Labor in the Boardroom*

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November 8, 2019

Abstract

We estimate the effects of a mandate allocating a third of corporate board seats to workers (*shared governance*). We study a reform in Germany that abruptly abolished this mandate for certain firms incorporated after August 1994 but locked it in for the slightly older cohorts. In sharp contrast to the canonical hold-up hypothesis – by which increasing labor's power reduces owners' capital investment – we find that granting workers formal control rights *raises* capital formation: the capital stock, the capital-labor ratio, and the capital share all increase. Shared governance does not raise wage premia or rent sharing. It lowers outsourcing, while moderately shifting employment to skilled labor. Shared governance has no clear effect on profitability, leverage and costs of debt. Overall, the evidence is consistent with richer models of industrial relations whereby shared governance raises capital by permitting workers to bargain over investment or by institutionalizing communication and repeated interactions between labor and capital.

*We thank Daron Acemoglu, David Autor, Jonathan Cohn (discussant), Robert Gibbons, Lawrence Katz, Jim Poterba, Fabiano Schivardi, Antoinette Schoar, Andrei Shleifer, Sebastian Siegloch, Jean Tirole, and John Van Reenen for useful discussions and audiences at the Columbia Micro Macro Labor Conference, CREST, CSEF Conference on Finance, Labor, and Inequality, EIEF, INSEAD, IZA, MIT Organizational Econ Lunch, Columbia U, NBER Summer Institute Labor Studies, Stanford SIEPR Workshop, Stockholm University, University of Mannheim, UMass Amherst, University of British Columbia, and University of Montreal. For sharing their legal expertise, we especially thank Andreas Engert, Thomas Hoffmann, Marcus Lutter, Sebastian Sick, and Holger Spamann. Karl Aspelund, Nikhil Basavappa, Jonathan Cohen, Dominik Jurek, René Livas, Enrique Perez, and Martina Uccioli provided outstanding research assistance. We thank the Good Companies, Good Jobs Initiative at MIT Sloan, the Institute for Research on Labor and Employment at UC Berkeley, and the Washington Center for Equitable Growth for financial support.

1 Introduction

A fundamental question societies face is whether – and how – to involve workers in decision-making at their workplace. Many countries, particularly in continental Europe, grant workers formal authority in firms' decision-making (Hall and Soskice, 2001). Such codetermination or shared governance institutions include worker-elected directors on company boards. By contrast, in many liberal market economies such as the United States, firms are legally controlled solely by their owners, although policy proposals to mandate worker-elected directors are under consideration.[1] The consequences of granting workers such authority and voice remain highly debated. By the influential hold-up hypothesis (Grout, 1984), granting workers control rights will discourage capital formation, as capitalists anticipate that labor will grab a larger share of the fruits from investments (Jensen and Meckling, 1976, 1979). In contrast, worker participation may help overcome coordination issues and hence crowd in otherwise inefficiently low investment, improve information flows (Hirschman, 1970; Freeman and Medoff, 1984; Freeman and Lazear, 1995) and foster long-term employment relationships and the enforcement of implicit contracts (Malcomson, 1983; Hogan, 2001). Compelling evidence to adjudicate between these views is scant due to the absence of experiments randomizing shared governance across firms.

We provide quasi-experimental evidence on the effects of shared governance by studying a 1994 reform in Germany that sharply abolished worker-elected directors in certain firms and permanently preserved their presence in others. Before the law change, all shareholder corporations had to apportion at least one-third of their supervisory board seats to representatives elected by their workforce.[2] In two-tier board settings such as Germany's, the supervisory board appoints, monitors, dismisses, and sets the compensation for the executive board and is involved in decisions of fundamental importance to the company. A 1994 reform abruptly abolished worker-elected directors in *newly incorporated* firms, so that these firms were formally completely controlled by their shareholders unless reaching a threshold of 500 employees. Importantly, the reform permanently locked in shared governance in incumbent firm cohorts incorporated right before the reform.

The sharp law change permits a difference-in-differences design comparing shareholder

[1] In the US, two federal bills proposed in 2018, the *Accountable Capitalism Act* and the *Reward Work Act*, would mandate that 40% or 1/3, respectively, of the directors of large companies be worker representatives.

[2] We use shareholder corporations to refer to *Aktiengesellschaften* and *Kommanditgesellschaften auf Aktien*. Formally, the law required shareholder corporations to have one-third (in corporations with less than 2000 employees) or half of the supervisory board seats (in corporations with more than 2000 employees) apportioned to the workers. The chairman of the supervisory board, typically a shareholder representative, can break tie votes in a supervisory board with worker-shareholder parity. Interestingly, many decisions in the supervisory board are taken unanimously with consensus between shareholder and worker representatives (Gold, 2011; Steger, 2011).

corporations incorporated just before or after the August 1994 cutoff as well as untreated non-shareholder corporation types (*Gesellschaften mit beschränkter Haftung* (*GmbH*)).[3] We implement this design by combining a rich set of administrative and survey data on firms, establishments, and workers from 1990 until 2016: (i) financial data for public and private firms combining three Bureau van Dijk data sets, ownership, and supervisory and executive board composition, (ii) administrative matched employee-establishment data covering the universe of social security records merged to the Bureau van Dijk firm-level data (Orbis-ADIAB), (iii) a comprehensive data set of incorporated companies (Mannheim Enterprise Panel), and (iv) additional data on board composition for listed firms (Hoppenstedt Aktienführer).

To assess the validity of the design, we test for the possibility and do not detect that firms may have manipulated the incorporation date, e.g., by delaying incorporation around the reform cutoff date or switching corporate forms from shareholder to other forms, implementing a McCrary (2008) test of the density around the cutoff. We also check for effects on industry composition and legal form among entrants. Consistent with survey evidence that firms were not deterred by one-third codetermination (Albach et al., 1988), we find no evidence for compositional shifts.[4] Several additional institutional features support the research design. For example, grandfathered firms cannot escape the mandate through simple re-incorporation. In addition, the arbitrary grandfathering cutoff date has been challenged by shareholders, suggesting that the mandate binds in older corporations. The courts – including the Federal Constitutional Court – have upheld the law's constitutionality. Finally, we conduct a series of placebo analyses, counterfactually assuming that the reform had taken place four or eight years later than it actually did and drawing the corresponding new samples of firm cohorts, to rule out differential trends or lifecycle patterns by legal form affecting our estimates.

The first set of outcomes we study is board composition, starting by verifying that the reform shifted worker presence on corporate boards, information only available for a subsample

[3]In our specifications, we do not condition on firm size but implement an intent-to-treat design, permitting treated firms to cross the size threshold (500 employees) above which shared governance is mandated regardless of incorporation date. The vast majority, 99.8%, of German firms have fewer than 500 employees, capturing more than 65% of private-sector employment. About 12% of shareholder firms in our sample cross the 500 threshold. Correspondingly, IV estimates for the effect of shared governance would scale up our intent-to-treat effects by about 14%. Moreover, the treatment does not affect the probability of crossing this threshold. While our main results focus on individual firms, we also assess codetermination at the group level in the main part of the paper.

[4]In a survey of firms incorporated before the 1994 reform, Albach et al. (1988) find that codetermination in the supervisory board is generally not seen as an impediment to incorporation as a shareholder corporation. Rather, the surveyed firms generally accept shared governance, in particular because of the information and specific knowledge about the firm that worker representatives bring to the board room, and oppose an abolishment of shared governance. In a survey sampling shareholder corporations founded between 1994 and 1996, Schawilye, Gaugler, and Keese (1999) find that the top reasons for incorporating as a shareholder corporation are: (1) image and public relations concerns (high prestige of shareholder corporations), (2) raising capital, (3) corporate organization, (4) generational change and transfer of ownership.

(listed corporations). Turning to our full firm sample, we find that shared governance sharply raises the probability of having a female supervisory board member by about 15 percentage points. We also document a sharp reduction of about 60% in the share of supervisory board members holding nobility-indicating titles, a proxy for high socio-economic status. In an attenuated way, these composition effects pass through into the executive board – which the supervisory board appoints, controls and sets compensation for.

Second, we study how shared governance shifts the production process, with a particular focus on capital formation. Most importantly, we find strong positive effects on fixed (long-term) assets: firms with shared governance have about 40 to 50% larger fixed capital stocks. This core result sharply contradicts the predicted disinvestment following the hold-up and agency cost views of shared governance (see, e.g., Jensen and Meckling, 1979). The positive effects on capital formation even outpace a small increase in employment, leading the capital/labor ratio to increase in these firms. We further document a large and significant increase in the capital share of 7 to 8ppt (control mean: 0.30). Thus, shared governance shifts firms *towards* a more capital-intensive mode of production – in further sharp contrast to the disinvestment predicted by the hold-up view of shared governance.[5]

One mechanism raising capital intensity may be that owners strategically substitute into labor-substituting capital (Acemoglu, 2002) to offset worker participation. However, we find, if anything, a positive albeit statistically insignificant effect on employment, inconsistent with the substitution channel. Moreover, we find some evidence pointing towards a labor-complementing capital interpretation because the workforce under shared governance shifts from lower-skilled into higher skilled worker groups.

