Managerial Ownership and Dividend Policy During Covid-19: Evidence from Euro Stoxx 50 Firms

RITA FERREIRA [a], VÍTOR RIBEIRO [a], JORGE FARINHA [a,b*]

[a] Faculdade de Economia, University of Porto, Porto, Portugal, b Faculdade de Economia, University of Porto, Porto, and Center for Economics and Finance (CEF- UP), University of Porto, Porto, Portugal.
* Corresponding author: jfarinha@fep.up.pt

To cite this article: Rita Ferreira, Ribeiro, V., Farinha, J. 2026. Managerial Ownership and Dividend Policy During Covid-19: Evidence from Euro Stoxx 50 Firms, *European Review of Business Economics V*(2): 63-98.

DOI: https://doi.org/10.26619/ERBE-2026.5.2.4.

ABSTRACT

This study examines how managerial ownership affects dividend policy among large European listed firms and whether this relationship changed during the Covid-19 pandemic. Drawing on agency theory and the view that dividends and ownership may function as substitute or complementary governance mechanisms, we analyse a panel of 38 non-financial Euro Stoxx 50 firms over 2013–2023 using instrumental-variable and panel regressions with firm- and year-level controls. The results show a positive and statistically significant association between managerial ownership and dividend payouts. This effect is stronger at lower levels of managerial ownership and does not support the non-monotonic relationship predicted by entrenchment theories for the full sample, although industry-level analyses suggest some heterogeneity. Covid-19 had no direct effect on dividend payouts but strengthened the positive association between managerial ownership and dividends, a finding robust to alternative definitions of the pandemic period. These results suggest that managerial ownership and dividends operate primarily as complementary governance mechanisms in large European blue-chip firms, particularly during periods of uncertainty. The study contributes to the ownership-dividend literature by providing evidence from a European civil-law setting and by documenting how this governance relationship evolved during the Covid-19 shock. An external validity analysis confirms the robustness of the positive ownership-dividend relationship.

Keywords: Managerial ownership, Dividend policy, Corporate governance, Agency theory, Covid-19, Euro Stoxx 50.
JEL Codes: G01, G32, G34, G35.

I. Introduction

Dividend policy remains one of the most persistent puzzles in corporate finance. In a frictionless world, payout policy should be largely irrelevant. In real corporations, however, dividends are interpreted by investors, disciplined by boards, constrained by financing needs, and shaped by ownership structures. The puzzle becomes more interesting when managers themselves own shares. Managerial ownership can align incentives, but it can also entrench insiders. Dividends can reduce free cash flow and agency costs, but they can also be used strategically to reassure investors. The interaction between these mechanisms is therefore not obvious; this is precisely why it requires empirical attention.

Agency theory provides the theoretical foundation for this study. The separation of ownership and control creates potential conflicts between managers and shareholders (Jensen & Meckling, 1976). Dividends may mitigate these conflicts by reducing the cash under managerial discretion and by forcing firms to return to external capital markets more frequently, where monitoring is stronger (Easterbrook, 1984; Jensen, 1986). Managerial ownership, in turn, can align managerial incentives with shareholder wealth by making managers residual claimants. Yet once ownership becomes sufficiently high, voting power and control rights may protect managers from external discipline, generating entrenchment (Stulz, 1988; Shleifer & Vishny, 1989).

The empirical literature mirrors this theoretical ambiguity. Some studies find that managerial ownership and dividends are substitutes: higher ownership reduces agency conflicts and therefore lowers the need for dividends (Crutchley & Hansen, 1989; Jensen et al., 1992; Chen & Steiner, 1999). Other studies find complementarity, arguing that entrenched managers may voluntarily distribute dividends to signal discipline and avoid shareholder pressure (Zwiebel, 1996; Jo & Pan, 2009). A third group documents nonlinear patterns, including U-shaped or more complex relationships (Schooley & Barney, 1994; Farinha, 2003b; Florackis et al., 2015; Farinha & Lopez-de-Foronda, 2009).

This study revisits this debate in the specific context of large European-listed firms and the Covid-19 shock. The pandemic provides a useful setting because it imposed a sudden and severe liquidity and uncertainty shock while also testing the resilience of firms' governance arrangements. Dividend policy came under pressure from collapsing revenues in some sectors, caution from boards, and political scrutiny of distributions to shareholders. At the same time, well-established firms may have used dividends to signal stability and reassure investors. The central question is therefore whether managerial ownership continued to shape payout policy during this turbulent period and, if so, whether the pandemic intensified or weakened that relationship.

Using a panel of 38 non-financial Euro Stoxx 50 firms from 2013 to 2023, the study examines two questions. First, is the relationship between managerial ownership and dividends monotonic or nonmonotonic? Second, did Covid-19 change this relationship? The dependent variable is dividends scaled by total assets. The key explanatory variable is the percentage of shares held by managers and directors. The models control for institutional ownership, board size, board independence, female board representation, CEO duality, board tenure, board type, firm size, profitability, capital expenditures, cash holdings, and leverage.

The findings are clear. Managerial ownership is positively and significantly associated with dividends in the main specifications. The evidence does not support a statistically robust nonlinear relation. The Covid-19 dummy is not significant as a standalone determinant of dividends, but the interaction between managerial ownership and Covid-19 is positive and significant. In plain terms: Covid-19 did not mechanically change dividend policy for all firms, but it strengthened the ownership-dividend channel. This result is more relevant than a blunt pandemic dummy. It suggests that governance mechanisms mattered precisely when uncertainty increased.

The contribution of this paper is threefold. First, the study extends the ownership-dividend literature to a European blue-chip setting, where legal systems, ownership structures, and governance codes differ from the heavily studied US and UK contexts. Second, it adds to the evidence available concerning dividend policy during Covid-19, a crisis that differed from traditional financial crises in its origin, sectoral impact, and policy response. Third, it shows that managerial ownership and dividends can serve as complementary governance mechanisms in large firms, especially when managerial ownership levels are generally low.

II. Literature Review and Hypothesis Development

A. Agency Theory, Dividends and Managerial Ownership

Agency theory stems from a simple but powerful idea: managers do not automatically act as perfect stewards of shareholder wealth. When ownership and control are separated, managers may consume private benefits, avoid effort, overinvest free cash flow, or pursue strategies that increase their own utility rather than firm value. Corporate governance mechanisms exist to reduce these agency costs. Among such mechanisms, dividend policy and managerial ownership are especially relevant because both affect the allocation of cash and incentives inside the firm.

Dividends discipline managers by reducing the amount of free cash flow available for discretionary use. Jensen (1986) argues that managers with excess cash may invest in negative net present value projects or pursue empire-building. Easterbrook (1984) adds that dividends can force firms to access external capital markets more often, thereby increasing monitoring from investors, analysts, and intermediaries. Under this view, dividends are not just a way of distributing profits; they are a governance mechanism. The firm sends cash out the door before managers can find creative ways to spend it. This is corporate finance's version of hiding the biscuit tin.

Managerial ownership is also a governance mechanism, but its effect is theoretically ambiguous. At low levels, ownership aligns incentives: managers who own shares internalise more of the consequences of their decisions. At high levels, however, managerial voting power can insulate insiders from discipline, creating entrenchment. Morck et al. (1988), McConnell and Servaes (1990), and Stulz (1988) emphasise that the relation between ownership and corporate outcomes may therefore be nonlinear.

B. Substitution, Complementarity and Nonlinearity

The substitution view predicts a negative relation between managerial ownership and dividends. If managerial ownership already aligns incentives, the marginal need for dividends as a monitoring device declines. Crutchley and Hansen (1989), Jensen et al. (1992), Chen and Steiner (1999), Eckbo and Verma (1994), and Short et al. (2002) provide evidence consistent with this perspective in different settings. Under this view, ownership and dividends are alternative tools for mitigating agency conflicts.

The complementarity view predicts a positive relation. Zwiebel (1996) develops a model in which entrenched managers voluntarily pay dividends to reduce the likelihood of external intervention. Jo and Pan (2009), Vo and Nguyen (2014), and Al-Qahtani and Ajina (2017) provide empirical evidence that managerial ownership may be associated with higher dividends. This view is especially plausible when firms want to reassure investors that insiders will not appropriate cash flows.

The nonlinear view reconciles the two mechanisms. Schooley and Barney (1994) report a U-shaped pattern. Farinha (2003b) finds evidence consistent with managerial entrenchment in UK firms. Florackis et al. (2015) show that the relationship is more complex and can vary across ownership ranges and financing constraints. Farinha and Lopez-de-Foronda (2009) document distinct nonlinear patterns across legal systems, with civil-law countries exhibiting a positive-negative-positive profile. Since Euro Stoxx 50 firms operate mostly in continental European institutional environments, a nonlinear relationship is a plausible ex ante expectation.

