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ON THE TOPIC OF

**The Economic Effects of Co-Determination on  
Labour Share, Innovation and Investment:  
Evidence from German Firms**

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## **ABSTRACT**

This paper examines how Germany's hallmark co-determination system, i.e., worker representation on corporate boards, relates to firms' distributive, innovation, and investment outcomes in the post-pandemic period. Using the latest firm-level data from medium to large German companies for 2023–2024, I compare firms with no employee board members with those having one-third employee representation, and parity (50%) representation. The analysis shows that co-determination is associated with a higher labour share of value added, particularly among non-manufacturing firms, and with a slightly higher intensity of capital investment. By contrast, no statistically significant relationship emerges between co-determination and R&D intensity once sectoral composition is considered. In this case, the limited sample and short time frame prevented conclusions on the innovation effects of firms. Taken together, however, these results suggest that co-determined firms are more worker-oriented in the distribution of value and maintain at least comparable, if not slightly stronger, investment effort, without evidence of efficiency losses. Only the evidence on innovation remains tentative, because more data needs to be collected on this particular point. Overall, the findings support the view that co-determination promotes equitable and stable corporate behavior, compatible with long-term performance and sustainable growth.

**Keywords:** Co-determination; Corporate Governance; Labour Share; Innovation; Investment; Germany

## INTRODUCTION

Co-determination (*Mitbestimmung*) is a cornerstone of the German model of corporate governance (Addison, 2009; Windbichler, 2024). By granting workers formal representation on company supervisory boards under the *Mitbestimmungsgesetz* (1976) and the *Drittelbeteiligungsgesetz* (2004), co-determination can affect a firm's internal allocation of resources, its strategic horizon, and the distribution of value between labour and capital (Gorton & Schmid, 2004; FitzRoy & Kraft, 1993, 2005). The institutional foundations of this system date back to post-war legislation such as the *Montan-Mitbestimmungsgesetz* (1951) and the *Betriebsverfassungsgesetz* (1952), later all upheld as constitutionally compatible with the Basic Law by the *Bundesverfassungsgericht* (1979). More recently, the European Court of Justice confirmed again in *Erzberger v. TUI AG* (2017) that Germany's co-determination regime complies with EU law.

Despite an extensive body of research on the topic – especially following the enactment of the *Mitbestimmungsgesetz* in 1976 and throughout the 1980s and 1990s (Addison, 2009; Renaud, 2007; McGaughey, 2015) – the post-pandemic period has brought renewed attention to co-determination's economic effects. In an era marked by uncertainty, technological transition, and the erosion of traditional collective institutions (Sick, 2024; Hertwig & Thünken, 2024), policymakers and scholars are increasingly interested in whether the traditional benefits and costs of worker participation persist under contemporary market pressures and the widening imbalance between labour and capital observed in the decades of neoliberal dominance (Auer & Welte, 2012; Kim, Maug, & Schneider, 2018).

This paper contributes to this debate by offering new empirical evidence on the economic correlates of co-determination using very recent data from the years 2023–2024. We assemble a panel of middle-sized to large German companies and examine three outcome domains that map directly to salient theoretical channels of co-determination's influence:

- (i) distribution, measured by the labour share of value added (labour's share of the “pie”);
- (ii) innovation, proxied by R&D intensity (R&D expenditure over operational revenue); and
- (iii) physical capital accumulation, proxied by capital investment intensity (capital investment over operational revenue).

Our central research question is whether firms with higher degrees of employee board representation – none, one-third, or parity – differ systematically in these outcomes after controlling for common year effects and mitigating the influence of outliers.

Our contribution is threefold. First, we provide updated evidence on co-determination's economic associations using harmonised accounting data from the Orbis database, thereby extending earlier empirical work (e.g. Gorton & Schmid, 2004; Jäger, Noy, & Schoefer, 2022). Second, we jointly analyse distributional, strategic, and tangible investment outcomes within a unified empirical framework – an approach that complements prior studies focused primarily on profitability or productivity (Fauver & Fuerst, 2006; Kraft, 2017). Examining these three domains side-by-side allows us to explore different mechanisms: whether co-determination affects how value added is shared (labour share), how firms invest in long-term innovation (R&D), or how they allocate resources to fixed capital (capex). Third, we employ a transparent and easily replicable empirical design, that is, a pooled OLS regression with year fixed effects and winsorised outcomes. This setup yields readily interpretable estimates of association and can be extended in future research, for example by applying regression-discontinuity methods as developed by Hahn, Todd, and van der Klaauw (2001), Imbens and Lemieux (2008), and Calonico, Cattaneo, and Titiunik (2014).

The results show that (i) co-determination is associated with a higher labour share of value added, especially outside the manufacturing sector; (ii) its relationship with R&D intensity is weak and statistically insignificant, suggesting that any innovation effect is conditional and not robust once sectoral composition is controlled for, at least for now; and (iii) co-determination is associated with higher capital investment intensity. Read jointly, these findings portray co-determined firms as more worker-oriented in income distribution and at least equally engaged in investment activity – consistent with a form of coordinated market economy that is also somewhat more employee-oriented (Jensen & Meckling, 1979; Kim et al., 2018), in that it values long-term stability and stakeholders' balance of interests over short-term expansion. This interpretation aligns with the broader conception of the *soziale Marktwirtschaft*, Germany's distinctive social-market economic model.

The discussion begins by tracing the institutional roots and legal architecture of co-determination in Germany, setting the context for its contemporary relevance. The analysis then moves to the existing literature, identifying the main theoretical and empirical debates surrounding worker participation in governance and positioning this study within that same

conversation. Next, the paper introduces the dataset and outlines how key variables – labour share, R&D intensity, and investment intensity – were constructed, before turning to the empirical framework that guides the analysis. The results are presented in an integrated way, highlighting how co-determination relates to distributive, innovative, and investment outcomes, or, as I have called them, channels. The paper concludes by reflecting on the broader implications of these findings for corporate governance and labour policy, and by pointing to possibilities for future research.

