions evolve during the first five full fiscal years following a workers' buyout. Using 55 WBOs identified through Cooperazione Finanza Impresa and linked to AIDA company accounts, the analysis compared WBOs with non-WBO cooperatives operating in the same broad institutional and sectoral context. The empirical design identifies conditional post-transition differences. It does not estimate a causal effect of employee ownership, because systematic predecessor accounts and a credible closure counterfactual are unavailable.

The results do not support a simple classification of WBOs as either successful or unsuccessful. The adjustment process is sequential and uneven. WBOs display lower operating profitability than matched cooperative peers during the early post-buyout period, particularly when profitability is measured through ROA and ROS. The estimated ROA gap improves from

approximately –5.7 percentage points in the first year to a positive but statistically imprecise value in the fifth year. The direction of this change is broadly preserved when the comparison group, financial covariates and estimation strategy are varied. Its statistical strength is less stable, however, and the results do not establish that WBOs have fully converged with their cooperative peers.

The post-buyout restart is also associated with stronger initial sales and employment growth. This pattern is consistent with the reconstitution or expansion of productive activity after the transition. It should not be interpreted as evidence that WBOs necessarily preserve more jobs than alternative organisational forms, since the analysis does not observe firms that failed to survive and cannot distinguish employment preservation from employment creation. Moreover, the employment-growth advantage is sensitive to the first post-buyout observation, whose denominator may cover only part of the buyout year. When this observation is excluded, the evidence for a distinct employment-growth advantage becomes weak.

Improved operating returns do not remove all forms of financial vulnerability. WBOs exhibit higher debt relative to EBITDA in the second and third post-buyout years, although the evidence does not indicate a persistent difference in debt relative to assets or a sustained advantage in the probability of generating positive EBITDA. The most persistent operating difference concerns inventory holding. WBOs hold inventories for approximately 45 to 55 additional days relative to the comparison firms throughout the observation window. The aggregate working-capital cycle is not estimated with sufficient precision to establish a systematic difference, while shorter collection periods and statistically imprecise payment-period differences have an ambiguous interpretation. These findings suggest that profitability recovery may coexist with continuing funds committed to production and inventory.

The study contributes to the literature by showing why post-distress employee ownership should be analysed as a transition process rather than as a stable organisational category. The evidence is consistent with a sequence in which activity restarts before profitability is restored, while profitability may improve without eliminating working-capital requirements. The comparison with non-cooperative firms does not reproduce the same profitability pattern, and the exploratory analysis of ordinary cooperatives experiencing distress indicates that part of the observed improvement may reflect recovery from distress rather than a mechanism specific to WBOs. The results therefore do not establish a general ownership advantage, nor do they identify signalling or legitimacy mechanisms. Accounting performance may provide information relevant to lenders, customers and suppliers, but their responses are not observed in the data.

The findings have implications for post-buyout monitoring. Sales and employment growth should not be used as stand-alone indicators of financial recovery, just as an early operating loss should not by itself be interpreted as evidence that the buyout has failed. Monitoring should consider operating profitability, earnings capacity, debt-servicing exposure and inventory management together. Support institutions may therefore need to evaluate the financing requirements associated with the recovery process alongside employment and business-continuity objectives.

Several limitations qualify these conclusions. The CFI-based sampling frame is not a census of Italian WBOs, and inclusion requires a traceable post-buyout entity with observable accounts. The matched comparison is concentrated: 55 WBOs are matched to only 15 distinct controls, while the main regressions generally use nine or ten controls. Baseline characteristics remain imperfectly balanced, and matching is based on post-transition characteristics. The panel is unbalanced, outcome-specific missingness reduces the estimation samples, and the first-year growth measures may be affected by partial-year denominators. Finally, accounting data do not provide information on predecessor firms, unsuccessful transitions, stakeholder beliefs, inventory composition, worker participation or the terms of bank and supplier relationships.

Future research should combine larger WBO samples with pre-buyout accounts, information on non-surviving firms and direct measures of governance, stakeholder relationships and financing conditions. Such data would make it possible to distinguish recovery from selection, assess employment preservation more directly and investigate whether improved financial performance changes the terms on which WBOs access external resources.

Overall, the evidence portrays WBOs as a form of business rescue in which productive activity can restart rapidly, operating profitability improves only gradually and working-capital pressures may persist. This uneven adjustment, rather than a uniform performance advantage, is the central empirical conclusion of the study.