C. Why complementarity is the expected dominant pattern in this setting?

The three views above are not equally plausible expected ex ante for every sample. Euro Stoxx 50 firms are not a random draw from the universe of listed companies. Indeed, these are the largest, most liquid, most closely scrutinized non-financial corporations in the euro area, operating under a specific bundle of institutional constraints that should push the ownership-dividend relation toward the complementarity end of the spectrum rather than toward entrenchment-driven substitution or a full nonlinear profile.

First, the level of managerial ownership itself matters for which theoretical regime applies. Entrenchment arguments (Stulz, 1988; Shleifer & Vishny, 1989; Morck et al., 1988) describe what happens once insiders accumulate enough voting power to resist outside discipline; nonlinear evidence such as Farinha and Lopez-de-Foronda's (2009) positive-negative-positive profile for civil-law countries is identified across a wide range of ownership, including the high-ownership region where entrenchment bites. Euro Stoxx 50 firms are, almost definitionally, the opposite case: large blue chips with dispersed share registers in which managers and directors typically hold small stakes (e.g., mean managerial ownership of 3.6% in our sample, with the bulk of the distribution well below 10%). At these ownership levels, the alignment-of-interests mechanism that motivates the complementarity view is the one with empirical content. The entrenchment mechanism is mostly theoretical because so few sample firms ever reach the ownership concentrations at which it would be expected to operate.

Second, the regulatory environment surrounding large euro-area issuers already performs much of the work that internal ownership concentration would otherwise have to do under the entrenchment story. Euro Stoxx 50 constituents are subject to EU-wide disclosure and governance requirements – including enhanced related-party-transaction and remuneration disclosure under the revised Shareholder Rights Directive 2017/828 – together with national corporate governance codes operating on a "comply-or-explain" basis and close coverage by sell-side analysts, proxy advisors, and index providers. These external constraints limit the scope for managers to extract private benefits even as their personal shareholdings grow, which weakens the mechanism that would otherwise generate a negative, entrenchment-driven leg in the ownership-dividend relation. In this sense, the institutional environment substitutes for high managerial ownership as a source of managerial discipline, leaving dividends and ownership free to operate as complements rather than as alternative disciplining devices.

Third, the same large-firm, civil-law setting that could in principle support a nonlinear pattern also reduces the value of dividends as a pure cash-discipline device and correspondingly increases their value as a credible signal. La Porta et al. (1999, 2000) note that minority shareholder protection is generally weaker in civil-law countries than in common-law countries, which increases investors' reliance on firm-level commitment devices such as dividends to certify that cash will not be diverted. When managers themselves hold equity, a dividend commitment is not costless to them either, which makes it a more credible signal precisely because it is personally costly – an argument closer to Miller and Rock (1985) than to the free-cash-flow logic of Jensen (1986) alone. High institutional ownership, namely 64.2% on average in our sample, reinforces this signalling channel by supplying an audience of sophisticated investors who can act on it. These features – low managerial ownership levels, strong external governance constraints, and an institutional environment that rewards credible commitment – jointly motivate complementarity, rather than substitution or a full nonlinear profile, as the pattern we expect to dominate empirically in this sample, even though Hypothesis 1 is stated in its more general nonmonotonic form to allow the data to discriminate between the three views.

D. Covid-19 and Dividend Policy

The Covid-19 pandemic created an exceptional corporate finance environment. Firms faced abrupt demand shocks, operational disruptions, liquidity concerns, and intense uncertainty. Dividend policy was therefore likely to become more sensitive to governance and ownership. Some firms cut or suspended dividends to preserve cash, while others maintained payouts to signal confidence and financial resilience. Krieger et al. (2021) document extensive dividend cuts and omissions among US firms in 2020, whereas Tinungki et al. (2022) show that some firms used dividends as a positive signal during the pandemic.

Prior crisis-related governance studies suggest that ownership and board characteristics become more relevant during adverse periods. Sawicki (2009) shows that corporate governance and dividends interacted differently before and after the Asian financial crisis. Mili et al. (2017) find that ownership and board structures help explain dividend policy in emerging markets during financial crises. Covid-19, however, was not a conventional banking or leverage crisis. It was an external shock with uneven sectoral effects and substantial policy intervention. This makes it a useful test of whether managerial ownership matters when uncertainty is high.

The first hypothesis follows the nonlinear governance literature. The second hypothesis follows the crisis-governance argument that ownership mechanisms should become more relevant during periods of uncertainty.

Hypothesis 1. The relationship between managerial ownership and dividend payments is nonmonotonic.

Hypothesis 2. The Covid-19 pandemic strengthens the relationship between managerial ownership and dividend payments.

III. Data and Methodology

A. *Sample, Data Sources, and Empirical Design*

The sample consists of firms included in the Euro Stoxx 50 index, a market-capitalization-weighted index of the 50 largest and most liquid blue-chip stocks in the euro area. We use this index, rather than an ad hoc collection of large European firms, for three reasons. First, its rules-based, quarterly-reconstituted free-float methodology provides a consistent and replicable definition of the relevant population over time. Second, governance and ownership disclosure is generally more complete and more standardized among the largest, most visible issuers, which materially reduces missing-data bias in the manually collected ownership variables described below; this is particularly relevant for managerial ownership, which is reported far less consistently among smaller European issuers. Third, Euro Stoxx 50 constituents are of direct interest to regulators, index providers, and institutional investors monitoring the payout behaviour of systemically important firms, including through the Covid-19 shock. Financial and insurance firms are excluded because their payout policies and capital structures are subject to specific prudential and supervisory constraints and are therefore not directly comparable with non-financial firms.

The final sample includes 38 non-financial firms observed from 2013 to 2023, for a maximum of 418 firm-year observations. The sample period spans pre-pandemic, pandemic, and post-pandemic years. Throughout the study, the baseline Covid-19 dummy, COVID, is coded 1 for fiscal years 2020 through 2023 and 0 for 2013-2019, so as to capture both the acute shock of 2020-2021 and the slower post-shock normalization that followed. Because the choice of which years count as "pandemic" years is not self-evident and could in principle affect the interaction results, we report a sensitivity analysis that recomputes the Covid-19 interaction model under three alternative definitions of the pandemic period (2020 only; 2020-2021; 2020-2022) and compares the resulting coefficients against the baseline.

Finally, financial and governance data are obtained from Refinitiv Workspace. Managerial ownership and institutional ownership are manually collected from annual reports, universal registration documents, Form 20-F filings, and other firm disclosures.

This manual collection is important because ownership disclosure is not always standardized across European jurisdictions. As such, the empirical design prioritizes verifiable ownership observations rather than mechanically filling gaps. The full data-collection protocol, including the specific document types consulted, the order in which sources are cross-checked, and the treatment of missing or banded disclosures, is described step by step in the Data Availability Statement.

B. Variables

The dependent variable, DIV, is defined as total dividends paid divided by total assets. This scaling avoids some of the distortions associated with payout ratios when net income is volatile or negative. The key explanatory variable, MAN_OWN, is the percentage of shares held by the firm's managers and directors. To test for nonlinear effects, the squared term MAN_OWN2 is included in the nonlinear specification.

Governance controls include institutional ownership, board size, board independence, board tenure, female board representation, board type, and CEO duality. Financial controls include firm size, return on assets, capital expenditures, cash holdings, and debt. Firm size is measured as the natural logarithm of market capitalisation. Return on assets captures profitability. Capital expenditures scaled by total assets proxy for investment intensity. Cash holdings and debt capture liquidity and leverage, respectively.

C. Descriptive Statistics and Preliminary Econometric Tests

Table 1 reports descriptive statistics. Dividends average 2.5% of total assets and display relatively modest variation, which is consistent with the smoothing behaviour typically associated with dividend policy. Managerial ownership averages 3.6%, but the distribution is highly skewed: most Euro Stoxx 50 firms exhibit very low managerial ownership, while a small number of firms have substantially higher insider stakes. Institutional ownership is high, averaging 64.2%, confirming the relevance of professional investors in the ownership structures of large European firms.