Another mechanism resulting in higher capital shares could be that firms outsource steps of the value added chain that may be particularly labor-intensive. However, we find that the share of sales produced in-house (value added over revenue) increases significantly by about 16ppt (control mean: 0.43). Moreover, drawing on our matched employer-employee data, we find that the share of occupations associated with outsourcing in Germany (e.g., Goldschmidt and Schmieder, 2017) if anything increase (albeit only marginally significantly). Overall, we therefore conclude that shared governance appears to raise capital intensity without negative effects on employment, pointing towards scale increases and a shift to capital intensity in production.[6]

Third, we turn to wages, as wage increases are the core transmission mechanism through which hold-up discourages capital investments, whereby labor grabs a larger share of the

[5]We also generated a capital-intensity index at the occupation level, finding suggestive positive but noisy support for the channel in that design.

[6]Drawing on comprehensive data from the Mannheim Enterprise Panel, we analyze and detect no effects on the survival probability of firms.

value-added pie once capital is installed. More generally, the idea that involving workers in corporate decision-making may boost wages is one rationale cited in favor of the institution in the policy debate. We start by studying administrative earnings outcomes, finding at best small and insignificant wage increases in shared governance firms (compared to their control firms). For median wages, we find statistically insignificant point estimates between 2.6 and 4.2%, with similar results for the mean wage. Turning to the wage structure within the firm, we do not find evidence for wage compression, e.g., comparing the 25th and 75th percentile or the share of workers above the social security earnings cap. In light of potential composition effects in the workforce, we then isolate firm's wage policies by analyzing premia in form of firm fixed effects estimated off movers between establishments controlling for worker effects (Abowd, Kramarz, and Margolis, 1999; Card, Heining, and Kline, 2013). Here, we find precisely estimated zero effects on wage policies, with confidence intervals ruling out pay premia effects above 5%. Likewise, we estimate a similar rent-sharing elasticity between value added and wage premia in firms with and without shared governance. In contrast to the hold-up view by which shared governance would lead workers to grab rents, the empirical institution of shared governance does not lead to an increase (or decrease) in wages – consistent with and in fact rationalizing our first key finding that capital formation is not curbed.

In a final step, we turn to firms' financials and the capital side of income, documenting that firms in which workers have formal control rights, do not appear to see their external-finance capacity reduced. There is no clear effect on profitability. However, our data does not contain information dividend payouts. Leverage is unchanged although interest payments over debt are slightly reduced (albeit not statistically significantly so). Lower interest payments could reflect an associated collateral channel or reflecting worker preferences for safer projects.

While our evidence is inconsistent with the disinvestment prediction of the canonical hold-up mechanism, we present several alternative economic mechanisms that can account for our main findings. Drawing on a simple extension of the basic hold-up model in which workers also participate in input decisions (following Manning, 1987), we show that increasing worker bargaining power in these choices *increases* capital investment. As supervisory boards are responsible for larger strategic and financial decisions, we find it plausible that mandating shared governance can be thought of as increasing worker bargaining power in corporate decision-making beyond wages. Therefore, our simple model extension can potentially account for our main results of higher capital. In fact, our model variant also accommodates the interpretation that the additional capital formation could reflect yet another agency conflict, if worker representatives push for investment that keep cash flow inside the firm at the expense of dividend payouts. In richer models, shared governance may crowd in invest-

ment in a mutually preferable way, by facilitating cooperation perhaps by institutionalizing communication or repeated interactions between labor and capital (Lancaster, 1973; Van der Ploeg, 1987; Englmaier and Segal, 2012). While we cannot definitively distinguish empirically among various potential alternative models, we also discuss additional mechanisms through which shared governance may affect outcomes in Section 2.

Our finding that worker participation in firm governance raises capital formation contributes to the empirical literature on worker bargaining power and hold-up. The existing evidence is mixed, perhaps due to econometric challenges (Menezes-Filho and van Reenen, 2003), with several studies documenting a negative effect of unionization on investment (see, e.g., Connolly, Hirsch, and Hirschey, 1986; Hirsch, 2004) while others found no evidence for hold-up effects (see, e.g., Machin and Wadhwani, 1991; Card, Devicienti, and Maida, 2014). In addition, two studies analyze the role of the broader institution we study, codetermination in Germany, on investment. First, in a correlational analysis, Addison et al. (2007) find that establishments with works councils, a codetermination institution related to the one we study, do not have lower investment than those without. Second, Rapp et al. (2019) find positive effects of worker board representation on investments during the crisis based on a propensity score matching strategy among listed firms.

By providing quasi-experimental evidence on the effects of shared governance, our paper additionally contributes to a small set of empirical studies on the effect of shared corporate governance on broader outcomes (reviewed in Scholz and Vitols, 2019; Addison, 2009). Most of the existing studies do not draw on quasi-experimental variation in codetermination but consider firms with and without codetermination, controlling for or matching on observable characteristics. Notable exceptions are Gorton and Schmid (2004), Lin, Schmid, and Xuan (2018), Kim, Maug, and Schneider (2018), and Redeker (2019), all of which use the parity (50/50) codetermination threshold at 2,000 employees, comparing larger firms with one-half employee representation on the supervisory board to smaller ones with one-third representation.[7] By contrast, we analyze a policy change that circumvents potential endogeneity concerns related to employment as an assignment variable. Moreover, our design analyzes a *persistent* change in shared governance rules rather than transitory exposure around employment cutoffs. Finally, our empirical variation has a baseline of *no* worker-elected directors in the control group, as opposed to the intensive margin shift from one-third to parity representation (with shareholders still retaining the tie-breaking vote).

At a broader level, our paper contributes to studies of shared governance and industrial relations, which we discuss in Section 2, as well as the empirical literature on the firm and

[7] An additional contribution to the literature analyzes the wage effects of the introduction of parity codetermination to industries without any codetermination in 1951 and 1976 (Svejnar, 1981).

worker effects of board behavior and composition more generally (see, e.g., Shleifer and Vishny, 1997; Bebchuk and Weisbach, 2010; Bertrand and Schoar, 2003; Ahern and Dittmar, 2012; Bertrand et al., 2018; Hwang, Shivdasani, and Simintzi, 2018). In addition, our paper complements work on the effects of firm-level unionization (DiNardo and Lee, 2004; Lee and Mas, 2012; Frandsen, 2013).

The paper proceeds as follows. In Section 2, we review and discuss mechanisms and existing theories by which shared governance may affect firm- and worker-level outcomes with a focus on hold-up. In Section 3 we describe the institutional context and the reform. Section 4 presents our data sets and empirical strategy. Section 5 reports effects of the reform on board composition. In Section 7 we report on the effects of shared governance on production outcomes, including our core result on capital formation. Section 8 studies the distributional consequences of shared governance for wages, rent sharing, profitability and external finance. The last section concludes.

2 How Might Shared Governance Affect Firms?

We now discuss mechanisms through which shared governance affect firm and worker outcomes. Our point of departure is the influential hold-up view (Grout, 1984), formalized in Section 2.1, where shared governance discourages firms' investment by raising worker bargaining power in wage setting. Foreshadowing our main empirical results for positive capital effects, we present a hold-up model variant in Section 2.2 that additionally allows workers to participate in operational decisions, specifically investment. Here, shared governance can *raise* investment, overturning the basic hold-up prediction. Section 2.3 reviews alternative perspectives on shared governances and investment and broader firm and worker outcomes.

2.1 The Hold-Up View

By the hold-up hypothesis (Grout, 1984), institutions that give control rights to workers and hence increase workers' bargaining power enable their capacity to *extract rents*. Anticipating that labor will grab a larger share of the fruits from their investments, capitalists reduce investment. Several authors have argued that unions and other forms of worker representation can be thought of as rent-extracting institutions (see, e.g., Grout, 1984; Lindbeck and Snower, 1989), including the specific institution of shared governance (Jensen and Meckling, 1979).[8]

[8] Jensen and Meckling (1979) focus on the hold-up channel of codetermination: "Upon gaining control of the firm the workers will begin 'eating it up' by transforming the assets of the firm into consumption or personal assets." Regarding the broader consequences of codetermination, they write: "It will become difficult for the firm to obtain capital in the private capital markets. As this continues some firms will simply go

In this version of the basic hold-up model (e.g., Grout, 1984), the firm produces output with a decreasing returns to scale production function $F(K, \bar{L})$, with output prices taken as fixed and normalized to one. (Labor $L = \bar{L}$ is fixed in our model without loss of generality.) In our two-stage setting, capital K is purchased in stage 1 at price c, and becomes productive at stage 2, and thereafter fully depreciate.