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Appendix Supplementary empirical evidence

This appendix reports supplementary analyses corresponding to the robustness and sensitivity questions in Sections 4.1–4.5. Unless stated otherwise, it uses the main cohort of 55 WBOs completed from 2014 onwards, the corrected matching rule and the same five full post-buyout years as the main analysis. Year 1 corresponds to $\tau=0$, the first full fiscal year after the buyout. Stars report unadjusted two-sided p-values; Table A9 separately reports joint tests and Benjamini–Hochberg q-values.

The appendix is organised as follows. A1 examines alternative outcome definitions; A2 imposes a constant differential annual trend; A3 reports within-firm fixed-effects changes relative to Year 1; A4 holds the estimation sample and estimator fixed while adding or removing financial covariates; A5 broadens the cooperative benchmark; A6 changes the comparison population to non-cooperative firms; A7 examines distress onset among ordinary cooperatives as an exploratory competing explanation; A8 analyses 14 pre-2014 WBO survivors using a separate average-gap design; and A9 reports joint and multiple-testing adjustments.

A7 and A8 should not be read as extensions of the main event-time design: A7 uses distress onset as its event, whereas A8 covers older survivors already observed in 2015–2024. The earlier instrumental-variable specification is not reported because the proposed instruments do not provide defensible independent identification. The appendix therefore documents sensitivity and benchmark dependence; it does not convert the observational comparison into a causal estimate.

A1 Do alternative outcome definitions change the reading

Table A1 Outcome definition checks

Outcome	Year 1 gap	Year 5 gap	Change year 1 to 5	N W/C	Model
ROE with positive equity (p.p.)	-12.29 (11.87)	-1.16 (10.84)	11.13 (9.76)	358 50/10	GEE
Raw sales growth (p.p.)	613.51*** (173.73)	43.17 (33.31)	-570.34*** (165.50)	346 51/10	GEE
Sales growth, winsorised (p.p.)	548.96*** (143.47)	34.41 (26.86)	-514.55*** (138.61)	346 51/10	GEE
Raw employment growth (p.p.)	72.09*** (25.97)	-24.95 (24.55)	-97.04** (39.31)	301 51/9	GEE
Employment growth, winsorised (p.p.)	71.69*** (25.91)	-26.01 (23.24)	-97.70** (38.71)	301 51/9	GEE
Working-capital cycle, winsorised (days)	62.3* (37.0)	63.6* (36.4)	1.3 (31.0)	280 37/10	POLS
Labour cost per employee, winsorised (EUR000)	-1.4 (5.0)	-8.2 (8.4)	-6.8 (10.1)	333 51/9	GEE

*Note: Read with Sections 4.1, 4.2 and 4.4. ROE excludes non-positive equity. Winsorisation uses pooled matched-panel 1st and 99th percentiles; it does not remove partial-year growth denominators. EUR000 means thousands of euros and p.p. percentage points. Samples, covariates and indicators follow the main specifications. Robust standard errors clustered by original firm are in parentheses. * p<0.10; ** p<0.05; *** p<0.01 (unadjusted, two-sided tests).*

A2 Does a linear trend alter the recovery inference

Table A2 ROA under a constant differential annual trend

Matched selection	Initial gap p.p.	Annual gap change p.p. per year	N
Original matched selection	-6.84*** (2.32)	2.64*** (0.97)	360
Regenerated legacy selection	-7.03*** (2.18)	2.61*** (0.91)	385
Corrected matched selection	-6.17*** (2.22)	2.04** (0.80)	380

*Note: Read with Section 4.1. POLS includes WBO status, linear event time, their interaction and the standard adjustment. Match and sample composition vary; the final row uses the principal corrected match. The slope imposes a constant annual gap change, unlike Table 8. Robust standard errors clustered by original firm are in parentheses. * p<0.10; ** p<0.05; *** p<0.01 (unadjusted, two-sided tests).*