The board variables indicate mature governance structures. Average board size is approximately 14 directors, board independence is about 68%, and female board representation averages 36.1%. Financially, the firms are large, profitable, and generally stable, with average ROA of 5.7%, cash holdings of 9.3% of assets, and debt of 26% of assets. These features matter for interpretation because it reflects a sample of large blue-chip firms with relatively stable payout capacity. Additionally, several preliminary econometric tests are performed. The Ramsey test, whose null hypothesis states that the model is correctly specified due to the absence of omitted variables, does not reject the null hypothesis, $F(3,287)=2.03$, $p=0.109$, when considering the simple linear regression model formed by DIV = f (MAN_OWN) plus the non-deterministic component. Table A1 in Appendix shows that variance inflation factors for the full set of regressors are all below 5, the conventional threshold, indicating that multicollinearity is not a source of concern. A pairwise correlation matrix is computed and reported in Table A2 of the Appendix.

We also apply the Breusch-Pagan test to understand whether OLS is preferred to random effects (χ_([1])^2=53.35, $p<0.01$), and Hausman test to assess whether the random effects estimator is preferred to fixed effects ($\chi_{([13])}^2=28.94$, $p<0.01$). These results justify employing fixed effects from a statistical point of view.

Table 1– Descriptive Statistics.

Note: DIV is total dividends divided by total assets. MAN_OWN is the percentage of shares held by managers and directors. The sample consists of 38 non-financial Euro Stoxx 50 firms over 2013-2023.

Variable	Mean	Std. dev.	Minimum	Maximum
DIV	0.025	0.020	0.000	0.162
MAN_OWN	0.036	0.110	0.000	0.594
INST_OWN	0.642	0.202	0.033	0.920
BOARD_SIZE	14.405	3.926	6.000	22.000
BOARD_INDEP	0.679	0.230	0.160	1.000
FEMALE_BOARD	0.361	0.109	0.000	0.667
CHAIR_CEO	0.432	0.496	0.000	1.000
BOARD_TENURE	6.832	2.073	2.111	14.250
FIRM_SIZE	10.896	0.725	8.176	12.882
ROA	0.057	0.048	-0.133	0.360
CAPEX	0.041	0.025	0.001	0.138
CASH	0.093	0.079	0.011	0.528
DEBT	0.260	0.121	0.000	0.583

Regarding the two relevant classical hypotheses – heteroscedasticity, autocorrelation in the within-variation component and serial correlation in the between-variation component of the panel – we confirm rejection of the null hypothesis capturing homoscedasticity ($\chi_{([20])}^2=2056.52$, $p<0.01$), rejection of the null hypothesis of no autocorrelation ($F(1,19)=13.307$, $p<0.01$), and the complete absence of contemporaneous serial correlation or serial correlation of higher order ($z_{(AR(1))}= -1.420$, $p=0.156$ and $z_{(AR(2))}= -1.260$, $p=0.208$). This suggests that in the panel data analysis, one should control for the presence of heteroscedasticity and autocorrelation only through the estimation of the multiple linear regression model (MLRM) by OLS with the support of the Newey-West variance-covariance matrix.

D. *Empirical Specification*

The main empirical specification estimates dividend payments as a function of managerial ownership and control variables. The benchmark model can be written as:

$$DIV_{it}=\alpha+\beta_1 \, MAN\_OWN_{it}+\gamma X_{it}+\mu_i+\lambda_t+\varepsilon_{it}$$

where DIV_{it} is dividends scaled by assets, $MAN\ OWN_{it}$ is managerial ownership, X_{it} is the matrix of governance and financial controls, μ_i denotes firm fixed effects, λ_t denotes year fixed effects, and ε_{it} captures the disturbance term. The nonlinear specification adds MAN_OWN2. The Covid-19 specification adds a Covid dummy and interactions between Covid and managerial ownership and controls.

The analysis uses 2SLS with robust standard errors to control for heteroscedasticity, complemented by OLS estimations with Newey-West standard errors to address both heteroscedasticity and autocorrelation in the within-variation component of the panel.

Lagged managerial ownership is used as an instrument in the 2SLS specification. Additional robustness tests include temporal subsamples, sectoral subsamples, alternative dividend measures, winsorised and standardised variables, and quantile analysis. This is sensible econometrics rather than significant modelling changes, so as to test whether the central result survives reasonable benchmark modifications.

IV. Empirical Results

A. Baseline and Benchmark Regressions

The baseline results in Table 2 provide strong preliminary support for a positive relation between managerial ownership and dividends. In the 2SLS specification (column 1), the coefficient on MAN_OWN is positive and statistically significant. The OLS specification with Newey-West standard errors and without fixed effects yields the same sign and significance level. This result supports the complementarity view: firms with greater managerial ownership tend to pay higher dividends. Institutional ownership is negatively associated with dividends, suggesting that institutional investors may substitute for payout-based monitoring.

The benchmark specification also includes governance and financial controls. Board size is negatively associated with dividends. Firm size and profitability are positively associated with dividends, while leverage is negatively associated with dividends. These signs are economically intuitive. Large and profitable firms have the capacity to pay, whereas highly levered firms, quite sensibly, have less room to be generous.

Once within-firm fixed effects are imposed, the coefficient on the within-transformed managerial ownership variable becomes negative and insignificant, and the specification is less informative because managerial ownership displays limited within-firm variation over time. The sign reversal on MAN_OWN once firm-level fixed effects are imposed in Table 2 (column 3) deserves a detailed explanation. Managerial ownership changes very little within most firms over an eleven-year window. For instance, directors who hold shares tend to keep holding similar stakes, and the rare year-to-year movements that do occur are typically idiosyncratic (e.g., an option grant vesting, a block sale following a price run-up, or a director's retirement) rather than a deliberate, payout-relevant change in governance philosophy.

The within-firm estimator can only use this residual, mostly mechanical variation, because it discards the persistent cross-firm differences in ownership level that drive the cross-sectional 2SLS and OLS results. If idiosyncratic ownership changes are more likely to coincide with temporarily depressed share prices or one-off cash needs that also depress that year's dividend, the within-firm slope can pick up this short-run, mechanically induced association rather than the structural alignment relation the study is interested in, and can even flip sign. Consistent with this interpretation, the estimated coefficient of MAN_OWN in column 3 is far less precisely estimated than its cross-sectional counterparts and loses significance under the Newey-West fixed-effects specification. Additionally, despite the Breusch-Pagan and Hausman tests favour random effects over pooled OLS and fixed effects over random effects in a purely statistical sense, it is relevant to recognize that statistical preference for fixed effects is not the same as informativeness: with so little within-firm signal in the regressor of interest, the fixed-effects estimator is the most conservative test the data can offer, not the most informative one. For this reason, we treat the cross-sectional 2SLS estimates – corroborated by the random-effects specification in column (2), which relies on between-firm variation while still allowing for a partial firm-level random component – as the main specification in Table 2, and report fixed effects as a lower-power robustness check.

Table 2– Benchmark Regression Results.

Note: Robust standard errors in parentheses. Estimated value of the interception term is omitted for the sake of brevity. The dependent variable is DIV. Column (1) presents the estimation results of the 2SLS-IV approach. A random-effects specification that controls for both heteroscedasticity and autocorrelation is estimated in column (2). The fixed-effects estimation provided in column (3) reports within-transformed variables. In column (1), since we have one instrument for one potential endogenous variable, the underidentification test result ($\chi\_([1])^2$=3.787, p=0.052) confirms that we do not reject the null that the instrument is invalid for a significance level of 5%. Regarding the instrument's strength, result confirm that the instrument is strong (Cragg-Donald Wald F statistic = 22,776.37 and Kleibergen-Paap Wald rk F statistic = 34,696.46). However, these two analyses are irrelevant because the endogeneity test confirms that MAN_OWN is exogenous ($\chi\_([1])^2$=1.826, p=0.177). Column (4) provides the estimation results from applying the procedure proposed by Lewbel (2012), which exogenously assumes endogeneity of MAN_OWN, and therefore creates pseudo-instruments based on moment conditions. Results are aligned with those reported in column 1 given that, since we have more than one pseudo-instrument for one potential endogenous variable, the overidentification test result (χ_([11])^2=14.137, p=0.226) confirms that we do not reject the null that the instruments are valid. Regarding the instrument's strength, result confirm that the instrument is strong (Cragg-Donald Wald F statistic = 54.634 and Kleibergen-Paap Wald rk F statistic = 74.063). Statistical significance: * $p < 0.10$, ** $p < 0.05$, *** $p < 0.01$.