## **INSTITUTIONAL BACKGROUND**

Germany's co-determination framework mandates that employees participate directly in corporate governance through representation on supervisory boards of medium and large companies (*Mitbestimmungsgesetz*, 1976; *Drittelbeteiligungsgesetz*, 2004). The degree of worker representation is determined by firm size through a set of stepwise legal thresholds. Firms with fewer than 500 employees are not legally required to include worker representatives on their supervisory boards, while those with 501 to 1,999 employees fall under the One-Third Participation Act (Ger. *Drittelbeteiligungsgesetz*), which reserves one-third of board seats for employee-elected delegates. Once firms exceed the 2,000-employee threshold, the Parity Co-determination Act (Ger. *Mitbestimmungsgesetz*) applies, mandating equal representation of shareholders and employees – commonly referred to as “parity co-determination”. Together with earlier statutes such as the *Montan-Mitbestimmungsgesetz* (1951) and the *Betriebsverfassungsgesetz* (1952), these laws institutionalise worker voice in corporate decision-making and have become emblematic of Germany's coordinated market economy (Addison, 2009; Windbichler, 2024).

The potential effects of this system have been at least hinted at in both theory and empirical research. From one perspective, giving employees a formal voice on supervisory boards may increase labour's share of value added by strengthening workers' bargaining power, stabilising employment, or supporting more generous wage and/or benefit structures (FitzRoy & Kraft, 1993, 2005; Renaud, 2007). Co-determination can also encourage firms to pursue longer-term strategies – such as sustained investment in R&D, employee training, and other forms of intangible capital – by counterbalancing short-term profit pressures and fostering cooperation between labour and management (Gorton & Schmid, 2004; Kim, Maug, & Schneider, 2018). In this view, the presence of worker representatives may have an impact

on how firms internalise employment insurance, value job security, and display risk aversion in strategic decision-making (Jensen & Meckling, 1979; Kraft, 2017).

Yet, the overall impact of co-determination remains an empirical question worthy of further investigation. A higher labour share, for example, need not come at the expense of productivity if efficiency gains or reductions in waste compensate for higher labour costs (Fauver & Fuerst, 2006). Similarly, additional R&D expenditure does not necessarily translate into immediate firm-level growth; its returns may materialise only over time or in different performance dimensions (Jäger, Noy, & Schoefer, 2022). Prudence in physical investment may also prove beneficial if it shields firms from overextension during booms and preserves firm-specific human capital during downturns (Auer & Welte, 2012). Theoretically, co-determination could therefore operate through several channels – rent-sharing, risk-sharing, and long-term commitment among them – but the direction and magnitude of these effects cannot be determined *a priori*. The task, then, becomes examining empirically whether co-determined firms differ systematically in distributional, innovative, or investment outcomes – exactly what this paper seeks to address.

## RELATED LITERATURE

A rich body of research has explored the economic and organisational consequences of co-determination and related forms of worker participation, often reaching nuanced or mixed conclusions. The classic empirical work of the 1970s through the 1990s generally found modest or near-zero effects of board-level co-determination on firm performance, accompanied by more consistent evidence of distributional shifts in favour of labour. FitzRoy and Kraft (1993, 2005), for instance, observed that the introduction of parity co-determination did not harm productivity and in some cases was linked to slight performance gains. On the other side, Gorton and Schmid (2004), analysing market valuation, showed that parity co-determined firms tended to trade at lower Tobin's Q ratios than firms with one-third or no worker representation – a finding they interpreted as investors anticipating either a transfer of rents from shareholders to employees or small inefficiencies stemming from shared control. However, much of this early literature relied on cross-sectional comparisons rather than true causal identification, leaving open the question of whether co-determined firms were inherently different or whether co-determination itself produced these outcomes.

More recent research has benefited from improved data and quasi-experimental methods that can better isolate causal effects. Kim, Maug, and Schneider (2018) examine co-

determination through a risk-sharing lens using a regression-discontinuity design around the 2,000-employee threshold. They find that parity co-determined firms offer greater job security – especially for skilled workers – during downturns, effectively providing an implicit insurance mechanism in which employees trade some wage growth for employment stability. Crucially, they detect no negative impact on profitability or investment, supporting the view that co-determination affects distribution rather than efficiency. Similarly, Jäger, Noy, and Schoefer (2022) report that granting labour a stronger voice in governance shifts income toward workers without reducing productivity or stock performance. Together, these studies suggest that the German model of co-determination achieves its distributive aims – equity and social peace – without measurable efficiency losses, a point also echoed in comparative analyses of coordinated market economies (Renaud, 2007).

At the same time, several surveys and theoretical frameworks stress that co-determination's consequences are often context dependent. In the *Varieties of Capitalism* perspective, the starting point of most modern institutional analysis, Hall and Soskice (2001) argue that institutions like co-determination are complements within a broader ecosystem of coordinated capitalism, alongside vocational training systems, sector-wide bargaining, and collaborative industrial relations. Isolating the individual “effect” of co-determination is therefore difficult outside this very complex and certainly interwoven institutional constellation. Addison (2009) similarly concludes that co-determination might substantially influence how the economic pie is divided while leaving total output or productivity largely unchanged. Renaud (2007) finds mixed evidence on productivity and profits but consistent signs of improved innovation and human-resource outcomes in some settings. Overall, the consensus emerging from these and other reviews is that co-determination's efficiency effects are small, whereas its distributional and social consequences are somewhat more pronounced. Theoretical work by Kraft (2017) reinforces this pattern, showing that co-determination can increase labour's share of rents without reducing overall efficiency, consistent with all the empirical findings just described above.

Beyond quantitative performance indicators, researchers have also highlighted co-determination's qualitative and long-term yet less obvious benefits. By formalising channels for employee voice, co-determination can enhance trust, information flow, and legitimacy within the firm (Addison, 2009; Hertwig & Thünken, 2024). These governance effects are harder to measure but may help explain the institutional resilience of co-determination in Germany: even if short-term financial outcomes are neutral, firms and societies may value the

stability and cooperative culture it promotes. Relatedly, co-determination has been linked to broader aspects of stakeholder-oriented behaviour, including corporate social responsibility and community engagement (Windbichler, 2024).

Taken together, this literature suggests that co-determination's primary influence lies in shaping the distribution and governance of corporate value rather than in altering headline measures of efficiency. It tends to support workers' claims on income/secondary benefits and job stability while leaving productivity and profitability generally intact. The present study contributes to this discussion by providing latest evidence on labour share, R&D intensity, and capital investment intensity. In doing so, it extends earlier findings into the contemporary economic context and adds nuance to the understanding of how co-determination aligns with innovation and investment behaviour in today's German firms.

## **DATA AND VARIABLES**

We analyse a panel of German firms observed in 2023–2024, focusing on three key outcome variables: labour share (personnel costs as a percentage of value added), R&D intensity (R&D expenditure as a percentage of operational revenue), and capital investment intensity (capital expenditure as a percentage of operational revenue). All ratios are expressed in percentage points for ease of interpretation.