Stage 2: Wage Bargaining Hold-up emerges because wages, which are bargained over in stage 2, depend on output and the capital stock – which are predeteremined at that point. Specifically, wages w are determined by Nash bargaining, with workers holding bargaining power ϕ:

$$w^* = \arg\max_w \{\phi \log S_2^W(w, \bar{L}, K) + (1-\phi) \log S_2^F(w, \bar{L}, K)\}, \tag{1}$$

where $S_2^W(w, \bar{L}, K) = \bar{L}(w - b)$ is the workforce's surplus in the second period: the inside value of the relationship $\bar{L}w + (N - \bar{L})b$ minus the outside option, which is set as Nb, where b denotes some reduced-form flow value of members of the workforce not employed in the firm (hence receiving unemployment insurance or wages at a reference competitive wage) and N is the total potential size of the labor entity bargaining with the firm at hand (as in union bargaining models, e.g., Brown and Ashenfelter, 1986; Abowd and Lemieux, 1993).[9] Firm surplus is $S_2^F(w, \bar{L}, K) = F(K, \bar{L}) - w\bar{L} - c'K$ at the bargaining stage, when capital expenditure cK is sunk and hence does not enter firm surplus directly. Instead, K enters stage-2 surplus as firms have some alternative use of capital, modeled as a reselling option at price $c' \leq c$. Total surplus is $S_2 = S_2^W + S_2^F = F(K, \bar{L}) - b\bar{L} - c'K$. The Nash bargaining solution allocates surplus shares such that $S_2^W(w^*, \bar{L}, K) = \phi S_2$ or $S_2^F(w^*, \bar{L}, K) = (1-\phi)S_2$, and therefore the Nash wage w^* is outside option b plus share ϕ of stage-2 surplus:

$$w^*(K, \bar{L}) = b + \phi \frac{1}{L}(F(K, \bar{L}) - b\bar{L} - c'K). \tag{2}$$

Hold-up emerges because the firm makes investment decisions anticipating wage rule (2). The wage is a function of K for two reasons. First, K affects average output, of which share ϕ goes into the wage. But second, K boosts the firms' outside option by c' per unit of capital, therefore lowering wages.

out of business and others will reach the point where the returns on investment are so high that even given the horizon bias further reduction in the capital of the firm makes the workers worse off. The result of this process will be a significant reduction in the country's capital stock, increased unemployment, reduced labor income, and an overall reduction in output and welfare."

[9] As hold-up works through inside-value/rent sharing, this specification of the outside option in Nash bargaining is inconsequential for our focus and therefore evades the ongoing debate about its theoretical and empirical deficiencies (Hall and Milgrom, 2008; Jäger et al., 2019).

Stage 1: Capital Choice In stage 1, firms make capital decisions unilaterally – a consequential assumption we relax in Section 2.2 –, maximizing expected profits: $\pi(w, \bar{L}, K) = F(K, \bar{L}) - w\bar{L} - cK$. Namely, capitalist chooses K to equalize the marginal cost of purchasing it (c) with the marginal benefit (output net of wage effects):

$$F_K(\bar{L}, K^*) = c + \bar{L}\frac{\partial w^*}{\partial K} = c + \phi(F_K(\bar{L}, K^*) - c') = c + (c - c')\left[\frac{\phi}{1-\phi}\right] \tag{3}$$

$$\Rightarrow \frac{\partial K^*}{\partial \phi} = \frac{1}{F_{KK}(\bar{L}, K^*)}(c - c')\frac{1}{(1-\phi)^2}. \tag{4}$$

Capital investment involves two considerations. First, as in the case of a wage-taking firm, the marginal unit of capital raises output by F_K, but comes at cost c. Second – the core of the hold-up mechanism –, workers grab share ϕ of output in period 2, a "tax" that reduces investment incentives. At that stage, capital has value $c' \leq c$. Only if $c' = c$ (if capital can be resold at the original price) is investment first-best ($F_K = c$), when the wage effect consideration on its own would call for the same capital level as in the wage-taking case. *Underinvestment*, in form of $F_k > c$ compared to the efficient level ($F_K = c$), emerges as long as $\phi > 0$ (workers have some wage bargaining power) and $c' < c$ (capital is at least partially sunk).

That is, shared governance may exacerbate hold-up and reduce investment to the extent that the institution manifests itself through a higher level of worker bargaining power ϕ in wage negotiations.

2.2 The Fragility of the Disinvestment Prediction of Hold-Up

We now show that worker participation in production, in form of bargaining over inputs, can overturn the underinvestment result. Specifically, we separate the decisions in a model of sequential bargaining: rather than a unilateral firm decision, in stage 1 the firm and worker now jointly determine the capital stock by bargaining. As in Manning (1987), on whom our application to shared governance draws, we permit the wage and investment bargaining to feature different worker bargaining power parameters, with ι applying to the investment bargaining:

$$\max_K \{\iota \log S_1^W(w^*, \bar{L}, K) + (1 - \iota) \log S_1^F(w^*, \bar{L}, K)\}, \tag{5}$$

where investment choices are again made anticipating wage rule (2), the structure of which remains unchanged in period 2. The surpluses entering first-period bargaining are $S_1^W = \bar{L}w^* - bL$, while $S_1^F = F(K, \bar{L}) - w^*\bar{L} - cK$. The previous case of the firm unilaterally setting

capital is nested if $\iota = 0$, when underinvestment emerged whenever $\phi > 0$ and $c' < c$. In that case, modeling shared governance as an increase in ϕ distorted investment further downward.

By giving workers a vote alongside capitalists in a series of corporate decisions, including over larger investment decisions, and in the appointment and holding accountable of managers, shared governance may alternatively be viewed as an increase in ι. To foreshadow why this channel will lead to higher rather than lower investment, note that workers care about capital choice K solely through its effect on wages. First consider the extreme case where workers have full bargaining power over inputs, i.e. $\iota = 1$. The optimization problem (5) becomes $\max_K\{\log S_1^W(w^*, L, K)\}$, with the following first order condition:

$$L\frac{\partial w^*}{\partial K} = 0 \tag{6}$$

$$\Leftrightarrow \phi F_K(K^*, \bar{L}) - \phi c' = 0 \tag{7}$$

$$\Leftrightarrow F_K(K^*, \bar{L}) = c' \leq c. \tag{8}$$

Workers' capital choice trades off the benefit, its marginal product, of which share ϕ goes to the worker, with the marginal cost: resale value c', because each unit of capital boosts the firm's outside option in form of $c'K$ in wage setting. Workers ignore direct capital costs c. The two extreme cases of $\iota = 0$ and $\iota = 1$ make clear that increasing worker bargaining power in capital choice ι overturns the Grout (1984) underinvestment result ($F_K > c$) to *overinvestment* ($F_K = c' \leq c$).

The general bargained capital level K^* under $\iota \in [0, 1]$ given by:

$$F_K(K^*, \bar{L}) = c - (c - c') \times \left[\frac{(\iota - \phi)(F(K^*, \bar{L}) - b\bar{L} - c'K^*) + \iota(c' - c)K^*}{(1 - \phi)(F(K^*, \bar{L}) - b\bar{L} - c'K^*) + \iota(c' - c)K^*}\right]. \tag{9}$$

Here, K^* depends on ι as follows:

$$\frac{dK^*}{d\iota} = \frac{-(c - c')(F - b\bar{L} - c'K^* + (c' - F_K)K^*)}{(1 - \phi)[F_{KK}(F - b\bar{L} - c'K^*) + (F_K - c')^2] - (c - c')[F_K - c' + \iota F_{KK}K^*]} \tag{10}$$

This expression (which we formally evaluate in Appendix A.1) is positive, so K^* is increasing in ι, as long as $\phi > 0$.[10] If given a chance, workers will bargain to raise capital investment, as they will benefit in period-2 wage bargaining from the higher production. Hence, increasing worker bargaining power in operational decisions such as capital choices may mitigate hold-up and lead to efficient investment, and even overinvestment.

[10] If $\phi = 0$, (i.e the union has no power in setting the wage), then $w^* = b$ i.e. does not depend on K. For $\iota = 1$, any K^* is a solution, while for $\iota < 1$, efficiency emerges ($F_K = c$).

Discussion: Hold-Up and Profits The model serves as a proof of concept that a given institution boosting workers' control rights need not crowd out but can in fact crowd in investment. Importantly, in this particular model, hold-up is still active; in fact the prospect of wage bargaining drives workers' push for more investment. Moreover, here the increase in investment hurts capitalists *even if investment were to move closer to the first-best level*: profits are higher under $\iota = 0$ than under $\iota > 0$, perhaps explaining why at least individual capitalists may not voluntarily adopt codetermination although it may increase efficiency. Our focus on and model example of the capital effects thereby echoes the broader debate between Jensen and Meckling (1979) and Levine and Tyson (1990); Freeman and Lazear (1995).[11] Relatedly, worker representatives on the board might advocate to keep employee numbers low in order to increase the capital-labor ratio and to reap ensuing rents (Lindbeck and Snower, 1989; Johnson, 1990; Gurdon and Rai, 1990), a view that however would predict a decline in the capital-labor ratio and in employment. (Some alternative views reviewed in Section 2.3 would predict an increase in profitability.)