Variable	2SLS	Newey-West without FE	Newey-West with FE
MAN_OWN	0.0609***	0.0602***	-0.0497
	(0.00689)	(0.0107)	(0.0323)
INST_OWN	-0.0225***	-0.0170**	-0.0431**
	(0.00498)	(0.00705)	(0.0177)
BOARD_SIZE	-0.00110***	-0.00112***	-0.000481
	(0.000333)	(0.000427)	(0.000398)
BOARD_INDEP	0.00852	0.00668	0.00487
	(0.00696)	(0.00641)	(0.00743)
FEMALE_BOARD	-0.00271	-0.00239	-0.0134
	(0.0185)	(0.0120)	(0.0106)
CHAIR_CEO	0.00379	0.00293	0.00351
	(0.00348)	(0.00253)	(0.00359)
FIRM_SIZE	0.00404***	0.00461***	0.00585***
	(0.00141)	(0.00162)	(0.00215)
ROA	0.201***	0.205***	0.111**
	(0.0322)	(0.0320)	(0.0426)
CAPEX	-0.0215	-0.0102	0.227***
	(0.0540)	(0.0440)	(0.0660)
CASH	-0.0126	-0.00956	-0.0192
	(0.0252)	(0.0186)	(0.0250)
DEBT	-0.0254***	-0.0240***	-0.00963
	(0.00762)	(0.00902)	(0.0140)
R^2	0.760		

B. Instrument Validity

The dividend equation contains a potentially endogenous regressor, MAN_OWN, instrumented with its own one-period lag, L.MAN_OWN. With one instrument for one endogenous regressor, the equation is exactly identified, with zero overidentifying restrictions. The Sargan-Hansen test of overidentifying restrictions requires strictly more instruments than endogenous regressors to generate the degrees of freedom on which the test relies and is therefore neither computable nor interpretable here. Accordingly, we report the informative diagnostics for this setting, which is the underidentification test (i.e., Kleibergen-Paap rk LM statistic), whose null hypothesis is that the equation is underidentified, or equivalently, that the instrument is invalid.

In turn, weak-identification tests (i.e., Kleibergen-Paap rk Wald F-statistic and the Cragg-Donald F-statistic), which are conventionally compared against the Stock and Yogo's (2005) critical value of 16.38 for a 5% maximal instrumental variable (IV) size with one endogenous regressor and one instrument, assess the instrument's strength. From a statistical point of view, a strong first stage in any 2SLS approach establishes relevance. Both diagnostics, together with the endogeneity test applied to MAN_OWN, are produced for the 2SLS specification and reported in the notes of Tables 2 and 3.

From a conceptual point of view, a relevant argument can be given to justify the plausibility of the selected instrument. Conditional on the contemporaneous governance and financial controls already included in the MLRM – institutional ownership, board characteristics, profitability, capital expenditure, cash holdings, and leverage – there is no obvious channel through which last year's ownership stake should have an independent direct effect on this year's dividend beyond its effect on this year's ownership stake, implying a priori a strong correlation between instrument and potential endogenous variable. However, the standard threat to this argument is a slow-moving omitted factor – for instance, a persistent family- or founder-control orientation, or a long-run payout culture – correlated with both the lag and current dividends independently of current ownership.

Our empirical analysis mitigates this source of concern in three complementary ways. First, the firm fixed-effects specification in Table 2 (column 3) absorbs this kind of time-invariant firm heterogeneity. While that estimator is individually under-powered, the temporal-subsample evidence in Table 3 shows the positive relation holding within each sub-period rather than being driven solely by persistent cross-firm differences. Second, the endogeneity test reported alongside the 2SLS specification fails to reject the null that MAN_OWN is exogenous, which is itself evidence against an important omitted common factor operating through the instrument. Third, we implement the Lewbel's (2012) heteroskedasticity-based IV strategy that does not rely on the lag of MAN_OWN. Although assuming the presence of endogeneity, results in Table 2 confirm that the positive sign and significance of MAN_OWN remains unchanged with the application of this procedure, thereby reinforcing evidence of a positive association between managerial ownership and dividend policy.

C. Covid-19 Moderation Analysis

Table 3 reports the results of the Covid-19 interaction model. The coefficient on MAN_OWN is positive and statistically significant in the pre-pandemic period, indicating that greater managerial ownership is associated with higher dividend payouts under normal conditions. More importantly, the interaction term between MAN_OWN and the Covid-19 dummy is also positive and statistically significant under the two extreme definitions of the pandemic period – i.e., when Covid-19 is defined as covering only 2020 and when it is defined as spanning the entire 2020–2023 period.

These findings suggest that the positive effect of managerial ownership on dividend payouts was reinforced during the pandemic under both the narrowest and broadest classifications of the COVID-19 period, thereby supporting Hypothesis 2: the pandemic intensified the positive ownership-dividend relation.

Meanwhile, the Covid dummy itself is insignificant, indicating that the pandemic did not have a uniform direct effect on dividends after controlling for ownership, governance and financial characteristics. This distinction is crucial because the result confirms that Covid-19 changed the strength of the relation between governance and dividends. Firms with higher managerial ownership were more likely to sustain or increase payouts relative to others. This is consistent with a signalling or reassurance interpretation, whereby insider ownership and dividends jointly communicated stability during a period of high uncertainty.

Other governance variables also change during the pandemic. Female board representation is negatively associated with dividends outside the pandemic, but its interaction with Covid-19 is positive and strongly significant. Cash holdings have a negative Covid interaction. These results reflect that crisis conditions altered the relevance of board composition and liquidity in payout decisions. Again, the pandemic did not simply push all firms in one direction but rather changed which governance and financial characteristics mattered.

Because the interaction result in column 1 of Table 3 could in principle be sensitive to the specific years coded as "pandemic" years, we check it in two complementary ways. The first splits the panel into Pre-Covid (2013-2019), Acute-Covid (2020-2021), and Post-Covid (2022-2023) sub-periods and re-estimating the benchmark 2SLS specification separately within each window, rather than through a single interacted dummy. The MAN_OWN coefficient remains positive and statistically significant in every sub-period — 0.049 before the pandemic, 0.090 during the acute 2020-2021 window, and 0.081 in 2022-2023 — peaking during the acute phase and remaining elevated relative to the pre-pandemic baseline even after the most severe shock had passed. This is the same qualitative pattern as the interaction result in column 1 of Table 3. As such, the temporal subsample analysis shows that MAN_OWN is positive and significant before, during, and after Covid-19, with the coefficient largest during the acute pandemic period. This pattern reinforces the claim that uncertainty strengthened the ownership-dividend channel. The second robustness check varies the definition of the COVID-19 dummy within the interaction model by comparing the baseline specification (2020–2023) with three progressively narrower alternatives: 2020 only (capturing the initial lockdown period), 2020–2021 (the acute phase of the pandemic), and 2020–2022 (the acute phase plus the first year of recovery). Although the interaction term between MAN_OWN and the COVID-19 dummy is not statistically significant under every specification, it remains positive throughout and is statistically significant under the two extreme definitions of the pandemic period – namely, the narrowest definition (2020 only) and the broadest definition (2020–2023). The consistency in sign, together with the significance observed under these alternative classifications, provides robust support for Hypothesis 2 and indicates that the documented moderating effect of the pandemic is not driven by a particular choice of the Covid-1-time window.

Table 3– Covid-19 Interaction Models and Subsample Analysis.

Note: The table reports selected coefficients from the 2SLS Covid-19 interaction specification. Columns (1), (5), (6), and (7) are MLRMs with both additive and multiplicative effects. Columns (2), (3), and (4) correspond to subsample analyses. Most interaction terms in columns (1), (5), (6), and (7) are omitted for the sake of brevity. Robust standard errors are in parentheses. In column (1), the baseline Covid dummy equals 1 for 2020-2023. Since we have one instrument for one potential endogenous variable, the underidentification test result ($\chi\_([1])^2=7.111$, $p=0.008$) confirms that we do reject the null that the instrument is invalid for a significance level of 5%. Regarding the instrument's strength, result confirm that the instrument is strong (Cragg-Donald Wald F statistic = 9499.108 and Kleibergen-Paap Wald rk F statistic = 4778.433). However, these two analyses are irrelevant because the endogeneity test confirms that MAN_OWN is exogenous ($\chi\_([1])^2=2.037$, $p=0.154$). In column (2), the endogeneity test confirms that MAN_OWN is exogenous ($\chi\_([1])^2=0.668$, $p=0.414$). In column (3), the endogeneity test confirms that MAN_OWN is exogenous ($\chi\_([1])^2=3.600$, $p=0.058$). In column (4), the endogeneity test confirms that MAN_OWN is exogenous ($\chi\_([1])^2=3.081$, $p=0.079$). In column (5), the endogeneity test confirms that MAN_OWN is exogenous ($\chi\_([1])^2=2.489$ $p=0.115$). In column (6), the endogeneity test confirms that MAN_OWN is exogenous ($\chi\_([1])^2=2.485$, $p=0.115$). In column (7), the endogeneity test confirms that MAN_OWN is exogenous ($\chi\_([1])^2=2.484$, $p=0.115$). Statistical significance* $p < 0.10$, ** $p < 0.05$, *** $p < 0.01$.