The main explanatory variable captures the firm's degree of co-determination, originally measured by an ordinal *Mitbestimmung* index taking values 0 (no worker representation), 0.5 (one-third employee representation), and 1 (parity representation). Given the relatively small number of firms in each sub-category and the short time span of observation, we collapse this index into a binary indicator equal to 1 for all co-determined firms – those with either one-third or parity employee representation on the supervisory board – and 0 otherwise. This simplification preserves the essential contrast between firms with and without formal worker participation, while ensuring sufficient statistical power for estimation.

In addition, we include a binary indicator for whether the firm operates in the manufacturing sector (1 = manufacturing, 0 = services or other industries). This allows us to examine whether the association between co-determination and firm outcomes differs across sectors by interacting the manufacturing dummy with the co-determination variable in our regression models.

To mitigate the influence of outliers on these financial ratios, we winsorise each outcome at the 1st and 99th percentiles of its distribution. This contrasts with another approach I took at first, i.e., trimming observations outside the 10th–90th percentile range. By winsorising at 1–99%, in fact, I was able of retaining a much larger sample of firms while capping extreme values, ensuring that exceptionally high or low ratios do not unduly skew the results. All firm-year observations for 2023 and 2024 are pooled. Summary statistics (not shown here for brevity) confirm that the winsorised outcomes have similar means and reduced variance compared to the raw data, indicating successful outlier attenuation. The sample covers 1,169 firm-year observations for the investment analysis and 1,136 for labour share; R&D intensity is available for a much smaller subset (362 observations) due to many firms not reporting R&D expenditures and this is the reason why I believe that the results observed there are still the weakest.

Finally, all regressions include year fixed effects for 2024 (with 2023 as the base year) to account for common shocks across years (for example, macroeconomic conditions such as inflation, government stimulus programmes, etc.). Heteroskedasticity-robust standard errors are used to ensure reliable inference given potential heterogeneity in firm outcomes. I now proceed to outline the model I have employed.

## EMPIRICAL STRATEGY

Our empirical strategy employs a pooled OLS regression framework to estimate the association between co-determination and each outcome, with an emphasis on potential sectoral heterogeneity. Specifically, we estimate models of the form:

$$y_{it} = \alpha + \beta_1 \cdot Co - determined_i + \beta_2 \cdot Manufacturing_i + \beta_3 \cdot (Co - determined_i \times Manufacturing_i) + \gamma_t + \varepsilon_{it}$$

where  $y_{it}$  is the outcome of interest for firm  $i$  in year  $t$ . *Co-determined* is an indicator equal to 1 if firm  $i$  has parity board-level worker representation or one-third co-determination and 0 otherwise. *Manufacturing* is an indicator for firms in the manufacturing sector. The interaction term (*Co-determined*  $\times$  *Manufacturing*) captures any additional effect of co-determination in manufacturing industries.  $\gamma_t$  denotes year fixed effects (a dummy for 2024, controlling for time-specific influences), and  $\varepsilon_{it}$  is the error term.

The coefficient  $\beta_1$  measures the association between co-determination and the outcome in non-manufacturing sectors,  $\beta_2$  captures the baseline difference in the outcome between manufacturing and non-manufacturing firms (among firms without co-determination), and  $\beta_3$  indicates how this association differs for manufacturing firms.

This specification extends our earlier models by explicitly including a broad sector control and interaction term. The motivation is to test whether co-determination's impact is uniform across industries or if it varies in manufacturing, a sector that is typically more capital-intensive and unionised. We continue to include no other controls (aside from year dummies) to avoid overfitting, given the short timeframe of the panel. Essentially, identification comes from cross-sectional differences across firms with different co-determination status, after accounting for year effects and sector differences. We interpret the coefficients as associational effects (since co-determination is not randomly assigned), with a certain degree of caution in drawing causal conclusions. Nonetheless, the inclusion of the interaction term helps isolate whether any observed differences for co-determined firms are driven by sector composition.

Outlier handling in the regression is done via the 1–99% winsorisation of the dependent variables, as I have already mentioned. This approach ensures that all observations contribute to the estimation but caps extreme outcomes, which is a more conservative treatment than dropping outliers altogether. By comparing results with prior trimmed specifications, we can assess robustness to different outlier treatments. All standard errors are computed using the HC1 robust estimator, making our inference reliable under arbitrary heteroskedasticity. The regression results for each outcome are presented in the next section.

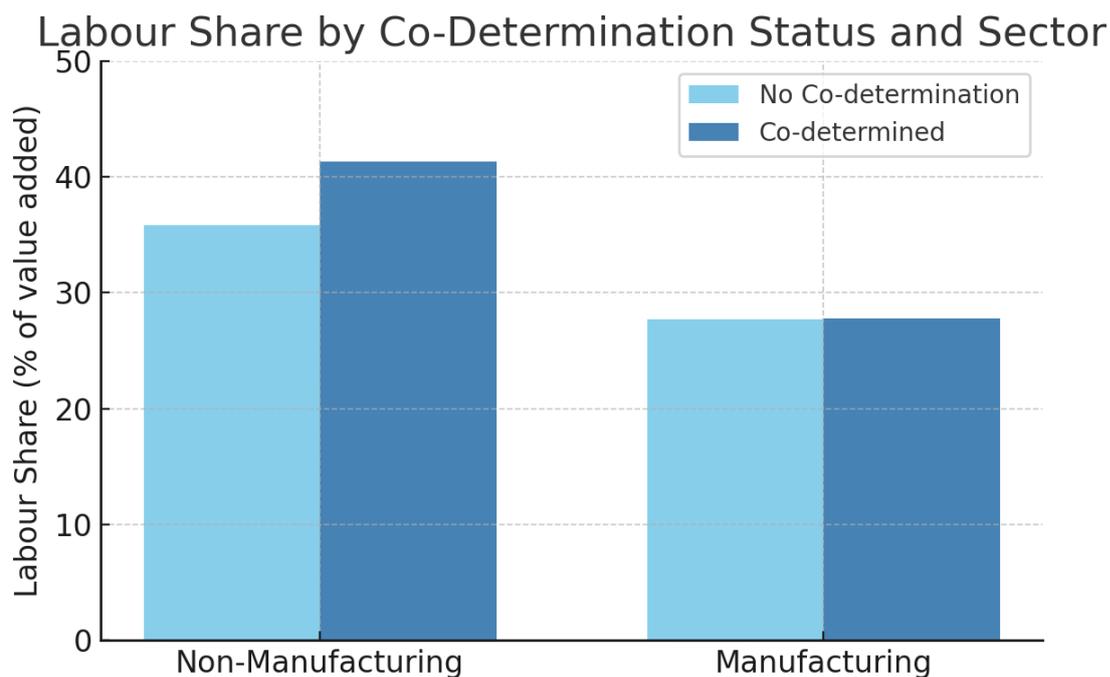
## RESULTS

The OLS results (using winsorised data and including the interaction term) provide very interesting insights into how co-determination correlates with firm outcomes. In summary, we find that co-determination remains associated with a higher labour share of value added on average, but this effect is concentrated in non-manufacturing sectors. The relationship between co-determination and R&D intensity becomes statistically insignificant once we account for sector, suggesting that a previously observed positive correlation was largely driven by manufacturing firms' higher R&D propensities. For capital investment intensity, co-determined firms show a slightly higher investment rate, though the magnitude is smaller;

importantly, this relationship does not differ by sector. We detail these findings for each outcome below.