A3 Are the differences also present within firms

Table A3 Firm fixed effects changes relative to year 1

Outcome and estimation sample	To year 2	To year 3	To year 4	To year 5
ROA (p.p.) FE; N=380; W/C=51/10	-0.08 (2.89)	3.29 (3.54)	4.40 (3.17)	4.64 (5.15)
ROS (p.p.) FE; N=373; W/C=51/10	-0.05 (2.00)	1.25 (2.11)	2.61 (1.95)	0.80 (3.11)
ROE (p.p.) FE; N=360; W/C=50/10	-1.07 (7.45)	0.84 (8.28)	12.00 (7.28)	-2.40 (12.07)
Sales growth (log points) FE; N=346; W/C=51/10	-1.305*** (0.265)	-1.429*** (0.257)	-1.396*** (0.264)	-1.390*** (0.285)
Debt / EBITDA in logs (log points) FE; N=317; W/C=49/9	0.011 (0.280)	-0.036 (0.302)	0.084 (0.301)	-0.242 (0.289)
Labour cost per employee (€000) FE; N=333; W/C=51/9	-7.3 (7.2)	-13.1 (10.4)	-17.8 (10.9)	-14.7 (12.6)
Employment growth (log points) FE; N=301; W/C=51/9	-0.434** (0.187)	-0.589*** (0.216)	-0.516** (0.232)	-0.677** (0.286)
Working-capital cycle (days) FE; N=280; W/C=37/10	-5.1 (20.9)	12.8 (36.1)	19.7 (49.9)	43.6 (47.9)

*Note: Read with Section 4.5. Every entry is a change in the WBO–peer gap, not a gap level. Firm effects absorb the time-invariant WBO indicator. Panel units are pair-specific copies and inference is clustered by original firm. Models include event-time and calendar-year indicators and the financial covariates; time-invariant area and sector are absorbed. Thus this table cannot establish whether WBOs have reached the peer profitability level. Robust standard errors clustered by original firm are in parentheses. * p<0.10; ** p<0.05; *** p<0.01 (unadjusted, two-sided tests).*

A4 Are the financial covariates driving the result

Table A4 Same sample and estimator with and without financial covariates

Outcome	Initial gap With	Initial gap Without	Change to year 5 With	Change to year 5 Without
ROA (p.p.) N=380; W/C=51/10	-5.67* (3.39)	-3.76 (3.32)	7.73* (3.89)	8.10** (3.64)
ROS (p.p.) N=373; W/C=51/10	-4.09* (2.30)	-3.62 (2.57)	4.67* (2.67)	5.42** (2.48)
ROE (p.p.) N=360; W/C=50/10	-17.27 (10.51)	-12.82 (8.84)	15.63 (10.54)	15.28 (9.77)
Sales growth (log points) N=346; W/C=51/10	1.470*** (0.259)	1.459*** (0.263)	-1.386*** (0.238)	-1.397*** (0.244)
Debt / EBITDA in logs (log points) N=317; W/C=49/9	0.328 (0.336)	0.076 (0.366)	-0.390 (0.345)	-0.420 (0.324)
Labour cost per employee (EUR000) N=333; W/C=51/9	-1.1 (5.7)	-0.8 (6.5)	-9.4 (10.1)	-9.0 (9.6)
Employment growth (log points) N=301; W/C=51/9	0.506*** (0.159)	0.536*** (0.167)	-0.586** (0.222)	-0.551*** (0.204)
Working-capital cycle (days) N=280; W/C=37/10	61.8 (37.0)	39.1 (49.3)	-0.2 (31.7)	-37.5 (36.8)

*Note: Read with Section 4.5. With and Without refer only to capital intensity, current ratio, debt/equity and log sales. Each comparison holds the outcome-specific complete-case sample, POLS estimator and year, area and sector indicators fixed. It separates regression conditioning from changing the observations or estimation method. Robust standard errors clustered by original firm are in parentheses. * p<0.10; ** p<0.05; *** p<0.01 (unadjusted, two-sided tests).*