Variable	(1) 2SLS – COVID 20-23	(2) PRE-COVID	(3) ACUTE-COVID	(4) POST-COVID	(5) COVID 20 only	(6) COVID 20-21	(7) COVID 20-22
MAN_OWN	0.052***	0.049***	0.090***	0.081***	0.063***	0.065***	0.064***
	(0.011)	(0.011)	(0.017)	(0.021)	(0.010)	(0.011)	(0.012)
MAN_OWN x COVID	0.034**				0.040***	0.012	0.010
	(0.014)				(0.011)	(0.010)	(0.013)
COVID	-0.019				0.002	0.001	-0.002
	(0.055)				(0.002)	(0.002)	(0.002)
INST_OWN	-0.027***	-0.028***	-0.015	-0.032	-0.026***	-0.026***	-0.026***
	(0.009)	(0.008)	(0.010)	(0.020)	(0.009)	(0.009)	(0.009)
BOARD_SIZE	-0.001**	-0.001**	-0.001	0.001	-0.001*	-0.001*	-0.001*
	(0.000)	(0.000)	(0.001)	(0.001)	(0.000)	(0.000)	(0.000)
BOARD_INDEP	0.007	0.007	0.012	0.031**	0.007	0.008	0.007
	(0.011)	(0.011)	(0.012)	(0.013)	(0.011)	(0.011)	(0.011)
FEMALE_BOARD	-0.029***	-0.030***	0.065	0.129***	-0.025**	-0.024**	-0.025**
	(0.011)	(0.010)	(0.041)	(0.045)	(0.012)	(0.012)	(0.012)
FEMALE_BOARD x COVID	0.106***				0.104***	0.097***	0.096***
	(0.030)				(0.030)	(0.032)	(0.032)
CHAIR_CEO	0.005**	0.005**	0.005	0.001	0.005**	0.004**	0.004**
	(0.002)	(0.002)	(0.005)	(0.007)	(0.002)	(0.002)	(0.002)
BOARD_TENURE	-0.000	-0.000	-0.001	-0.002**	-0.000	-0.000	-0.000
	(0.000)	(0.000)	(0.001)	(0.001)	(0.000)	(0.000)	(0.000)
BOARD_TYPE	0.000	-0.000	-0.008	-0.013**	0.000	0.000	0.000
	(0.002)	(0.002)	(0.006)	(0.007)	(0.002)	(0.002)	(0.002)
FIRM_SIZE	0.005**	0.005**	0.003	0.009**	0.005**	0.005**	0.005**
	(0.002)	(0.002)	(0.005)	(0.004)	(0.002)	(0.002)	(0.002)
ROA	0.184***	0.188***	0.180***	0.220**	0.171***	0.168***	0.169***
	(0.032)	(0.315)	(0.045)	(0.091)	(0.029)	(0.031)	(0.032)
CAPEX	-0.072	-0.068	-0.005	-0.000	-0.087	-0.090	-0.089
	(0.062)	(0.061)	(0.123)	(0.139)	(0.065)	(0.065)	(0.065)
CASH	0.025	0.027	-0.081*	0.030	0.019	0.018	0.019
	(0.036)	(0.037)	(0.045)	(0.050)	(0.035)	(0.035)	(0.035)
DEBT	-0.029**	-0.029**	-0.027	0.004	-0.028**	-0.028**	-0.028**
	(0.012)	(0.012)	(0.024)	(0.032)	(0.011)	(0.011)	(0.011)
CASH x COVID	-0.083*				-0.064	-0.061	-0.064
	(0.047)				(0.042)	(0.041)	(0.042)
R-squared	0.818				0.821	0.814	0.815

D. Robustness Checks

Nonlinear Specification

The key result emerging from the benchmark analysis is a positive association between managerial ownership and dividend policy. However, Hypothesis 1 predicts a nonmonotonic ownership-dividend relationship. To evaluate whether this relationship effectively holds, we consider a nonlinear specification that essentially adds the squared term MAN_OWN2 to the deterministic component. The results presented in Table 4 do not support the nonlinearity claim. In the 2SLS model, the coefficient on MAN_OWN is positive but insignificant, and the coefficient on MAN_OWN2 is also insignificant. The Newey-West fixed-effects specification similarly provides no evidence of a reliable nonlinear pattern. The absence of significance does not prove that nonlinearities never exist, but it does mean that they are not detectable in this Euro Stoxx 50 sample over the period studied.

The lack of support for nonlinearity is not entirely surprising. Managerial ownership in the sample is highly concentrated at low levels, with limited variation in the ranges where entrenchment effects would most likely appear. In other words, the data contain many firms where managerial ownership is small and only a few firms with very high managerial stakes. Detecting a full U-shaped or S-shaped relation in such a distribution is demanding. The safer conclusion is that, for these firms, the dominant empirical relation is positive rather than nonlinear.

To emphasize one specific result, Table 4 also reports the nonlinear specification estimated within the Industrial/Materials sector alone. In this particular case, the squared term MAN_OWN2 is positive and statistically significant, while the linear term MAN_OWN is negative and insignificant, a pattern broadly consistent with a U-shaped relation of the kind documented in other settings (Schooley & Barney, 1994; Florackis et al., 2015). Because this pattern emerges only within one sector subsample of already limited size, we read it as suggestive rather than as evidence against the full-sample conclusion above. Essentially, it indicates that nonlinearity, while undetectable at the full-sample level given the concentration of managerial ownership at low values, may be more relevant for capital-intensive sectors where ownership stakes and entrenchment incentives both tend to be larger.

Sectoral Subsample Analyses

The previous finding motivates a further examination of whether the positive relationship between managerial ownership and dividend payouts holds consistently across industries. The sectoral subsample analysis reported in Table 4 reveals substantial heterogeneity. In particular, the Consumer and Industrials/Materials sectors exhibit positive and statistically significant coefficients on MAN_OWN, with magnitudes broadly comparable to those obtained for the full sample. By contrast, the Energy/Utilities sector constitutes a notable exception. The estimated coefficient is negative and statistically significant, suggesting that higher managerial ownership is associated with lower dividend payouts. Moreover, its magnitude is unusually large in absolute value relative to the observed range of the dependent variable, DIV1, which varies between 0 and 0.162 in the full sample. This pattern indicates that the Energy/Utilities result should be interpreted with caution and may reflect sector-specific institutional characteristics, limited within-sector variation, or the influence of a small number of influential observations rather than a general economic relationship. Additionally, Energy/Utilities firms represent a small subset of the 38-firm sample, and a small sub-sample sharply limits the within-sector variation available to identify the instrumented MAN_OWN coefficient. A negative sign is nonetheless economically plausible for this sector given that regulated utilities and capital-intensive energy firms face stronger incentives to retain cash for capital expenditure and regulatory compliance, which could make managerial ownership a weaker complement to, or even a substitute for, dividend-based signalling relative to less capital-intensive industries.

Table 4 – Additional Robustness Checks.

Note: All coefficients are from 2SLS specifications with MAN_OWN instrumented by L.MAN_OWN, with the full set of governance and financial controls. Column "Significant?" reports significance at conventional levels (5%) as obtained in the underlying regression output. Statistical significance: * $p < 0.10$, ** $p < 0.05$, *** $p < 0.01$.

Specification	MAN_OWN	MAN_OWN2	Significant?
A. Nonlinear effects			
All sample (2SLS)	0.040 (0.037)	0.038 (0.063)	No
All sample (OLS+NW without fixed effects)	0.022 (0.025)	0.068 (0.043)	No
All sample (OLS+NW with fixed effects)	-0.056 (0.035)	0.496 (0.629)	No
B. Sectoral analysis			
Sector: Consumer Discretionary/Staples	0.053*** (0.014)	—	Yes
Sector: Energy/Utilities	-7.340*** (0.843)	—	Yes
Sector: Industrials/Materials	0.162*** (0.030)	—	Yes
Sector: Industrials/Materials, nonlinear	-0.065 (0.090)	5.282*** (1.456)	MAN_OWN2 only
C. Alternative target variable			
Alternative dependent variable: DIV2	-0.646 (0.615)	—	No
Alternative dependent variable: DIV3	0.745 (1.014)	—	No
D. Alternative data treatment options			
Winsorization	0.045* (0.027)	—	Yes
Standardization	0.343*** (0.039)	—	Yes

Alternative Dependent Variables and Data Treatment Options

Table 4 also presents the results of considering two alternative dividend measures. On the one hand, DIV2 corresponds to the dividend payout ratio, which is defined as total dividends divided by net income. On the other hand, we consider DIV3, which is a broader distribution measure calculated as the sum of total dividends and share repurchases divided by net income. Our results indicate that these measures, which are commonly used in the literature to capture different aspects of a firm's payout policies, preserve the sign of the relation in one case but lose statistical significance in both, indicating that the benchmark result is sensitive to how the payout variable itself is defined. In turn, both winsorisation and standardization of all variables preserve the positive sign and statistical significance of MAN_OWN[1].