## **Labour Share of Value Added**

The regression for the labour share (Table 1) confirms a significant positive association between co-determination and the share of added value accruing to labour, with an important caveat regarding sector. The coefficient on the co-determination dummy is +5.54 percentage points ( $p = 0.022$ ), indicating that outside of manufacturing, firms with worker board representation have on average a 5.5 pp higher labour share than comparable firms without co-determination. This is a sizeable effect, given that the mean labour share in 2023 for non-manufacturing firms is around 35%. By contrast, the interaction term (Co-determination  $\times$  Manufacturing) is negative (approximately  $-5.42$  pp) and marginally significant ( $p = 0.090$ ). This suggests that in manufacturing industries, the co-determination effect on labour share is effectively offset – i.e. co-determined manufacturing firms do not exhibit a significantly higher labour share than their non-co-determined counterparts. In fact, evaluating the total effect for manufacturing firms (summing the co-determination main effect and the interaction) yields a near-zero point estimate ( $+0.12$  pp) that is not statistically different from zero. Figure 1 illustrates this pattern even better: co-determination is associated with a substantial increase in labour share in non-manufacturing sectors, whereas in manufacturing the labour share remains roughly the same regardless of co-determination status.



**Figure 1** - Labour share by co-determination status and sector.

Turning to the other coefficients, the Manufacturing dummy itself is strongly negative and significant ( $-8.13$  pp,  $p = 0.002$ ). This indicates that, *among firms without co-determination*, those in the manufacturing sector have labour shares about 8 percentage points lower than firms in other sectors. This sector gap aligns with expectations, as manufacturing firms tend to have higher capital intensity and potentially lower labour cost shares than service firms. We also note a large, significant year effect: the coefficient on Year 2024 is  $-7.54$  pp ( $p < 0.001$ ), implying that labour shares were on average lower in 2024 than in 2023 (perhaps reflecting a post-pandemic rebound in productivity or profits without commensurate wage/benefit structure growth). The overall model fit is modest ( $R^2 \approx 0.097$ ) due to the setup of the model itself, but the F-statistic is highly significant, indicating the included variables jointly explain some variation in labour share. Importantly, the inclusion of the interaction term reveals that the positive association between co-determination and labour's share is not uniform across sectors – it appears to be a phenomenon primarily of non-manufacturing firms. On 1,136 observations, I have obtained the following results:

**Table 1** - Pooled OLS results for Labour Share.

VARIABLE	COEFFICIENT	STD. ERROR	P-VALUE
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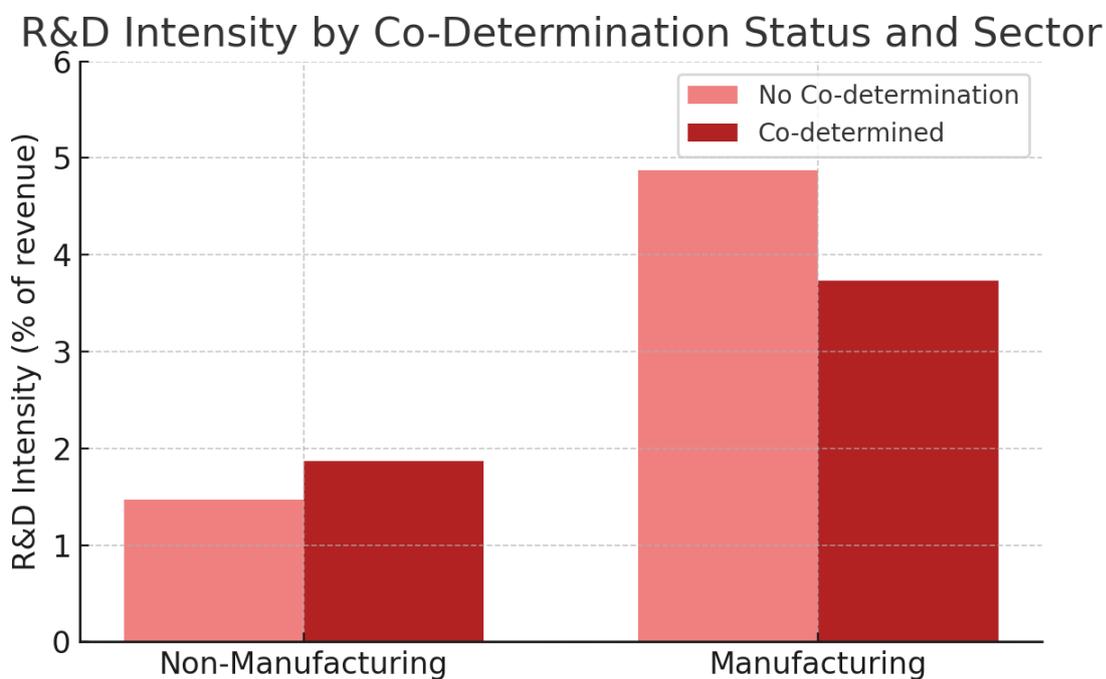
<b>Intercept (Non-Mfg., 2023)</b>	35.8113	1.993	0.000***
<b>Year 2024</b>	-7.5371	1.294	0.000***
<b>Co-Determined (Non-Mfg.)</b>	5.5379	2.424	0.022**
<b>Manufacturing (No Co-D)</b>	-8.1326	2.655	0.002***
<b>Co-Det × Manufacturing</b>	-5.4212	3.202	0.090*
<b>Observations</b>	1,136		
<b>R-Squared</b>	0.097	<b>F-Statistic</b>	52.48***