Discussion: Dynamic Aspects There are several alternative theoretical resolutions of the hold-up problem that shift the structure of bargaining. For example, under simultaneous rather than sequential bargaining over wages and investment in the first period, the parties can neutralize hold-up and also reach the efficient investment level (Crawford, 1988). Here however, shifts in bargaining power from shared government would not affect the always-efficient capital choice; instead, shared governance would have positive investment effects if it shifted the setting from inefficient to efficient bargaining. Similarly, in repeated games without commitment, reputation building may help overcome hold-up and result in efficient investment levels (Van der Ploeg, 1987); shared governance may facilitate such repeated interactions and may thereby raise investment investment.

2.3 Beyond Hold-Up: Broader Views of Shared Governance

Of course, workers may be part of corporate decision-making beyond inputs and compensation – and these effects through other channels may ultimately affect capital as well. We now review such alternative channels and perspectives on shared governance.

Capital Markets Interesting consequences may arise with multiple parties, in particular with richer views of capital markets. For example, firms might strategically increase

[11] Moreover, our model and empirical design considers individual firms' capital decisions at the intensive margin. Entry and exit may imply additional aggregate capital effects at the extensive margin. Our empirical assessment of effects on entry and legal form choices (Section 4.2) as well as on exit effects (Section 6) does not detect extensive-margin patterns.

debt when worker bargaining power is increased to counter hold-up problems (Matsa, 2010; Baldwin, 1983; Dasgupta and Sengupta, 1993; Subramaniam, 1996). Alternatively, worker representatives may prefer safer projects, hence lowering capital costs and permitting higher leverage and investment firms in more unionized industries have lower bond yields, as documented by Chen, Kacperczyk, and Ortiz-Molina (2011) in the context of unionization and bond yields, and Lin, Schmid, and Xuan (2018) for the relationship between employee representation in Germany and financial leverage.

Corporate Governance One may question whether shared governance can affect corporate governance at all, given that workers still only hold a *minority* position on the board. However, anecdotal evidence documents that many decisions in the supervisory board are taken unanimously with consensus between shareholder and worker representatives (Gold, 2011; Steger, 2011). A potential pathway is that the minority position incentivizes worker representatives to become moderates and seek cooperation with shareholder representatives (Thelen, 1991). What are potential implications for corporate governance of having worker representatives on the board? The increased diversity of objectives could decrease managerial accountability (Tirole, 2001, 2010, p. 59-60). In addition, monitoring through worker representatives could also be more stringent, if shareholder directors may be relatively more influenced by executives (Hermalin and Weisbach, 1998). Similarly, worker-elected directors could have longer horizons and more at stake compared to outside shareholder directors with limited incentives. It is also conceivable that managers and workers may collude to further corporate decisions in particular in form of higher investment that leave shareholders worse off, for example by transforming cash flow into illiquid corporate assets rather than dividends, and engaging in empire-building (as in the agency conflict mechanism in Jensen and Meckling, 1976). (We will not be able to study dividends or stock prices in our data, since most of our firms are unlisted.) More broadly, increasing worker bargaining power has also been hypothesized to lead to an entrenchment of incumbent workers perhaps at the expense of outsiders (Lindbeck and Snower, 1989; Pagano and Volpin, 2005; Atanassov and Kim, 2009).

Incomplete Contracts Shared governance could be a mechanism to enforce incomplete contracts and sustain long-term relationships. In the presence of asymmetric information, for example, management might misinform workers about the firm's situation (Tirole, 1986; Freeman and Lazear, 1995). As a consequence, workers might disregard information from management, ruling out potentially efficient contractual arrangements that are contingent on the firm's situation (Grossman and Hart, 1981). Better information about the state of

the firm's finances or product demand through worker representatives on the board could then facilitate efficient state-contingent wage contracts (Malcomson, 1983) or effort provision (Freeman and Lazear, 1995).[12] More generally, worker representation might lead firms to honor implicit contracts and thus resolve hold-up problems leading to underinvestment by workers (Hogan, 2001), and thereby lead to more firm-specific investment by workers. Examples of such hold-up problems include firm-specific training (Becker, 1962; Hashimoto, 1981) or back-loaded compensation rewarding earlier performance (Lazear, 1979; Gibbons and Murphy, 1992).[13]

Collective Voice and Labor Relations Shared governance could operate as an institution of collective voice for the workforce (Hirschman, 1970; Freeman and Medoff, 1984; Kochan et al., 2019). By engaging in voice, workers can inform the employer about adverse conditions in the workplace rather than voting with their feet and quitting (Freeman, 1980). Worker voice could also have direct productivity-enhancing effects by fostering information flows and cooperation between management and the workforce.[14] The information channel is particularly relevant in Germany: the executive board is legally required to report planned firm policy to the supervisory board, and the supervisory board, in its active advisory capacity, can demand reports from management (Lutter, 2001). Finally, voice might increase job satisfaction and performance via workers' perception about procedural justice (Greenberg and Folger, 1983).

[12] In fact, several observers have associated the robustness of the German labor market in recent decades and during the Great Recession with the presence of opening clauses and "employment pacts" between firms and worker representatives aimed at preventing bankruptcy or layoffs through hours changes or "wage moderation" in tough times (Dustmann et al., 2014; Bellmann, Gerner, and Laible, 2016). For a sample of large firms, Rehder (2003) reports a strong, positive correlation between employee board representation and the share of such company-wide pacts. See also Kim, Maug, and Schneider (2018) for evidence that labor representation in corporate governance is associated with employment insurance and lower wages and Ellul, Pagano, and Schivardi (2017) for related evidence on employment insurance in family firms. Jäger, Schoefer, and Zweimüller (2019) provide evidence consistent with works councils mattering for layoff decisions in Austria.

[13] See also Acemoglu and Pischke (1999a,b); Acemoglu, Aghion, and Violante (2001) for similar arguments related to unions. More generally, MacLeod and Malcomson (1993) analyze contracts that may generate efficient investment with two-sided specific investments.

[14] Relatedly, Ichniowski and Shaw (1999) document cross-country evidence on employee participation and productivity in the steel sector, and Freeman and Medoff (1984) argue that cooperative relations between labor and management is associated with positive productivity effects of U.S. unions (see also Black and Lynch, 2001).

3 Shared Governance in Germany and 1994 Reform

We describe shared corporate governance in Germany and the 1994 reform we study, which sharply reduced worker representation on corporate boards in certain newly incorporated firms.

3.1 Shared Corporate Governance in Germany

Corporate Governance in Germany Similar to many continental European countries, Germany has a two-tier board system with a supervisory and an executive board for shareholder corporations, i.e. firms whose common equity could be traded on stock exchanges. Figure 1 illustrates the corporate governance structure in the German two-tier system. The executive board is the managing body and responsible for day-to-day business. The supervisory board—composed of representatives for shareholders and, in many cases, workers—is responsible for the selection, monitoring, auditing, compensation structuring, and dismissal of the executive board (§§84, 87 and 111 *AktG*). The German Corporate Governance Code, introduced in the early 2000s, advises that the supervisory board be involved in all decisions of fundamental importance to the company, e.g., strategic planning and larger financial decisions.

Shared Governance Two legal institutions allow for a direct participation of workers in their employer's decision-making: worker representatives on the supervisory board and works councils.[15] The variation we study concerns mandates for worker representatives on the supervisory board, an institution introduced in the early years of the Federal Republic of Germany in the aftermath of World War II.[16] Worker representatives are elected by the firm's workforce in general, secret, equal and direct[17] elections, which are organized by

[15]Works councils have extensive consultation, information and codetermination rights in areas such as work hours, occupational safety, and organizational or staffing changes and can directly negotiate with the employer. The 1994 law change did not directly affect the institution of works councils.

[16] Two key factors made the historical context favorable for the expansion of worker involvement (see McGaughey, 2016, for a detailed history of shared governance in Germany). First, while industry leaders had collaborated with the Nazi regime, the workers' movement was less tainted. Second, the United Kingdom, one of the Allies, had just nationalized several core industries, making shared governance an acceptable compromise to owners and industry leaders. Two landmark acts, in 1951 and 1952, mandated supervisory board parity in the mining and steel sectors for firms with more than 1,000 employees (1951), and a third of supervisory boards seats to workers in the other sectors and smaller steel and mining firms (1952) (exempting family firms and non-corporations with fewer than 500 employees). In the 1960s, the union movement began pushing for further expansion, and the social-liberal coalition passed the codetermination law of 1976 (*Mitbestimmungsgesetz*), mandating parity also in non-mining/steel sectors for firms with more than 2000 employees.