[1] Although not presented in the main text for the sake of brevity, a quantile analysis confirms that the positive effect is strongest among firms with lower levels of managerial ownership and weakens as ownership rises (see Figure A1 in Appendix), a pattern that is qualitatively consistent with, though distinct from, the sector-level nonlinearity reported in Table 4.

From the application of all the above robustness checks, we can conclude that these make our results reasonably credible. The consistent message is that managerial ownership matters positively for dividends in this sample, and that the Covid-19 crisis amplified this relation.

E. External Validity with Monte Carlo Simulation

The sampling strategy buys data quality and a well-defined population at the cost of generalizability. The 38 firms studied here are larger, more profitable, more visible, and more closely monitored by analysts and proxy advisors than the typical European listed firm, so the documented ownership-dividend relation need not extend to smaller-cap or less closely governed companies. However, rather than merely noting this as a limitation, we construct a complementary external-validity analysis. A Monte Carlo simulation asks how sensitive the estimated ownership-divided relation is to the specific 38 firms in our sample, without requiring an independently collected comparison sample.

For each of four perturbation intensities, we block-bootstrap the 38 real firms with replacement into synthetic panels of 50 firm-slots. Each slot inherits the complete time series of one randomly drawn "donor" firm, so that within-firm dynamics and the timing structure underlying the MAN_OWN/L.MAN_OWN instrument are preserved rather than mechanically broken by resampling firm-years independently.

We then apply two superimposed multiplicative shocks to every continuous regressor: a firm-level shock, constant across a synthetic firm's years and intended to capture a persistent structural difference from its donor, and a smaller year-level shock representing idiosyncratic noise (drawn with one-third of the firm-level shock's standard deviation). Share-type variables are bounded to [0.01, 0.95] and flow/stock variables to non-negative values, ensuring no synthetic firm is a copy of a real one. Within each synthetic panel we rebuild the lagged instrument and re-estimate the benchmark 2SLS specification, clustering standard errors on the donor firm and year, since synthetic firms sharing a donor within a replication are not independent observations.

We repeat this procedure 500 times at each of four escalating perturbation intensities – firm-level shocks with a standard deviation of 5%, 15%, 30%, and 50% – for 2,000 simulated re-estimations in total, and report the distribution of the simulated MAN_OWN coefficient and the share of replications in which it remains positive and statistically significant, benchmarked against the real-sample estimate in Table 2 (column 1).

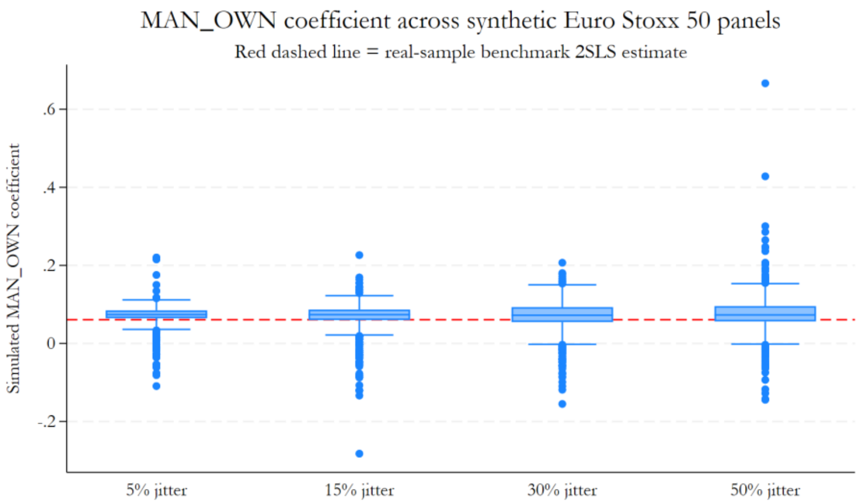
A coefficient that remains positive and significant across most replications, including at higher perturbation intensities, indicates that the documented ownership-dividend association is a stable feature of the underlying firm population rather than an artifact of the specific 38 firms observed. Conversely, a result that deteriorates as the perturbation intensity rises would instead point to fragility, and we report the full pattern across all four intensities rather than the most favourable one alone. We emphasize that this exercise speaks only to robustness within the Euro Stoxx 50 population – every synthetic firm remains, by construction, a perturbed variant of a real Euro Stoxx 50 constituent – and is thus complementary to, rather than a substitute for, an independent out-of-sample comparison, which is out of the study's scope. Table 5 reports the results of this exercise, and Figure 1 plots the corresponding distribution of the simulated MAN_OWN coefficient by perturbation level, alongside the real-sample benchmark estimate of 0.061 (Table 2, column 1).

Table 5 – External Validity Simulation Results.

Jitter level	Mean (β_{MAN_OWN})	SD (β_{MAN_OWN})	2.5th percentile	97.5th percentile	Share (%)
5%	0.068	0.033	-0.028	0.104	70.6
15%	0.064	0.048	0.077	0.129	64.2
30%	0.067	0.048	-0.057	0.145	65.8
50%	0.074	0.061	-0.054	0.192	71.8

The estimated coefficient is remarkably stable across all four perturbation intensities. The mean simulated coefficient ranges narrowly from 0.064 (15% jitter) to 0.074 (50% jitter), staying close to the real-sample benchmark throughout and showing no tendency to drift, let alone decay, as synthetic firms are allowed to diverge further from their real donors. As expected, the dispersion of the simulated distribution widens with the perturbation intensity. The standard deviation rises from 0.033 at the 5% jitter level to 0.061 at the 50% jitter level, and the central 95% interval of simulated estimates correspondingly widens from [-0.028, 0.104] to [-0.054, 0.192]. This is also visible in Figure 1, where the interquartile box for each perturbation level sits in a similar position around 0.07-0.08, while the whiskers and the scatter of outlying replications grow noticeably wider moving from the 5% to the 50% jitter level.

Figure 1
Managerial Ownership Coefficient Across Synthetic Euro Stoxx 50 Panels



The share of replications recovering a positive, statistically significant at the 5% level MAN_OWN coefficient is 70.6% at the 5% jitter level, dips modestly to 64.2%-65.8% at the 15% and 30% jitter levels, and recovers to 71.8% at the most demanding, 50% jitter level. The absence of any monotonic decline in this share as synthetic firms are perturbed more aggressively away from their real donors suggests that the positive ownership-dividend association is not being sustained by a narrow band of near-identical synthetic reconfigurations of the data. Even when synthetic firm characteristics are allowed to differ from their donor by up to roughly 50%, a clear majority of re-estimations continue to recover a positive and significant coefficient. At the same time, the share never approaches a near-unanimous threshold at any perturbation level, so that we interpret this as moderate rather than overwhelming support. As such, the association generalizes reasonably well across many statistically similar reconfigurations of the 38-firm population, while remaining sensitive enough to sampling variation that a meaningful minority of replications – roughly three in ten – do not recover statistical significance.

V. Discussion

The findings reject the nonmonotonic hypothesis and support the complementarity view. Managerial ownership and dividends appear to reinforce each other as governance mechanisms in large European firms. This does not mean that entrenchment is irrelevant in general. It means that in this particular institutional and sample context, characterised by generally low managerial ownership and high institutional ownership, the alignment and signalling roles dominate the entrenchment channel.

One interpretation is that managerial ownership increases the credibility of payout commitments. When managers own shares, dividend distributions are not merely transfers to outside shareholders; they also affect insiders. This can make dividends a more credible signal of confidence, especially during periods of uncertainty. The Covid-19 results fit this interpretation particularly well. During the pandemic, firms faced pressure to preserve cash but also pressure to reassure investors. In that setting, managerial ownership may have made continued dividends more credible and more valuable as a signal.