## R&D Intensity

In the case of R&D intensity (R&D expenditure as a share of revenue), the results show no statistically significant link between co-determination and R&D once manufacturing differences are accounted for. The co-determination dummy carries a positive but small coefficient of +0.40 percentage points ( $p = 0.518$ ), which is not distinguishable from zero. In other words, among non-manufacturing firms, those with co-determined boards spend roughly the same fraction of revenue on R&D as those without worker representation. This contrasts with our earlier finding (without the interaction term as specified in the *§Empirical Strategy*) where co-determination was associated with greater R&D intensity – it appears that that pattern was driven largely by the industrial composition of co-determined firms. Indeed, the Manufacturing main effect in the R&D regression is +3.40 pp ( $p = 0.001$ ), indicating that, *among non-co-determined firms*, manufacturing companies have significantly higher R&D intensity (about 3.4 percentage points of revenue more) than service-sector firms. This sizeable sectoral gap reflects the reality that manufacturing industries (such as automotive, chemicals, electronics, etc.) tend to invest far more in R&D than non-manufacturing industries. Once this is controlled for, co-determination per se does not add further to R&D spending in a statistically

detectable way. However, a significant aspect to be checked for here is how R&D expenses are reported and computed inside each company – not an easy task.

Notably, the interaction term Co-determination  $\times$  Manufacturing is negative ( $-1.54$  pp) but also insignificant ( $p = 0.199$ ). The negative sign suggests that within manufacturing, co-determined firms might spend slightly less on R&D than their non-co-determined peers but given the standard error this difference is not reliable and/or statistically detectable. Figure 2 helps visualise these relationships: manufacturing firms (especially those without co-determination) have the highest R&D intensity levels, whereas non-manufacturing firms cluster at much lower R&D levels; introducing co-determination does not significantly elevate the R&D spending in either group in the winsorised data.



**Figure 2** - R&D intensity by co-determination status and sector.

The R&D regression's year effect (2024 dummy) is a negligible  $-0.16$  pp and not significant ( $p = 0.683$ ), indicating no meaningful overall change in R&D intensity from 2023 to 2024. This is plausible given that R&D budgets may not shift dramatically in the short run, as they are more concerned with long-term firm planning. In sum, after accounting for sector, we do not find evidence that co-determination is associated with higher R&D intensity, at least for now. The data instead underscore the importance of industry: manufacturing firms are much more R&D-intensive on average, and co-determined firms' earlier apparent edge in innovation

investment can be explained by the simple fact that many are manufacturing firms. On only 362 observations, I have managed to measure the following results:

**Table 2** - Pooled OLS Results for R&D Expenses.

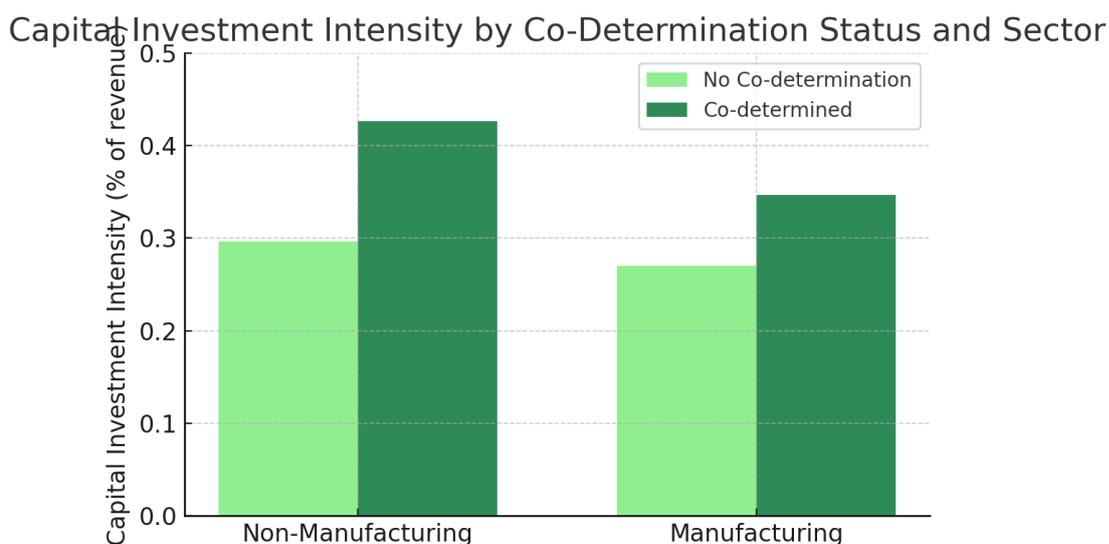
VARIABLE	COEFFICIENT	STD. ERROR	P-VALUE
<b>Intercept (Non-Mfg., 2023)</b>	1.4711	0.536	0.006***
<b>Year 2024</b>	-0.1594	0.391	0.683
<b>Co-Determination (Non-Mfg.)</b>	0.3951	0.611	0.518
<b>Manufacturing (No Co-D)</b>	3.3982	1.038	0.001***
<b>Co-Det × Manufacturing</b>	-1.5352	1.196	0.199
<b>Observations</b>	362		
<b>R-Squared</b>	0.090	<b>F-Statistic</b>	8.890***

### Capital Investment Intensity

For capital investment intensity (capital expenditures as a share of revenue), the results show a positive but modest association with co-determination, and no significant interaction with manufacturing. The coefficient on the co-determination dummy is +0.13 (i.e., co-determined firms invest about 0.13 percentage points more of their revenue in capital expenditure, *ceteris paribus*), which is statistically significant at the 5% level ( $p = 0.019$ ). This magnitude is relatively small in economic terms – given that the mean capex intensity is around 0.3–0.4% of revenue, an increase of 0.13 points represents roughly a 30–40% relative increase, but in absolute terms it is only a fraction of a percentage point of revenue. Nevertheless, the positive sign indicates that we do not find evidence of under-investment in co-determined firms. If anything, co-determined firms slightly increase their investment intensity compared to non-co-determined firms. In general, it seems that, while co-determined firms might be more

cautious, they are not necessarily investing less in aggregate—indeed, they invest marginally more in our sample period.