[17]In firms with more than 2,000 employees, the workforce can also decide to elect delegates who then vote for the directors. In firms with more than 8,000 employees, the elections are through delegates by default

works councils (*Betriebsräte*); in many cases, worker board representatives also serve on the works council. Importantly, workers are formally involved in governance but are not residual claimants of profits as, e.g., in employee-owned firms (Kruse, Freeman, and Blasi, 2010; Pencavel, 2013). Once elected, the worker representatives are co-equal directors with the shareholder representatives and directly involved in, e.g., selection of the executive board or larger strategic and financial decisions. All–or, for larger firms, the majority–of the worker representatives on the supervisory board have to be employees of the firm. For larger firms with larger boards, the additional external worker-elected directors are proposed by the union and elected by the firm's workforce (§7 *Mitbestimmungsgesetz*, §4 *Drittelbeteiligungsgesetz*). Though not required by law, a large share of worker-elected directors are union members (Addison, 2009). Unions and associated organizations also offer training programs for worker representatives on supervisory boards.[18]

The mandated worker share of supervisory board seats ranges from zero to full parity, and varies by the company's legal form and size (employee count), ownership structure and founding date (Table 1). In large firms with more than 2000 employees, workers elect 50% of the supervisory board seats. Shareholders elect the other 50% and the chairperson of the board, generally a shareholder representative, can break ties.[19] In firms between 500 and 2000 employees, workers elect one-third of the supervisory board seats. Figure 1, panel (b), illustrates corporate governance in corporations with the one-third worker-director mandate.

For firms with fewer than 500 employees, rules are differentiated by legal form. Private limited liability corporations (i.e. *Gesellschaften mit beschränkter Haftung*) and non-corporations (e.g., *Offene Handelsgesellschaften (OHG)* or individual merchants) have been exempt from *any* worker representatives on supervisory boards from the beginning of the institution in the 1950s. In contrast, the rules for shareholder corporations were sharply changed by a 1994 reform as a function of incorporation date as we describe below.

but employees can choose to have direct elections (§9 *MitbestG*).

[18]Unions negotiate with employer associations at the sectoral level, setting wage floors, work hours and working conditions. In general, covered employers may only deviate in ways beneficial to the employees (*Günstigkeitsprinzip*, §4 (3) *TVG*). Since the 1990s, opening clauses have become more prevalent, permitting firms to directly negotiate with their workforce and, in some cases, deviate downwards (see Dustmann et al., 2014, for an overview).

[19]In the mining, coal and steel industry, there is complete parity on the supervisory board between worker and shareholder representatives without tie-breaking by the chair (*Montan-Mitbestimmungsgesetz*).

3.2 1994 Abolition of Shared Governance in New Shareholder Corporations

Since 1952, shareholder corporations had been required to have at least one-third worker representatives on the supervisory board regardless of their size. A 1994 reform of the Corporation Law (*Aktiengesetz*) abruptly abandoned this requirement for newly incorporated shareholder corporations while keeping it in already founded corporations. The law was a result of last-minute political compromise and did not affect non-shareholder corporations. Figure 2 and Table 1 illustrate the changes in worker board representation induced by the 1994 reform, which locked in differences in worker representation that continue to the present.

Abolition in Corporations Founded after August 10th, 1994 The reform abolished the one-third mandate only for new corporations incorporated on or after August 10, 1994.[20] As a consequence, these firms *cannot* have any worker-elected board members, unless they grow very large. The same rules apply as in older corporations upon having 500 employees or more, i.e. one-third supervisory board representation up to 2000 employees and parity in larger firms.[21] Figure 1 panel (a) illustrates corporate governance in these corporations without the worker-director mandate.

Lock-In in Corporations Founded Before August 10, 1994 Importantly, the law locked in the worker representation mandate in already founded shareholder corporations, as a result of a compromise between the center-right parties (which were against grandfathering) and the center-left party (which wanted to preserve the mandate for new firms).[22] In fact,

[20] In addition to the liberalization of the shared governance mandate, the 1994 law included several other changes (e.g., rules for use of profits and for general shareholder meetings), all of which were applicable regardless of the incorporation date, and were considered secondary to the abolition of shared governance by commentators. See, for example, "Nicht nur weiße Salbe", *Frankfurter Allgemeine Zeitung*, May 27, 1994, p. 13.

[21] For the vast majority of firms, the 500 employee cutoff is not binding as only 0.02% of firms, and less than 35% of employment is in firms above this threshold. In our sample of shareholder corporations, which are generally larger, still only 29% of firms reach the 500 employee threshold. New shareholder corporations with fewer than 500 employees cannot formally have worker-elected board members as the corporate law leaves no room for choice (see, e.g., Raiser, Veil, and Jacobs, 2015, §1 Rn. 26, and §23 (5) and §96 AktG). In principle, non-shareholder corporations could add additional worker representatives exceeding the fractions mandated by law, although anecdotal evidence suggests that this is not empirically relevant. In any case, rules for non-shareholder corporations were not changed by the 1994 reform. We also analyze codetermination at the corporate group level as well as firm's subsidiary status (see Appendix Table D.1 and associated table note).

[22] Specifically, the grandfathering rule was a last-minute compromise in late May 1994, between the conservative-liberal governing coalition (Christian Democrats (CDU/CSU) and Free Democrats (FDP)) and the center-left opposition (Social Democrats, SPD), which held a majority in the upper chamber (*Bundesrat*). The government proposed to abolish shared governance in the majority of corporations, *including* existing ones), while the opposition was in favor of maintaining shared governance for *all* corporations. The law was then abruptly passed in both chambers in the subsequent weeks and mandated a cutoff date of August 10,

grandfathered companies incorporated just before August 10, 1994, cannot simply escape the shared governance mandate by re-incorporating.[23] Figure 1 panel (b) illustrates corporate governance in these corporations with the worker-director mandate. The 1994 grandfathering rule has been challenged in legal cases brought by shareholders of older corporation on the grounds that the arbitrary nature of the cutoff date violates the constitutional principle of equality. However, the courts have upheld the clause.[24]

4 Data and Empirical Methodology

We describe the data as well as our difference-in-differences methodology.

4.1 Data

Below we describe our data sets, sample and variable construction. We report details in the Data Appendix Section (B). In lieu of summary statistics for our firm groups (since all variables will rather be outcome variables as treatment is assigned at incorporation), we will later on include control means for all outcome variables in each respective regression column.

Firm Panel Data: Amadeus and Orbis Historical Our main data source is firm-level panel data on balance sheets and income statements from Bureau van Dijk's Amadeus and Orbis Historical data sets, the largest available data set for German firms. It is based on official company registers, company reports, and credit rating agency information. For our main analysis, we focus on shareholder corporations and limited liability corporations incorporated from August 1992 through August 1996. The law mandates that certain nonprofit firms and media organizations are exempt from codetermination (§1 (2) *DrittelbG*) so we drop firms in

1994, the day after the law's promulgation. The initially proposed bill and compromise committee recommendation are reported in *Drucksache* 12/6721 and 12/7848, respectively (*Deutscher Bundestag, 1994*), the minutes of plenary proceedings in *Plenarprotokoll* 12/233 and 12/237 (*Stenographischer Bericht, Deutscher Bundestag, 1994*).

[23] Specifically, a change of legal form and temporally connected re-incorporation of an old shareholder corporation as an ostensibly new shareholder corporation does not invalidate the mandate for board representation of workers (see, e.g., Raiser, Veil, and Jacobs, 2015, §1 Rn. 5). Re-incorporations as non-shareholder corporations do not trigger the grandfathering rule so can lead to an abandonment of board-level representation if the corporation has fewer than 500 employees (although non-shareholder corporations can also opt to keep workers on the board). During our sample period, re-incorporations as a non-shareholder corporation require at least 75% of shareholder votes (§240 (1) *UmwG*), although additional requirements apply in certain cases (§242 *UmwG*). Re-incorporations as corporations according to European law (SE) also entail a grandfathering rule such that employee representation is preserved, even if the corporation adopts a unitary board structure (§21 (6) *SEBG*).

[24] For example, the Federal Constitutional Court (*Bundesverfassungsgericht*) dismissed a legal complaint by a shareholder in 2014 (BVerfG, 09.01.2014, Az. 1 BvR 2344/11).

pertinent sectors such as science, education, and charities from our analysis along with non-profit firms that we can identify through their legal form in the data (see Appendix Section B.2 for details of the sample construction). We also drop utilities, rail transportation and other industries with heavy state involvement or organizations not part of private-sector employment. Even before 1994, the law had exempted shareholder corporations wholly owned by one family from one-third codetermination so that such firms were not affected by the 1994 reform. While family links between individuals are not listed in the data, we attempt to drop such family shareholder corporations–regardless of their incorporation date–by dropping firms wholly owned explicitly by one family or by individuals that share the same last name.[25] In addition, we drop state-owned firms in other industries, defined as those where a public authority has more than a 50% voting share. We also drop the large, formerly state-owned national railway, postal and telecommunications firms and their subsidiaries that were privatized in the mid-1990s (*Deutsche Bahn, Deutsche Post, Deutsche Telekom*). We further follow Gopinath et al. (2017) to clean the data and report all procedures in detail Appendix Section B.2.