It is worth being explicit about the mechanisms that could generate this strengthening. Two complementary channels seem plausible. The first is a costly-signalling channel in the tradition of Bhattacharya (1979) and Miller and Rock (1985), whereby dividends are a more informative signal because they are costly to pay, and that cost is higher, and therefore the signal more credible, when cash flows are more uncertain – the condition that prevailed in 2020-2021. When the manager paying the dividend is also a meaningful shareholder, the personal cost of an unsustainable distribution is internalized rather than borne only by outside shareholders, which should make the signal still more credible when uncertainty is highest. The second is a reputational-capital channel, whereby owner-managers have a direct personal stake in preserving the firm's long-run access to capital markets and its standing with regulators, employees, and the public. The pandemic intensified political and social scrutiny of corporate distributions – several European governments and regulators publicly discouraged dividends and share buybacks at firms receiving state support or furlough subsidies – which raised the reputational stakes of payout decisions for firms generally. Managers with meaningful equity stakes had a stronger personal incentive to protect long-run firm value and credibility through a stable, carefully calibrated payout rather than reacting only to short-run cash-preservation pressure. Both channels predict that no uniform direct Covid-19 effect on dividends, but a stronger ownership-dividend link when uncertainty, and the value of a credible signal, were highest.

At this point, a natural question is whether this association reflects a one-directional causal effect of managerial ownership on dividends or, alternatively, whether it is driven by reverse causality or a common omitted factor. Theoretically, reverse causality is conceivable because dividend reinvestment arrangements or equity-settled remuneration could, in principle, mechanically increase managerial ownership following a generous dividend payout. This would generate a positive correlation running from dividends to ownership rather than the other way around. However, our results suggest that this is unlikely to be a source of concern. First, the IV strategy relies on lagged managerial ownership, which, by construction, predates the current-year dividend it is used to instrument. Moreover, the endogeneity tests reported throughout the study consistently fail to reject the null hypothesis that managerial ownership is exogenous to the dividend equation. This would be an unexpected finding if reverse causality from dividends to ownership were economically important. Second, the evidence from the firm fixed-effects specification, the temporal subsample analyses, and Lewbel's (2012) heteroskedasticity-based alternative instrument all points to the same conclusion: our data exhibit little evidence of endogeneity. We therefore document a robust association consistent with managerial ownership and dividends functioning as complementary governance mechanisms, with this complementarity becoming stronger under a period of greater uncertainty. The negative coefficient on institutional ownership is also informative. It suggests that institutional monitoring may substitute payout discipline. Where institutional investors already monitor management closely, firms may rely less on dividends as a disciplining mechanism. The negative coefficient on debt is consistent with the view that debt and dividends are competing claims on cash flows and may also function as substitute discipline mechanisms. The positive effects of firm size and profitability are unsurprising but important: dividend policy is still constrained by financial capacity, not just governance theory.

For boards, the message is practical. Ownership design and payout policy should not be considered in isolation. Managerial equity incentives can shape how payout decisions are interpreted and how credible they appear. For investors, the results suggest that insider ownership may help identify firms more likely to maintain payout discipline under stress. For regulators, the absence of a uniform Covid effect on dividends suggests that large non-financial blue-chip firms retained considerable payout stability during the pandemic.

VI. Conclusion

This study analyses the relation between managerial ownership and dividend policy in 38 non-financial Euro Stoxx 50 firms from 2013 to 2023, with particular attention on the Covid-19 period. The evidence supports a positive relation between managerial ownership and dividend payments. It does not support a statistically robust nonlinear relation. Covid-19 did not directly affect dividend payouts across the board, but it strengthened the positive relation between managerial ownership and dividends.

The study contributes to the literature by showing that, in a European blue-chip setting, managerial ownership and dividends operate as complementary governance mechanisms. The result is particularly relevant because the sample is drawn from a predominantly continental European institutional environment, where ownership structures and legal systems differ from those in the United States and the United Kingdom. The Covid-19 analysis adds to the evidence concerning how this governance channel behaves during periods of uncertainty.

Several limitations should be acknowledged. The sample is restricted to Euro Stoxx 50 firms and excludes financial institutions, which limits generalisability. The firms are large, mature, and highly visible, so results may not apply to smaller or less established companies. Ownership data are collected manually and are sometimes incomplete, reflecting differences in disclosure across jurisdictions. Future research could extend the analysis to broader European indices, compare Europe with the United States and Asia, and model debt, dividends, and ownership simultaneously as interacting governance mechanisms.

Data availability statement: The empirical analysis combines two data sources: financial, market, and governance data from Refinitiv Workspace, and manually collected managerial- and institutional-ownership data from firms' public disclosures. Because Refinitiv coverage of director- and manager-level shareholdings is inconsistent across euro-area issuers, MAN_OWN could not be obtained by a database query alone and had to be manually collected and cross-checked firm by firm. The protocol below sets out, step by step, how the dataset was constructed, so that another researcher with access to the same sources could reconstruct it.
Step 1 – Define the panel of firms and years. The Euro Stoxx 50 constituent list and its historical reconstitutions over 2013-2023 were obtained from STOXX's published index factsheets and methodology documents, in order to correctly capture additions, deletions, and ticker or ISIN changes over the panel period. Financial firms and insurers were removed at this stage using the STOXX/ICB sector classification, leaving the 38 non-financial firms analyzed in the paper.
Step 2 – Map firms to database identifiers. Each firm's ISIN was matched to its corresponding Refinitiv identifier (RIC) to enable systematic retrieval through Refinitiv Workspace. This mapping was checked against company websites and stock exchange listings to resolve cases of dual listings, ticker changes, or corporate renaming during the sample period.
Step 3 – Retrieve financial, market, and governance variables from Refinitiv Workspace. Total dividends, total assets, net income, capital expenditure, cash holdings, total debt, market capitalization, and the board-related fields available in Refinitiv's corporate governance module (board size, board independence, female board representation, CEO-chair duality, average board tenure, board structure type, and institutional ownership) were downloaded for each firm-year. Variables were screened for unit and currency consistency (all euro-denominated firms; non-euro reporting currencies converted using Refinitiv's standardized financial statement fields) before being merged into the panel.

Step 4 – Manually collect managerial ownership (MAN_OWN) firm-year by firm-year. For each firm-year, the percentage of shares held by managers and directors was located directly in the firm's own disclosures, consulted in the following order of preference: (i) the corporate governance statement or remuneration report within the firm's annual report; (ii) the Universal Registration Document (or, for years before its introduction under the EU Prospectus Regulation, the equivalent national reference document) for firms required to file one; (iii) Form 20-F filings (Item 6.E, "Share Ownership") retrieved from the U.S. Securities and Exchange Commission's EDGAR system, for firms with a U.S. cross-listing; and (iv) the investor relations section of the firm's corporate website, used only to corroborate or fill isolated gaps in (i)-(iii). Institutional ownership (INST_OWN) was cross-checked against the same sources whenever the Refinitiv field appeared inconsistent with firm disclosures.
Step 5 – Record provenance and apply a consistent rule to ambiguous disclosures. For every MAN_OWN and INST_OWN observation, the source document, fiscal year, and the section or page in which the figure appears were logged in a collection spreadsheet, to make the construction of these two variables auditable. Where a firm disclosed only a banded ownership range (for example, "less than 1%") rather than an exact percentage, the midpoint of the disclosed band was used, and the observation was flagged as banded in the collection log; where no usable disclosure could be located for a given firm-year through any of the four sources in Step 4, the observation was left missing rather than imputed.
Step 6 – Merge and finalize the panel. The manually collected ownership panel was merged with the Refinitiv-sourced financial and governance panel on firm identifier and fiscal year, producing the firm-year dataset used throughout the study and accompanying do-files. The variable construction, recoding, and all subsequent estimation steps are fully documented and reproducible.
Access and replication. The Refinitiv-sourced financial and governance fields are proprietary and subject to a licensing agreement with the authors' institution and therefore cannot be redistributed in raw form. Researchers with their own Refinitiv Workspace subscription can reconstruct these fields directly using the RIC mapping and field list above. The manually collected ownership panel, the associated collection log recording source, year, and page/section for every MAN_OWN and INST_OWN observation, and the full replication do-file are available from the corresponding author upon reasonable request, subject to the redistribution restrictions on the Refinitiv-sourced fields noted above.

Conflicts of Interest: The authors declare no conflict of interest.

REFERENCES

Al-Qahtani, T. H., & Ajina, A. (2017). The impact of ownership structure on dividend policy: Evidence from Saudi Arabia. Journal of Emerging Issues in Economics, Finance and Banking, 6(1), 2187-2202.