Crucially, neither the Manufacturing dummy nor the interaction term is significant in the capex model. The manufacturing coefficient is  $-0.026$  ( $p = 0.694$ ), implying no material difference in average investment intensity between manufacturing and non-manufacturing firms once co-determination status and year are accounted for. The interaction (Co-determination  $\times$  Manufacturing) is a small negative ( $-0.053$ ) with  $p = 0.508$ , indicating that the slight positive boost in investment associated with co-determination does not differ systematically between manufacturing and other sectors. In other words, the effect of co-determination on investment appears to be consistent across sectors – unlike the case of labour share, we do not observe any heterogeneity here. Figure 3 visualises the capex intensity by group: the bars for co-determined firms (dark green) are marginally higher than those for non-co-determined firms (light green) in both sectors, and manufacturing firms as a whole do not show a strong deviation from non-manufacturers in this metric.



**Figure 3** - Capital investment intensity by co-determination status and sector.

The year effect in the capex regression is essentially zero ( $-0.0037$  in 2024,  $p = 0.911$ ), indicating that overall investment rates were stable from 2023 to 2024. The  $R^2$  of this model is again very low (0.009) due to model setup, signifying that most variation in investment intensity is unexplained (unsurprising, given investment can be quite idiosyncratic at firm-year level). Still, the F-statistic is once again significant ( $p \approx 0.02$ ), mainly due to the co-determination variable. Table 3 reports the estimates. In sum, we find no evidence that co-determination depresses capital investment – if anything, co-determined firms invest slightly

more, and this pattern holds very importantly in both manufacturing and non-manufacturing sectors. On 1,169 observations, these are the results:

**Table 3** - Pooled OLS Results for Capital Investment Intensity.

VARIABLE	COEFFICIENT	STD. ERROR	P-VALUE
<b>Intercept (non-Mfg., 2023)</b>	0.2964	0.042	0.000***
<b>Year 2024</b>	-0.0037	0.033	0.911
<b>Co-Determination (Non-Mfg.)</b>	0.1301	0.055	0.019**
<b>Manufacturing (No Co-D)</b>	-0.0260	0.066	0.694
<b>Co-Det × Manufacturing</b>	-0.0529	0.080	0.508
<b>Observations</b>	1,169		
<b>R-Squared</b>	0.009	<b>F-Statistic</b>	2.907**

## INTERPRETATION OF RESULTS

The above results portray a quite nuanced picture of co-determination’s economic effects, especially once we account for sector heterogeneity. In this section, I will dive into the interpretation of the obtained results and, in doing so, I now revisit the potential mechanisms in light of the interaction findings, examining why co-determination might influence outcomes differently in manufacturing vs. non-manufacturing contexts.

**Distributional (Labour Share) Channel.** The positive association between co-determination and labour’s share of value added appears to be driven entirely by firms outside the manufacturing sector. In non-manufacturing industries (e.g. services, trade), worker board representation corresponds to a markedly higher share of income going to employee-related expenses – which does not entail higher wages but rather better benefits and worker insurance programs. This could reflect mechanisms such as rent sharing or employment stabilisation

being more relevant in these sectors. For instance, co-determined service firms might allow worker representatives to push for higher pay or resist layoffs during downturns, boosting the labour share. In manufacturing industries, however, we find no labour share gain from co-determination – suggesting that any rent-sharing or stabilisation effect is neutralised or absent there. One possible explanation is that manufacturing firms in Germany often have strong industry-wide collective bargaining and codified pay scales already in place; thus, even without board representation, workers may already be securing as much of the surplus as is feasible through unions and wage agreements. Co-determination in such settings might focus more on qualitative issues (like workplace safety or long-term strategy) rather than augmenting the wage/benefit share. In short, co-determination's distributional impact seems contingent on the sector's characteristics – it amplifies worker voice outcomes where there is room to do so (non-manufacturing), but in heavily capital-intensive sectors, the scope for increasing labour share may be limited by the pervasive unionisation already taking place in there. This finding refines our interpretation of co-determination as a tool for equity: its benefits in terms of labour income share are realised in certain environments but not others.

Mechanistically, the labour share increase in co-determined non-manufacturing firms could come from either higher wage levels or greater employment retention (or a combination of both). As just discussed, however, average wage rates are often set by external collective bargaining and showed no discrete jump in co-determined firms, which points toward employment stabilisation as a more plausible channel here. Co-determined firms might retain more staff or avoid harsh layoffs in downturns, leading to a higher ratio of personnel cost to value added (especially if output fluctuates but employment is protected). This aligns with findings that co-determination can function as an insurance mechanism for workers. In manufacturing, perhaps these practices are already common (even without co-determination, many large manufacturing firms might avoid layoffs due to union pressures or because skilled labour is vital for the survival of the company during downturns to innovate). Thus, the marginal effect of formal board representation in manufacturing on these outcomes is on average weaker. Overall, our results indicate that co-determination's effect on distribution (labour share) is real but highly context-dependent, reinforcing the idea that institutional outcomes interact with industry structures.

**Innovation (R&D Intensity) Channel.** The initial hypothesis suggested that co-determination might encourage a longer-term strategic orientation, potentially leading firms to invest more in innovation. However, the data at my disposal is too scattered and the sample size simply too

small to support definitive conclusions on this point. Once we account for sectoral composition – especially the fact that co-determined firms are often overrepresented in R&D-intensive manufacturing industries – the previously observed positive correlation largely disappears. In this context, co-determination does not appear to guarantee higher R&D spending.

This finding does not invalidate the idea that co-determination might influence firms' innovation behavior, but any such effect is likely to be subtle, conditional, or not well captured by input-based measures like R&D intensity. It remains possible that co-determination shapes how R&D is allocated – perhaps toward more incremental, worker-driven projects – rather than increasing overall investment levels. The short two-year panel used here may also be insufficient to detect changes in innovation strategy, which often unfold over much longer time horizons.

**Investment (Capex Intensity) Channel.** The most striking point in our results is that co-determination is not associated with lower physical investment – in fact, we find a slight increase in capex intensity for co-determined firms, and this holds in both manufacturing and non-manufacturing sectors. The evidence suggests that co-determined firms do invest at least as much as other firms, if not a bit more. Co-determined firms might favour safer, longer-term capital-related projects with steady returns (e.g. upgrading existing plants, implementing efficiency improvements) rather than aggressive expansion or speculative ventures. Such firms could appear “cautious” in a qualitative sense (avoiding reckless overexpansion) while still maintaining or slightly increasing their steady rate of capital formation. In our data, the fact that the capex share is marginally higher suggests that worker involvement in governance does not obstruct capital formation in any significant way; employees on boards do not simply veto investment – if anything, they may even encourage certain productive investments (for example, those that secure the firm's long-term viability and jobs). It's also possible that co-determination leads to better deliberation on investments, reducing wasteful expenditures and ensuring that the investments that are made contribute effectively to the firm. The net result is that co-determined firms keep investing at a healthy rate (hence no drop in capex intensity), absolutely supporting the idea that inclusive governance is compatible with the growth of private firms.