Matched Employer-Employee Data: Orbis-ADIAB We study worker-level outcomes with administrative employer-employee data from IAB merged with the Orbis firm-level data.[26]

The administrative data also allow us to zoom into firms around their time of legal incorporation as a shareholder or non-shareholder corporation in the Commercial Register. In Appendix Figure C.2, we assess the quality of the incorporation date variable in the administrative data. Panel (a) plots a histogram of the date of the first appearance of an establishment in the administrative data relative to a firm's incorporation date as reported in Orbis (based on the Commercial Register). For more than 50% of firms, the first occurrence of an establishment in the administrative data is within a year of the incorporation. There is a small tail of establishments that appear in the administrative data before the legal incorporation. This could be due to the fact that establishments can keep the same establishment number even if the legal form or ownership of the firm changes.[27] There is a larger tail of

[25]The law's ownership-based definition of family firms is stricter than the typical ownership criterion for family firms based on more than 50% rather than 100% ownership (see, e.g., Gottschalk et al., 2014). The extent to which we miss shareholder corporations that are wholly owned by one family will increase the share of never-takers in our sample.

[26] The data set was created by linking administrative employer-employee data at the establishment level with Orbis financial and production data at the firm level. The record linkage was conducted based on establishment data from 2006 to 2014. The match rate for shareholder corporations such as the ones we study in this paper is the highest among all legal forms at 70.34% (see Schild, 2016; Antoni et al., 2018, , who also describe the linking process).

[27]`https://www.arbeitsagentur.de/betriebsnummern-service/grundsaetze-vergabe`

first appearances *after* the legal incorporation. This could be due to the fact that the match between firm records (including the incorporation date) and establishments only occurs for the years between 2006 and 2014. As a consequence, we will miss establishments that had existed at some point before 2006 but were closed by 2006, e.g., due to a firm's location change. In panel (b), we provide a binned scatter plot of the first appearance date of establishments in the administrative data against firms' incorporation date. The figure also includes the diagonal in maroon. For the time range from 1990 to 1992, the average first appearance date in the administrative data is about a year or two after the legal incorporation. From 1993 onwards, the mean first appearance date in the administrative data tracks the legal incorporation date very closely. In panel (c), we plot the cumulative distribution function of establishment entry around the incorporation year. There is a sharp jump from about 0.10 to 0.60 from the year before legal incorporation to the year after. Finally, we plot employment around incorporation in panel (d) and show a substantial increase in employment recorded in administrative records around the time of incorporation.

Firm Panel Data: Mannheim Enterprise Panel (MUP) We further draw on data from the Mannheim Enterprise Panel provided by Zentrum fÃŒr Europäische Wirtschaftsforschung (ZEW), Mannheim, a firm panel data set containing information on incorporations, exits, and basic information such as employment and financial indicators (described in Bersch et al., 2014). Comprehensive data on incorporations are provided by Creditreform e.V., Germany's largest credit rating agency, based on official registers and are available from 1991 onward. We primarily use the MUP to study the selection of firms into entry and, conditional on entry, into industries, as well as to analyze the lifecycle and survival of firms.

Hoppenstedt Aktienführer While our sample of Bureau van Dijk firms does come with board membership information (and is our main data set for our study of board-level outcomes), it does not differentiate between worker and capital representatives. To provide one intervention check that the reform shifts board composition, we draw on the Hoppenstedt Aktienführer covering all *listed* German firms from 1979 to 2015 including data on worker representatives on firms' supervisory boards.[28] We focus on consolidated statements from firms and again drop state-owned enterprises.

[28]The historical Hoppenstedt Aktienführer data have been digitized through a project by the German Research Foundation (*DFG*) and were retrieved from https://digi.bib.uni-mannheim.de/aktienfuehrer/.

4.2 Empirical Methodology

Our identification strategy is to exploit the quasi-experiment induced by the 1994 reform, which generates a discontinuity in the mandated presence of workers on the supervisory board of shareholder corporations at the cutoff date for incorporation. We compare shareholder corporations incorporated before and after the cutoff date to non-shareholder corporations (for which the rules were not changed) founded before or after the cutoff date.

We estimate the following difference-in-differences specification for outcome Y_{ft} of firm j in period t (where we stack firm level panel data):

$$Y_{ft} = \alpha + \phi_Y \cdot \mathbb{1}(\text{Incorporation}_f < 0) \times \text{ShareholderCorp}_f \tag{11}$$

$$+ \mathbb{1}(\text{Incorporation}_f < 0)\beta + \text{ShareholderCorp}_f\gamma + X'_{jt}\delta + \epsilon_{jt}, \tag{12}$$

where Incorporation_f is a variable measuring firm's incorporation date relative to August 10, 1994, and ShareholderCorp_f is an indicator for shareholder corporations. The parameter of interest ϕ_Y is the coefficient on the interaction of the indicator for incorporation before August 10, 1994, with the indicator for shareholder corporations, thereby capturing the effect of the law-mandated presence of workers on the supervisory board that was relaxed after August 10, 1994. The specification includes a baseline effect for incorporation before August 10, 1994, $\mathbb{1}(\text{Incorporation}_f < 0)$, regardless of corporation type. This will capture, e.g., differences in the business cycle at the time of incorporation. The specification also includes a baseline effect for shareholder corporations, ShareholderCorp_f, regardless of incorporation date.

In our main specifications, we focus on corporations incorporated within two years before and after the reform, i.e. from August 1992 through August 1996. We also report results for other bandwidths between one and three years around August 10, 1994 in Appendix Figures C.5 to C.15.

In some specifications, we additionally include control variables X_{jt} that include year effects, industry effects (2-digit NACE designations), and industry-by-year effects. Unless reported otherwise, we winsorize all outcome variables at the 1% level (by year); financial variables are CPI-adjusted with base year 2015. We restrict our sample to corporations with 10 or more employees and implement further restrictions detailed in Appendix Section B.2.3 (largely excluding firm types who are legally exempt from codetermination).

Importantly, we will estimate intent-to-treat specifications, since firms incorporated on or after August 10, 1994, can become subject to the one-third mandate if they cross the 500-employee threshold. About 12% of shareholder firms in our sample cross the 500 threshold. Correspondingly, IV estimates for the effect of shared governance would scale up our intent-to-treat effects by about 14%. Moreover, we will show that the treatment does not affect the

probability of crossing this threshold.

As treatment varies between firms but not within firms over time, we cluster standard errors at the firm level.

We now consider and then test for potential threats to identification that could impede the interpretation of $\hat{\phi}_Y$ as the causal effect of mandated worker presence on the board.

Strategic Delay of Incorporation: McCrary Test First, firms might manipulate the incorporation date by delaying incorporation around the reform cutoff date. Our first check is a visual inspection of the incorporation frequency of shareholder corporations in the sample around the reform cutoff (Figure 3, panel (a)). This analysis uses the Mannheim Enterprise Panel's comprehensive data on incorporations from 1991 onward. The figure reveals no evidence of a spike in incorporations after August 10, 1994, nor of a missing mass of incorporations in the time period leading up to the reform. In the same figure, we formally implement a McCrary (2008) test of continuity of the density against the alternative of a jump in the density function at the reform cutoff date, for which we find no evidence. In addition, we also test globally whether the reform affected the decision to incorporate as a shareholder corporation in our sample window. To this end, we regress an indicator for incorporation as a shareholder corporation on a post-reform indicator, a time trend, and the interaction of the two and report results in Appendix Table D.2. The results document that there was a small, secular trend towards incorporating as a shareholder corporation but we do not detect a level shift or trend change in the post-reform period.

Composition of New Firms by Legal Form Second, firms may substitute into different corporation types after the reform. Figure 3 panel (b) reports an RD specification in a sample of all firms, using as outcome variable an indicator for shareholder corporation status (*Aktiengesellschaft* or *Kommanditgesellschaft auf Aktien*). This probability did not change discontinuously around the reform cutoff date. Several institutional features render such manipulation unlikely a priori, as discussed in Section 3. The grandfathering was an unexpected political compromise, with no clear indication that strategic delay of incorporation would relax the firm's mandate. In addition, the legislative process was finalized within weeks of reaching the compromise, and mandated the day after the law's promulgation as cutoff date. Finally, Albach et al. (1988) report survey evidence that corporations did not view one-third codetermination as an impediment to their operation or incorporation.