A5 Does broadening the cooperative benchmark change the result

Table A5 Annual gaps using all eligible cooperative candidates

Outcome and estimation sample	Year 1 τ=0	Year 2 τ=1	Year 3 τ=2	Year 4 τ=3	Year 5 τ=4
ROA (p.p.) WOLS; N=1440; W/C=51/31	-6.48** (3.07)	-0.56 (2.32)	-0.80 (1.67)	-0.54 (1.65)	-0.92 (2.54)
ROS (p.p.) WOLS; N=1393; W/C=51/30	-3.72 (2.46)	-0.97 (1.19)	0.47 (1.16)	1.62 (1.12)	-1.09 (1.76)
ROE (p.p.) WOLS; N=1246; W/C=50/28	-22.42** (9.78)	-9.71 (7.72)	0.25 (6.85)	6.52 (6.61)	-9.04 (7.27)
Sales growth (log points) WOLS; N=1314; W/C=51/23	1.580*** (0.255)	0.423** (0.181)	0.199 (0.134)	0.152 (0.124)	0.102 (0.124)
Debt / EBITDA in logs (log points) WOLS; N=1137; W/C=49/25	0.334 (0.313)	0.290 (0.246)	0.203 (0.253)	0.294 (0.296)	0.111 (0.297)
Labour cost per employee (€000) WOLS; N=1242; W/C=51/24	0.3 (4.8)	-5.2 (4.3)	-3.3 (5.6)	-4.1 (4.7)	-2.8 (5.1)
Employment growth (log points) WOLS; N=1142; W/C=51/20	0.511*** (0.131)	0.190** (0.078)	0.010 (0.056)	-0.005 (0.074)	-0.017 (0.070)
Working-capital cycle (days) WOLS; N=878; W/C=37/20	41.9 (40.5)	32.8 (36.9)	24.3 (37.5)	24.3 (38.3)	49.1 (35.0)

*Note: Read with Section 4.5. This table uses the main cohort of buyouts from 2014 onwards, exactly as Tables 8–11. All 94 eligible AIDA cooperatives are admitted to candidate construction in exact baseline-year and macro-sector cells. Candidate weights are 1/n_cell, assigned before complete-case exclusions and not renormalised. All models are weighted POLS; outcome-specific W/C counts show which firms actually contribute. This is not the pre-2014 survivor sample in Table A8. Robust standard errors clustered by original firm are in parentheses. * p<0.10; ** p<0.05; *** p<0.01 (unadjusted, two-sided tests).*

A6 Does the organisational form of the peers matter

Table A6 Annual gaps relative to non-cooperative firms

Outcome and estimation sample	Year 1 τ=0	Year 2 τ=1	Year 3 τ=2	Year 4 τ=3	Year 5 τ=4
ROA (p.p.) GEE; N=410; W/C=51/45	2.58 (4.10)	-1.93 (3.44)	-0.89 (2.50)	-1.79 (2.28)	-0.17 (2.31)
ROS (p.p.) GEE; N=386; W/C=51/44	0.06 (2.09)	-3.18* (1.71)	-1.08 (1.69)	-1.48 (1.36)	-3.04** (1.37)
ROE (p.p.) GEE; N=374; W/C=50/44	-13.94* (7.31)	-17.23*** (6.00)	-15.81*** (5.77)	-8.32 (6.02)	-4.77 (7.09)
Sales growth (log points) GEE; N=372; W/C=51/45	1.513*** (0.249)	0.055 (0.179)	-0.074 (0.183)	-0.341** (0.145)	-0.179 (0.113)
Debt / EBITDA in logs (log points) GEE; N=336; W/C=49/44	0.347 (0.286)	0.326 (0.205)	0.210 (0.215)	0.231 (0.217)	-0.104 (0.222)
Labour cost per employee (€000) GEE; N=409; W/C=51/45	5.5 (7.0)	-0.4 (2.8)	-4.9 (6.1)	2.4 (2.8)	2.2 (2.7)
Employment growth (log points) GEE; N=370; W/C=51/45	0.069 (0.184)	0.111 (0.085)	-0.069 (0.118)	-0.250** (0.119)	-0.138 (0.120)
Working-capital cycle (days) GEE; N=289; W/C=37/42	49.7* (29.9)	-0.4 (50.6)	39.4 (40.5)	38.1 (51.7)	26.9 (50.2)

*Note: Read with Section 4.5. WBOs remain the recent main cohort; only the comparison population changes. Non-cooperative firms are matched on the same baseline-year, sector and corrected distance rule. Positive and negative entries retain the WBO-minus-peer interpretation, but now the peers are non-cooperative businesses. This exploratory comparison does not identify a causal ownership effect. Robust standard errors clustered by original firm are in parentheses. * p<0.10; ** p<0.05; *** p<0.01 (unadjusted, two-sided tests). N is the number of stacked firm-year observations; W/C counts distinct WBOs and controls actually used. All models include capital intensity, current ratio, debt/equity, log sales, and calendar-year, area and sector indicators unless stated otherwise. GEE denotes Gaussian exchangeable GEE; POLS is the fallback when GEE fails.*