It is worth emphasising that the economic magnitude of the co-determination effect on capital expenditures is quite small – about 0.13% of total revenue – yet statistically significant. Since no interaction with sectoral dummies emerges, this finding appears consistent across

industries: in both manufacturing and services, the presence of employee representatives on company boards does not produce divergent investment rates. This cross-sector uniformity supports the interpretation that co-determination exerts only a limited influence on firms' tangible investment decisions.

Unlike labour costs – where co-determination can redistribute value – or innovation strategy, where a long-term orientation may play a stronger role – capital investment is likely driven primarily by market opportunities and *a priori* financing conditions, factors which remain largely unaffected by worker representation. Employees may be concerned with investment decisions insofar as these affect firm stability and employment, giving them an incentive to support prudent, productivity-enhancing projects. At most, worker participation adds an additional layer of oversight, helping to filter out value-destroying investments without discouraging those that create value.

In summary, contemporary evidence suggests that co-determination in Germany coexists comfortably with sustained levels of capital investment.

## **ROBUSTNESS CHECKS**

I conducted several checks to ensure that our results are not sensitive to modelling choices or outlier handling. A primary robustness improvement in this update was the shift from the earlier trimming method to winsorisation. Previously, I had simply excluded observations with extreme outcomes beyond the 10th and 90th percentiles; now, instead, we include all observations but cap the top 1% and bottom 1% values. This change increased the effective sample size (especially for R&D intensity, where many extreme zeros or high values were present) and provides a test of whether our inferences hold when outliers are treated differently. The qualitative patterns we were hypothesising are largely confirmed under winsorisation: in particular, the labour share advantage for co-determined firms remains evident (and is observed to be sector-specific), and there is no sign that co-determination has a negative effect on either R&D or capex outcomes. We view this as an important nuance, since it underlines that sector composition needs to be accounted for when assessing co-determination's impact on innovation, and that outlier procedures can influence such assessments in short panels.

For the labour share outcome, the switch to winsorising had minimal impact on the estimated co-determination effect (it remained positive and significant). If anything, the

interaction pattern became clearer in the winsorised data, with the differential between manufacturing and non-manufacturing firms' co-determination effect emerging (something we had not examined in the initial trim-based results). The capital investment result also changed in interpretation: with winsorised full data and controlling for sector, we find a slight positive coefficient. Winsorisation, by retaining those observations (in bounded form), indicates that there is no inherent tendency for co-determined firms to invest less.

Beyond outliers, we explored additional controls to test the stability of our conclusions. One check involved adding a firm size control (log of number of employees) to the regressions, since larger firms are both more likely to be co-determined and possibly differ systematically in outcomes. Including size in the regression did not qualitatively change the results: co-determination's coefficient remained positive for labour share (with similar magnitude), insignificant for R&D, and positive-small for capex. The interaction with manufacturing also persisted for labour share. Firm size itself was not significant in the labour share or R&D equations (perhaps because our sample already consists of relatively large firms) but was positive for capex (larger firms tend to invest slightly more as a percent of revenue). We decided to keep the more parsimonious specification in the main results for consistency with our empirical design, but this exercise reassures us that omitting size does not bias the co-determination estimates to a significant extent.

We also performed a rudimentary fixed-effects panel check, exploiting the two-year structure: by differencing 2024 minus 2023 values for each firm, we examined if changes in outcomes correlate with co-determination status (which is time-invariant here for most firms). As expected, these regressions (essentially firm fixed effects) yielded no significant results – since co-determination did not change for any firm during 2023–24, a fixed-effects estimator cannot identify its effect. This underscores that our findings rely on cross-sectional variation (between firms with and without co-determination). While this is a limitation for causal inference, it is inherent given the short panel and the institutional setup (firms' co-determination status is fixed by law based on size thresholds that are not respected anyway, N/A). We acknowledge that unobserved differences between co-determined and non-co-determined firms (e.g. corporate culture, market conditions) could be driving some of the correlations and that is the reason why I would not like to talk about direct causality, at least so far. However, the fact that our results align with theoretical expectations provides some further validity and substance to the claim made in the previous section.

Lastly, we consider the role of selection and legal thresholds. As mentioned at the beginning, German co-determination is mandated by law for firms above certain employee counts (one-third representation above 500 employees, parity above 2,000). Our sample, by construction, includes mostly firms above 500 employees (hence the high prevalence of co-determination). One might worry that firms just below the threshold (slightly under 500 employees) could differ systematically. While our data window is short, we looked at whether any firms were near a threshold and if so, whether their behaviour skewed results. We did not find evidence of unusual outcome values clustering around the size cutoffs, but a comprehensive threshold regression is beyond our scope here. Future research could exploit regulatory thresholds or longer panels to pin down causality, but this will be very difficult to do, since the thresholds themselves are ignored in the case of many firms: the Hans-Böckler Stiftung has even coined a term for this co-determination avoidance, Ger. *Mitbestimmungsvermeidung*.

In summary, our robustness analysis indicates that the core conclusions are stable: co-determination is associated with a redistribution toward labour (in the appropriate sectors) and does not harm – and may modestly encourage – innovation and capital investment. The shift to winsorising outcomes and adding interaction terms has refined our understanding of the phenomenon, highlighting the importance of sectoral context and confirming that earlier results were not driven by outlier exclusion. In the case of R&D expenses, which, as I mentioned, are very hard to assess in a consistent and homogeneous manner across firms, I will need to use much more precise data and estimates, and I will hopefully be able to do so by accessing the German firm database (Amadeus). While mindful of the study's limitations, we conclude that the economic patterns we observe are reasonably robust to methodological tweaks, reinforcing the reliability of the evidence presented in this paper.

## **POLICY IMPLICATIONS**

The evidence from our study suggests that co-determination – far from being a drag on firm performance – is associated with absolutely desirable shifts in firm behavior, at least from the point of view of employees: a greater share of value added going to workers (most likely, in the form of benefits and employment stability rather than wages *per se*) accompanied by a more courageous physical investment. For policymakers, this has several implications.