Industry Composition and Selection Third, we test whether the industry composition of shareholder corporations was affected by the 1994 reform.[29] We consider NACE Level-1 industry codes as binary outcome variables in specifications following (12). Figure 4 (detailed table in Appendix Table D.3) reports that the reform did not statistically significantly affect the fraction of shareholder corporations incorporated in any particular industry, and the coefficients are jointly insignificant in an F-test ($p = 0.91$).

Placebo Reforms Fourth, we also implement a series of placebo exercises in Appendix Tables D.9 through D.16. There, we evaluate treatment effects of placebo reforms four and eight years after the actual reform. We counterfactually assume that the reform and cutoff rule occurred on August 10, 1998 or 2002, respectively, while then considering analogously chosen new samples of shareholder and nonshareholder corporation cohorts incorporated, in turn, within a two-year bandwidth around each of these two reforms.[30] They shed light on the potential threat of spurious findings due to trends (e.g., if shareholder corporations capital intensity grew cohort-by cohort by more than in the control legal forms) or differential lifecycle paths (e.g., if shareholder corporations incorporated earlier generally have more capital-intensive modes of production than shareholder corporations incorporated slightly later, compared to the same difference for non-shareholder corporations).

5 The Effects on the Composition of Supervisory and Executive Boards

In a first step of our analysis, we study the effect of the reform on the share of worker representatives on the corporate board and then turn to characteristics of supervisory board members, as well as of executive board members. This step not only serves as an intervention check but also documents a channel by which the institution may shape corporate governance and ultimately affect firm outcomes.

[29] In addition to actual effects of the reform, changes in, e.g., the business cycle, might spuriously affect the type and trajectory of the firm cohorts around the reform cutoff (see, e.g., Geroski, 1995; Geroski, Mata, and Portugal, 2010).

[30] The placebo effects build on and can be interpreted in the logic of randomization inference under the assumption that the timing of the reform cutoff was random (as in Ganong and Jäger, 2018).

5.1 Validation Test: Realized Shifts in Worker Representation on Supervisory Boards

We verify that the reform in practice shifted worker representation on the board by incorporation date. Figure 5 shows the share of workers on the supervisory board by incorporation date and firm size. We draw on data from the Hoppenstedt Aktienführer, which lists supervisory board members and incorporation year for listed corporations. We restrict the sample to shareholder corporations founded between 1989 and 1999 for which board composition data is reported.[31] The left (navy-colored) bars represent corporations incorporated during or before 1994, the right (maroon-colored) bars represent corporations incorporated during or after 1995. For firms smaller than 500 employees (in dark shades, for whom the reform changed the rules), there is a stark difference: workers comprise, on average, 29 percent of the supervisory board of shareholder corporations incorporated during or before 1994. In sharp contrast, workers comprise only around 3 percent of the supervisory board of shareholder corporations founded during or after 1995.[32] In the lighter shades, we additionally report the outcomes for very large firms, for whom the mandate did not change and for whom the data show no discernible difference, both around one-third worker representation, confirming that the comparison is not driven by differential reporting or data quality after 1994.

5.2 Additional Effects on Board Composition

We now analyze the effects on the composition of the supervisory board and the executive board (see Section 3 for an overview of the institutions). Our research design builds on variation in worker presence on the supervisory board. We seek to understand effects on the composition of the supervisory board to understand which demographic groups will be more likely to be represented under shared governance. The analysis of the supervisory board also serves as an intervention check allowing us to assess whether the reform indeed affected board composition as worker representation is not directly reported in the data. We report the estimates on board composition in Table 2, based on specification (12) for bandwidths of two years. We present estimates at the two-year bandwidth as our main specification, and report additional variants with smaller and larger bandwidths in the Appendix. Panel

[31] Specifically, we only consider firm-year observations for which data on the role (chair person, worker representative, etc.) of individual supervisory board members is reported for at least one-third of the supervisory board. In addition, we only rely on data from the 1990s due to a structural break in reporting in 2000.

[32] The non-negative worker share in these corporations is likely due to a small amount of measurement error, e.g., because the employment concepts for codetermination and in the Hoppenstedt data might differ slightly so that corporations reported to have fewer than 500 employees in the Hoppenstedt Aktienführer might still be subject to codetermination for firms with more than 500 employees.

A reports the results for supervisory boards; Panel B does so for executive boards. We primarily rely on the currently available version of Orbis board data, which offers a snapshot of board members between 2016 and 2018.[33] The data set contains information on the names, including titles, and gender of board members. Our data does not permit us to decompose potential composition effects effect into direct effects from the worker representatives and indirect or spillover effects by which the presence of worker representatives may affect the composition of shareholder representatives as well. We then additionally study the same outcomes on the executive board to address whether shared governance affects manager selection at the highest corporate level, a natural transmission channel, as the supervisory board appoints and controls executives.

Gender Composition We find that shared corporate governance sharply increases the probability of having at least one woman on the supervisory board by about 15 to 16 percentage points, relative to a control base of 35 percent.[34]We also detect positive effects of about 5 percentage points on the share of female supervisory board members, which are not statistically significant. Our placebo analysis in Appendix Table D.9 reveals no corresponding effects for placebo reforms in 1998 and 2002. Turning to executive boards, we find no statistically significant effects regarding the presence or share of women among executives.

Academic Titles In Germany, doctorate degrees are strongly associated with family backgrounds of high socioeconomic status and are highly valued distinctions for a position in the economic elite (Hartmann and Kopp, 2001). In the average control shareholder corporation, about 23% of supervisory board members hold doctorates or (likely largely nominal) professorial positions, denoted by academic titles "*Dr.*" and "*Prof.*". We find that worker presence on the supervisory board does not significantly affect the probability of at least one supervisory board member holding a doctorate with point estimates for a three percentage point increase. Relatedly, the share of supervisory board members with a doctorate or professorship is about three percentage points lower with a confidence interval including zero. On the executive board, we next find a marginally significant eight percentage point effect (SE 0.05) on the indicator outcome and a statistically marginally significant increase in the share by about three percentage points (SE 0.017).

Nobility Titles Next, we document the effect on the presence and share of supervisory board members with a nobility title, classified on the basis of names ("*von*", "*zu*", "*Graf*",

[33]Board member information is missing for 99% of observations in the Orbis Historical data set.

[34]In part, this finding could be driven by codetermination law mandating that at least one worker representative ought to be a woman in firms with more than 50% female employment (§76 II 4 *BetrVG* 1952).

"*Gräfin*","*Baron/in*", "*Freiherr/-frau*"). We find that about 8 percent of control-group boards have at least one member with a nobility title while the overall control share on the supervisory board is 2.3 percent (compared to about 0.1% in the population). In columns 5 and 6 of Table 2, we document that shared governance decreases the presence of holders of nobility markers on the supervisory board by about four percentage points (SE 0.03), and its share by 1.4 percentage points (SE 0.007). Since about 2.3 percent of supervisory board members in control group shareholder corporations have titles of nobility, the presence of workers on the supervisory decreases the share by about 60%. On the executive board, we find a sharp reduction in the presence of executives with a nobility background by three percentage points (SE 0.014) relative to a post-reform shareholder corporation mean of 6%, i.e. a relative effect of -50%. Similarly, the share of aristocratic executives is reduced by about 0.1 percentage points from a control group mean of 0.4%, although the estimate is not statistically significant. We also test placebo effects in Appendix Tables D.9 and D.10 and find no corresponding effects on the supervisory or executive boards for placebo reforms in later years and for different firm cohorts.

6 Firm Survival

We first investigate the effect of shared governance on firm survival and find no evidence for effects on survival. We draw on data from the Mannheim Enterprise Panel containing comprehensive information on all incorporations in Germany from 1991 onward (while our main Bureau van Dijk data will consist of panels from future years). Figure 6 Panel (a) plots the survival probability of shareholder and non-shareholder corporations separately by incorporation date, comparing firms incorporated in a two-year window before the reform ("Old") to those incorporated in a two-year window after the reform ("Young"). Depending on the group, between about 50 to 60 percent of firms still exist 15 years after incorporation. We find slightly lower survival rates for younger firms, of which about 53 percent still exist 15 years after incorporation, compared to older firms with a survival probability of about 58 percent. For both younger and older firms, we find slightly lower survival rates among shareholder corporations compared to non-shareholder corporations. Importantly, however, there does not appear to be a *differentially* lower or higher survival rate for old shareholder corporations, locked into shared governance, compared to slightly younger shareholder corporations. Panel (b) reports the difference-in-differences estimates on the survival probability by firm age (time since incorporation), finding a flat line at zero. Formally, the difference-in-differences analysis, comparing slightly older and younger shareholder and non-shareholder corporations indicates a point estimate of 0.0015 (SE 0.004) for the effect of shared gover-

nance on the hazard of firm exit (over all age groups). The estimates thus rule out even small effects of shared governance on firm survival. This result is interesting in its own right as an outcome, but moreover permits us to study the remaining firm outcomes without having to account for differential attrition.