Bhattacharya, S. (1979). Imperfect information, dividend policy, and "the bird in the hand" fallacy. *Bell Journal of Economics, 10*(1), 259-270. https://doi.org/10.2307/3003330

Chen, C. R., & Steiner, T. L. (1999). Managerial ownership and agency conflicts: A nonlinear simultaneous equation analysis of managerial ownership, risk taking, debt policy, and dividend policy. Financial Review, 34(1), 119-136. https://doi.org/10.1111/j.1540-6288.1999.tb00448.x

Crutchley, C. E., & Hansen, R. S. (1989). A test of the agency theory of managerial ownership, corporate leverage, and corporate dividends. Financial Management, 18(4), 36-46. https://doi.org/10.2307/3665795

Demsetz, H. (1983). The structure of ownership and the theory of the firm. Journal of Law & Economics, 26(2), 375-390. https://doi.org/10.1086/467041

Eckbo, B. E., & Verma, S. (1994). Managerial shareownership, voting power, and cash dividend policy. Journal of Corporate Finance, 1(1), 33-62. https://doi.org/10.1016/0929-1199(94)90009-4

Farinha, J. (2003a). Corporate governance: A survey of the literature. Farinha, Jorge, Corporate Governance: A Survey of the Literature (November 2003). Universidade do Porto Economia Discussion Paper No. 2003-06. http://dx.doi.org/10.2139/ssrn.470801

Farinha, J. (2003b). Dividend policy, corporate governance and the managerial entrenchment hypothesis: An empirical analysis. Journal of Financial Research, 30(9-10). https://doi.org/10.1111/j.0306-686X.2003.05624.x

Farinha, J., & Lopez-de-Foronda, O. (2009). The relation between dividends and insider ownership in different legal systems: International evidence. European Journal of Finance, 15(2), 169-189. https://doi.org/10.1080/13518470802588718

Florackis, C., Kanas, A., & Kostakis, A. (2015). Dividend policy, managerial ownership and debt financing: A non-parametric perspective. European Journal of Operational Research, 241(3), 783-795. https://doi.org/10.1016/j.ejor.2014.08.031

Jensen, G. R., Solberg, D. P., & Zorn, T. S. (1992). Simultaneous determination of insider ownership, debt, and dividend policies. Journal of Financial and Quantitative Analysis, 27(2), 247-263. https://doi.org/10.2307/2331370

Jensen, M. C. (1986). Agency costs of free cash flow, corporate finance, and takeovers. American Economic Review, 76(2), 323-329.

Jensen, M. C., & Meckling, W. H. (1976). Theory of the firm: Managerial behavior, agency costs and ownership structure. Journal of Financial Economics, 3(4), 305-360. https://doi.org/10.1016/0304-405X(76)90026-X

Jo, H., & Pan, C. (2009). Why are firms with entrenched managers more likely to pay dividends? Review of Accounting and Finance, 8, 87-116. https://doi.org/10.1108/14757700910934256

Krieger, K., Mauck, N., & Pruitt, S. W. (2021). The impact of the COVID-19 pandemic on dividends. Finance Research Letters, 42. https://doi.org/10.1016/j.frl.2020.101910

Lewbel, A. (2012). Using heteroscedasticity to identify and estimate mismeasured and endogenous regressor models. *Journal of Business & Economic Statistics, 30*(1), 67-80. https://doi.org/10.1080/07350015.2012.643126

McConnell, J. J., & Servaes, H. (1990). Additional evidence on equity ownership and corporate value. Journal of Financial Economics, 27(2), 595-612. https://doi.org/10.1016/0304-405X(90)90069-C

Mili, M., Sahut, J.-M., & Teulon, F. (2017). Do corporate governance and ownership structure impact dividend policy in emerging markets during financial crisis? Journal of Applied Accounting Research, 18(3), 274-297. https://doi.org/10.1108/JAAR-07-2014-0079

Morck, R., Shleifer, A., & Vishny, R. W. (1988). Management ownership and market valuation. Journal of Financial Economics, 20, 293-315. https://doi.org/10.1016/0304-405X(88)90048-7

Sawicki, J. (2009). Corporate governance and dividend policy in Southeast Asia pre- and post-crisis. European Journal of Finance, 15(2), 211-230. https://doi.org/10.1080/13518470802604440

Schooley, D. K., & Barney, L. D. (1994). Using dividend policy and managerial ownership to reduce agency costs. Journal of Financial Research, 17(3), 363-373. https://doi.org/10.1111/j.1475-6803.1994.tb00198.x

Shleifer, A., & Vishny, R. (1989). Management entrenchment: The case of manager-specific investments. Journal of Financial Economics, 25, 123-139. https://doi.org/10.1016/0304-405X(89)90099-8

Short, H., Zhang, H., & Keasey, K. (2002). The link between dividend policy and institutional ownership. Journal of Corporate Finance, 8(2), 105-122. https://doi.org/10.1016/S0929-1199(01)00030-X

Stock, J. H., & Yogo, M. (2005). Testing for weak instruments in linear IV regression. In D. W. K. Andrews & J. H. Stock (Eds.), *Identification and Inference for Econometric Models* (pp. 80-108). Cambridge University Press.

Stulz, R. M. (1988). Managerial control of voting rights. Journal of Financial Economics, 20, 25-54. https://doi.org/10.1016/0304-405X(88)90039-6

Tinungki, G. M., Robiyanto, R., & Hartono, P. G. (2022). The effect of COVID-19 pandemic on corporate dividend policy in Indonesia. Economies, 10(1). https://doi.org/10.3390/economies10010011

Vo, D. H., & Nguyen, V. T.-Y. (2014). Managerial ownership, leverage and dividend policies: Empirical evidence from Vietnam's listed firms. International Journal of Economics and Finance, 6(5). https://doi.org/10.5539/ijef.v6n5p274

Zwiebel, J. (1996). Dynamic capital structure under managerial entrenchment. American Economic Review, 86(5), 1197-1215.

APPENDIX A. Variable Definitions.

Table A1 – Variable Definitions and Variance Inflation Factor Value.

Note: The table summarises the variables used in the empirical analysis. Total mean VIF equals 2.16.

Variable	Definition	Expected sign	VIF
(1) DIV	Total dividends paid divided by total assets	Dependent variable	-
(2) MAN_OWN	Percentage of shares held by management and directors	Nonmonotonic / positive	2.48
(3) INST_OWN	Percentage of shares held by institutional investors	Ambiguous	3.46
(4) BOARD_SIZE	Number of directors on the board	Ambiguous	2.54
(5) BOARD_INDEP	Independent directors divided by total directors	Ambiguous	3.12
(6) FEMALE_BOARD	Female directors divided by total directors	Positive	1.49
(7) CHAIR_CEO	Dummy equal to 1 if the CEO also chairs the board	Positive	1.73
(8) BOARD_TENURE	Average years of director tenure	No expected sign	2.02
(9) BOARD_TYPE	Mixed, two-tier, unitary, not disclosed	No expected sign	1.75
(10) FIRM_SIZE	Natural logarithm of market capitalization	No expected sign	2.35
(11) ROA	Net income divided by total assets	Positive	1.87
(12) CAPEX	Capital expenditures divided by total assets	Negative	1.34
(13) CASH	Cash and equivalents divided by total assets	Positive	2.18
(14) DEBT	Total debt divided by total assets	Negative	1.76

Table A2 – Pairwise correlations.

	(1)	(2)	(3)	(4)	(5)	(6)	(7)	(8)	(9)	(10)	(11)	(12)	(13)	(14)
(1)	1.000													
(2)	0.552***	1.000												
(3)	-0.298***	-0.380***	1.000											
(4)	-0.247***	-0.127**	-0.254***	1.000										
(5)	-0.106**	-0.146**	0.549***	-0.223***	1.000									
(6)	0.143***	-0.071	0.161***	-0.041	-0.075	1.000								
(7)	0.164***	0.217***	0.207***	-0.075	-0.220***	0.345***	1.000							
(8)	0.297***	0.356***	-0.355***	0.169***	-0.294***	0.110***	0.310***	1.000						
(9)	0.062	0.140**	0.189***	-0.030	-0.209***	0.307***	0.590***	0.239***	1.000					
(10)	0.236***	0.083	-0.534***	0.301***	-0.137***	0.207***	0.064	0.220***	0.110**	1.000				
(11)	0.603***	0.340***	-0.220***	-0.166***	-0.138***	0.087*	0.032	0.322***	0.023	0.269***	1.000			
(12)	0.144***	0.261***	-0.128**	-0.182***	0.044	-0.038	-0.040	0.062	-0.069	-0.164***	0.166***	1.000		
(13)	0.438***	0.262***	0.041	-0.288***	-0.103**	0.055	-0.076	0.056	-0.001	0.001	0.538***	0.108**	1.000	
(14)	-0.416***	-0.204***	-0.148**	0.228***	0.067	-0.043	-0.168***	-0.064	-0.202***	-0.012	-0.370***	0.048	-0.470***	1

Figure A1
Quantile Analysis (Impact of MAN_OWN on the dependent variable)