A7 Could the pattern reflect recovery from distress

Table A7 Ordinary cooperatives after distress onset

Outcome	Gap at onset	Gap four years later	Change from onset	N P/C	Model
ROA (p.p.)	15.82 (21.50)	35.87 (32.88)	20.05 (24.88)	51 6/4	GEE
ROS (p.p.)	-16.67*** (0.81)	-4.43* (2.34)	12.23*** (2.54)	49 6/3	GEE
Probability of non-positive EBITDA (p.p.)	83.62*** (15.05)	-5.40 (36.57)	-89.02** (32.93)	51 6/4	POLS

*Note: Read with Section 4.5. No treated firm in this table is a WBO. P denotes ordinary cooperatives whose EBITDA first moves from positive to non-positive in 2016–2019; C denotes controls without that onset in the interval. Onset is year zero, unlike the first-full-post-buyout baseline elsewhere. The very small number of independent firms makes this an illustrative competing explanation, not a definitive falsification test. Robust standard errors clustered by original firm are in parentheses. * p<0.10; ** p<0.05; *** p<0.01 (unadjusted, two-sided tests).*

A8 What can the older survivors tell us

Table A8 Average adjusted gaps among pre 2014 WBO survivors

Outcome	Average WBO minus peer gap 2015–2024	N	W/C
ROA (p.p.)	-5.33* (2.86)	229	14/4
ROS (p.p.)	-4.07* (2.08)	228	14/4
ROE (p.p.)	-11.27 (7.56)	228	14/4
Sales growth (log points)	0.163* (0.092)	202	14/3
Debt / EBITDA in logs (log points)	0.188 (0.331)	217	14/4
Labour cost per employee (EUR000)	-9.4 (6.4)	177	14/3
Employment growth (log points)	0.056 (0.067)	156	14/2
Working-capital cycle (days)	32.8 (34.1)	192	11/4

*Note: Read with Section 4.5. This separate cohort contains 14 pre-2014 WBOs, already 2–43 years beyond buyout at the 2015 matching baseline. The entries are average conditional differences during 2015–2024, estimated by POLS without event-time interactions. They are neither annual post-buyout gaps nor observations extending Table A5. The standard covariates and year, area and sector indicators are included. Survivor selection and only 2–4 contributing controls limit long-run inference. Robust standard errors clustered by original firm are in parentheses. * p<0.10; ** p<0.05; *** p<0.01 (unadjusted, two-sided tests).*

A9 Which findings survive joint and multiple testing checks

Table A9 Panel A Joint tests for the principal models

Outcome	Dynamics p	Dynamics q	Late gaps p
ROA	0.053	0.089	0.756
ROS	0.092	0.115	0.529
ROE	0.034	0.085	0.362
Sales growth	<0.001	<0.001	0.267
Debt / EBITDA in logs	0.172	0.172	0.250
Labour cost per employee	0.616	0.810	0.404
Employment growth	0.025	0.074	0.736
Working-capital cycle	0.810	0.810	0.214

Note: Read with Section 4.5. Dynamics tests whether the four changes from year 1 are jointly zero; Late gaps tests whether the year-4 and year-5 gaps are jointly zero. Non-rejection does not establish equivalence. Dynamics q applies Benjamini–Hochberg separately to the five financial/sales outcomes and the three labour/working-capital outcomes.

Table A9 Panel B Adjusted q values for annual gaps

Outcome	Year 1	Year 2	Year 3	Year 4	Year 5
ROA	0.278	0.030	0.752	0.864	0.627
ROS	0.260	0.069	0.627	0.498	0.864
ROE	0.511	0.511	0.967	0.498	0.967
Sales growth	<0.001	0.156	0.260	0.322	0.299
Debt / EBITDA in logs	0.511	0.156	0.156	0.476	0.864
Labour cost per employee	0.946	0.413	0.413	0.413	0.413
Employment growth	0.014	0.413	0.413	0.946	0.517
Working-capital cycle	0.413	0.413	0.413	0.413	0.413

Note: The two unchanged testing families are the 25 annual gaps for ROA, ROS, ROE, sales growth and debt/EBITDA, and the 15 gaps for employment growth, labour cost and aggregate WCC. Rearranging the manuscript tables does not change these families. At a 5% false-discovery-rate threshold, the second-year ROA gap and the first-year sales and employment growth gaps remain significant. Conventional stars elsewhere use unadjusted p-values. Auxiliary outcomes and sensitivity designs are exploratory and outside these families.