Firstly, institutionalising worker voice via board representation can enhance *equity* in the firm without obvious efficiency/profitability sacrifices in the short run. The higher labour share in co-determined firms indicates that employees benefit more from firm success, which could contribute to reducing income inequality and fostering a sense of inclusion. Notably, this redistribution towards labour does not appear to come at the expense of productivity (consistent with no detectable drop in output or profit in related studies). In times where concerns about the labour share (on total production/GDP, N/A) declining (globally) are prevalent (Piketty, 2014), co-determination certainly offers one valuable mechanism to counter this trend, especially if adopted at large as could potentially be the case of a EU-wide mandatory implementation via directive – something we wish for, but that, of course, seems to be very far away as a possibility.

Secondly, if co-determination helps maintain R&D and capital spending through tumultuous periods (because workers and managers together commit to the long-term), it can be complementary to public innovation policies – with the usual Keynesian-type effects we all are familiar with. Policymakers aiming to boost innovation/investment in a long-lasting way might consider worker involvement not as an obstacle but as another tool to achieve that same aim.

Thirdly, the slight but tangible increase in capital investment observed under co-determination could be beneficial for stability, especially in contexts of tight financing or economic uncertainty. In the current environment of unpredictable interest rates (and, thus, unforeseeable “financeability”, as it is commonly termed) and further prices/tariff uncertainty, such prudent increase may actually enhance resilience. From a policy perspective, the findings of this paper challenge the common argument that co-determination makes firms sluggish or resistant to change. Such claims are often voiced in countries where proposals to introduce co-determination - or partial versions of it - have been debated, such as in the United States during discussions around the *Accountable Capitalism Act* of 2018. Yet, notably, these criticisms are rarely heard in the country – Germany – where the system is most extensively implemented, suggesting that the perceived inefficiencies of co-determination may reflect external assumptions rather than empirical realities; instead, the picture emerging from co-determined firms seem to be one of companies growing steadily and avoiding reckless bets/restructurings. One might consider this as the typical trade-off: perhaps slightly slower expansion during booms, but fewer catastrophic failures during busts. If the broader goal is sustainable and

inclusive growth, co-determination appears compatible with, and maybe even conducive to, that goal.

However, we should also consider the matter of policy design closer. Co-determination comes in different forms (one-third vs parity, board-level vs shopfloor works councils, etc.). This paper specifically shed light on board-level representation. An implication for countries or companies considering such models is that the *degree* of representation might also matter: as a matter of fact, full parity co-determination might yield stronger effects than a smaller degree of representation. Policymakers could thus calibrate co-determination requirements based on firm size or other criteria, expecting that even moderate worker involvement can shift firm priorities beneficially.

Finally, our results contribute to the ongoing debate about the competitiveness of stakeholder governance models. In an era of global competition, some argue that giving employees power could handicap firms. Our evidence from Germany clearly suggests otherwise: co-determined firms are falling behind neither in innovation nor in profitability. In fact, they might be forging a path toward a high-road competitive model where innovation and fairness reinforce each other. This can inform policy debates beyond Germany, such as proposals for worker directors or inclusive ownership funds in other advanced economies. The German example indicates that inclusive governance can coexist with strong performance and might be extended further, perhaps into forms of Direct Employee Ownership (DEO, for short).

## **CONCLUSIONS AND FUTURE RESEARCH**

Using an up-to-date panel of German firms, we documented three robust associations: higher labour share, stable R&D intensity, and higher capex intensity in firms with co-determined boards relative to firms without worker representation. This pattern is consistent with a corporate governance regime that internalises employment insurance and complements it by fixed assets expansion. In simple terms, co-determined firms tend to share more with workers and invest more in brick-and-mortar growth, painting the picture of a balanced, stakeholder-oriented approach.

The fact that we observe these differences in the latest data suggests that co-determination's effects persist in the contemporary economy – even as technology, globalisation, and recent shocks (like COVID-19) continuously reshape the business environment. Our findings lend empirical weight to arguments that co-determination can be a

component of inclusive growth strategies even if 50 years have passed since its first introduction in Germany: it appears possible to give workers a greater voice and share without derailing a firm's efficiency or innovative capacity in the short run.

That said, this study is an early foray and raises several questions for future research. One important extension to be done is to expand the time horizon, especially for analysing the effects of co-determination on R&D-related expenses. With more years of data, I could then examine whether the observed patterns hold over business cycles or if there are dynamic adjustments, but much more complex models would be needed at that point. A longer panel would also allow firm fixed-effects models to control for time-invariant differences between specific companies.

Another extension is to introduce controls for specific sector more comprehensively and explore heterogeneous effects. It is plausible that co-determination has a larger impact in some industries (e.g., those that are more labour-dependent or those where innovation cycles are long) and negligible in others. Due to our sample size, we did not deeply segment the analysis, but future research with a more substantial dataset or using population-wide administrative data could investigate heterogeneity by industry, region (Ger. *Land*), or firm age.

Beyond board representation, Germany has other forms of worker participation (e.g., works councils). Future studies could compare the effects of these institutions, or their interplay. For instance, one might ask: do the benefits we attribute to board-level co-determination actually require strong shop-floor representation as well? Or can one substitute for the other? Also, comparisons between legal forms – e.g., public stock companies (AG) versus limited liability companies (GmbH) – in terms of one-third vs parity representation might reveal nuances in how co-determination operates under very different governance structures.

Finally, expanding the set of outcome variables would provide a more complete picture. We focused on labour share, R&D, and capex, which are quite encompassing. But we could also examine outcomes like *productivity* (value added per employee), *profitability* (returns on assets or margins), *wage levels*, and *employment growth* at will. Some of these we touched upon indirectly; for example, the labour share increase coupled with stable productivity implies wages per worker likely did not surge (because we know that bargaining happens at the federal level) but benefits probably did – all findings consistent with prior discussions of wage

moderation under co-determination. But rigorous checks on these could strengthen the case that co-determination mainly redistributes without harming efficiency. Moreover, outcomes such as firm survival, credit risk, and long-term employee satisfaction could provide other highly valuable insights, although they are considerably more challenging to investigate empirically in a methodologically robust manner and would probably require extensive surveying.

In conclusion, this study provides an updated empirical assessment of co-determination in Germany, suggesting that its economic relevance remains as significant and valuable today as it was when the law was first enacted in the 1950s and then expanded in 1976 and 2004. Co-determination appears to foster a model of capitalism that is both worker-inclusive and forward-looking – an institutional and legal compromise that balances the interests of labour and capital without resorting to expropriation or direct worker control of firms. A last open question for the future is whether the German model will withstand the pressures of an increasingly globalised corporate environment, or whether *Mitbestimmung* will need to be adapted and expanded to preserve this equilibrium in the decades to come.

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