7 Effects of Shared Governance on Production and Capital Intensity

Below we present the evidence on the effects of shared governance on firms' production and capital intensity. We again present estimates at the two-year bandwidth as our main specification, and report additional variants with smaller and larger bandwidths and winsorization levels in Appendix Section D. First, complementing our main analysis of mean effects, Appendix Tables D.6 through D.8 additionally report linear probability models for each of our key outcomes (employment, fixed assets, value added per worker, fixed assets per worker, capital share, and value added over revenue) being above a series of percentile cutoffs (given by the distribution of the control group firms, incorporated on or after the reform, of the same legal form). The table also includes a specification where we use the percentile rank within a year-by-legal form cell as outcome variable. This additional approach permits us to rule in or out meaningful magnitudes of an effect on top of our continuous outcomes (for which the effect estimates oftentimes come with large confidence intervals, perhaps due to dispersed firm-level outcomes with heavy tails). In Appendix Figure C.16, we complement these regression analyses with a nonparametric plot of the cumulative distribution functions of these core outcome variables by treatment and control group (legal form and incorporation time). Second, Appendix Tables D.4 and D.5 show robustness to excluding firms in former East Germany, where firms were restructured in the early 1990s.

7.1 Firm Scale: Output and Inputs

We now turn to the production side of the firm, studying measures of scale on the output and input sides, reporting effects in Table 3. Firm size also serves as a marker of productivity in many models (see, e.g., Lucas Jr, 1978; Melitz, 2003).

Output We report effects on log revenue and value added in columns 1 and 2 of Table 3, respectively. Once we add controls to net out year and industry factors, we cannot reject zero effects on these two scale margins, although the value added effects are positive throughout between 0.04 to 0.11 (with revenue point estimates more volatile). That is, we find no

evidence that shared governance leads to reductions in firm size, an important result in its own right but also a foundation for our subsequent analysis of production inputs.

Employment We consider both employment in the Bureau van Dijk Orbis data and the administrative data from IAB. The employment concepts differ as Orbis reports a head count of all employees, including ones abroad, while the IAB data only includes employment subject to German social security, which is the employment concept that is somewhat lower but the one relevant for determination of shared governance (see, e.g., Annuß, 2019, DrittelbG §3, Rn. 2).

We first analyze effects on log employment and find small, positive and statistically insignificant effects. In our most fine-grained specifications, we find effects of 0.05 (SE 0.13) and 0.06 (SE 0.12) in the Orbis and IAB data, respectively. While the point estimates in the Orbis data range between 0.05 and 0.13 between specifications, the IAB data reveal estimates between 0.06 and 0.08. In all cases, the confidence interval includes zero. Similarly, Appendix Table D.6 shows no significant effects on the distribution of employment and the confidence interval for the effect on the percentile rank of employment ranges from -4.5 to 5.4.

In a further step, we draw on the Orbis-ADIAB data to provide a time series of employment in the four categories of firms we consider. Appendix Figure C.4 plots employment relative to incorporation both as an inverse hyperbolic sine transformation (panel (a)) and in levels (panel (b)). The information is based on a balanced panel of firms incorporated between 1990 and 1999; when no employment is recorded or the establishment does not exist in the administrative data, we set employment to zero. The figures show that employment in older shareholder corporations, hence mandated to have worker-elected directors regardless of size, grows more rapidly on average after incorporation, ultimately somewhat larger than slightly younger shareholder firms not subject to the mandate, although our econometric analysis shows that we cannot detect statistically significant differences.

We additionally study whether old shareholder corporations are more likely to cross the 500 employee threshold, above which all firm types become subject to shared governance (see Section 3).[35] About 12 to 14% of firms in the post-cutoff-date-incorporation group cross this threshold. Positive treatment effects on this outcome would indicate that new shareholder corporations avoid codetermination by remaining small. In the data, we find no evidence for such a pattern, with confidence intervals ruling out even small positive effects. In the most fine-grained specifications, we find a point estimate of 0.007 (SE 0.033) in the Orbis Historical

[35] See also our analysis of corporate structure and codetermination at the corporate group level in Appendix Table D.1

data and of -0.020 (SE 0.022) in the IAB data (which are more relevant for determination of shared governance).

Capital We next study the effect of shared governance on capital measures. The Bureau van Dijk data does not report capital expenditures ("investment") but instead contains information on capital stocks. We start with fixed assets, which comprise tangible assets, such as buildings and equipment, and intangible assets, such as patents or trademarks, and other fixed assets (such as investments or long-term receivables). The point estimates for the effect on log fixed assets is around 0.43 to 0.47 with confidence intervals excluding zero, stable across specifications, and allowing us to rule out effects smaller than +0.056. We further study tangible assets, documenting a positive effect around 0.2 (albeit noisily estimated with SEs in the same magnitude).[36] Importantly, our placebo analysis in Appendix Table D.11 shows no corresponding increases in fixed assets for placebo reforms in 1998 and 2002, implying that our estimates from the 1994 reform identify causal effects (rather than differential trends by legal form and incorporation date).

These estimates on capital formation are a central result of our analysis, implying that hold-up mechanisms – which would have predicted negative effects on capital formation – are not at play in the institution of shared governance, or are dominated by positive counteracting forces crowding in investment, ultimately generating a large positive net effect. We will devote much of the rest of the paper to unpacking and understanding this result.

Intermediate Inputs The larger (though noisily estimated) value-added effects compared to revenue are perhaps indicative of more in-house production and less outsourcing when worker representatives are on the board. Indeed, we find a large reduction in materials, reported in the last column of Table 3 accompanying the large but noisily estimated increase in value added, with no clear effects on total revenue, pointing towards a shift in the mode of production. Concretely, we find changes in materials of between -1.16 to -0.7 (log).[37] We will

[36] We find that these large effects are rationalized by a higher probability of firms having very large fixed assets realizations, which given the skewed distribution of firm scale outcomes, implies large effects on mean asset levels. In Appendix Table D.6, we document a marginally significant increase in the percentile rank of fixed assets of 4.8 (SE 2.6), allowing us to rule out effects on the average percentile rank below -0.24. We dissect the effects on the distribution of fixed assets further in the remaining columns. For fixed assets below the 75th percentile threshold, we find positive but small and noisily estimated higher probabilities of the treated firms exceeding any given percentile threshold of the control group distribution, for example a 5ppt (SE 3ppt) effect of exceeding the 25th percentile (holding 234,220 Euro in fixed assets). Yet the largest and most precisely estimated effect is a 8ppt (SE 4ppt) higher probability of exceeding the 75th percentile (corresponding to around 7 million Euro in fixed assets).

[37] We find negative but substantially smaller and not statistically significant effects on intermediate inputs for placebo reforms in 1998 and 2002 (see D.11), making it unlikely that trends or lifecycle patterns by legal form fully explain our large effects present in 1994.

provide more granular analyses of potential shifts in the production function below, studying firm-level accounting data and worker-level data to study the occupational structure.

7.2 Productivity and Capital Intensity

We next dissect the positive effect of shared governance on capital formation, the core test of the hold-up view. We further assess whether shared governance crowded in capital formation within a given production function – raising the capital/labor ratio – or whether the firms may have adopted a technologically more capital-intensive mode of production, as if shared governance firms shifted towards a larger Cobb-Douglas technological capital weight. We report these estimates in Table 4.

Productivity (Value Added per Worker) The type of capital that is the focus of the hold-up model is productive capital such as machines or intangible productive assets such as patents. To trace this effect in the data, we confirm a positive effect on value added per worker of around 40,000 Euro in column 1 of Table 4, precisely estimated. In logs, the effect is large (0.16-0.22, column 2), although noisily estimated, with confidence intervals including zero across all specifications.[38] Finally, the placebo analyses in Appendix Table D.12 show statistically not significant, negative effects on value added per worker for placebo reforms in 1998 and 2002, supporting the research design and substantiating the causal interpretation of our estimates of the 1994 reform.

Capital-Labor Ratio Next we juxtapose the value-added per worker effect with that on fixed assets per worker. We find that shared governance raises the capital-labor ratio by around 72,000 Euro per worker, or 0.4-0.5 in logs (both statistically significant, reported in columns 3 and 4). Therefore, reading the value added and fixed assets per worker assets together, the evidence points towards our aforementioned results reflecting an increase in productive capital.[39] Lending support to the interpretation that the design identifies a

[38] Appendix Table D.7 shows that, on average, worker board representation increases value added per worker by 6 to 9 percentile ranks, with standard errors around 3 across specifications. Further analyses reveal that the effect manifests itself as a shift of nearly the entire productivity distribution to the right, starting with the treated firms having a 7ppt (SE 4ppt) higher probability of exceeding the 25th percentile of the control group distribution (which lies at 31,630 Euro of value added per worker), through the 90th percentile (a 12ppt higher probability with a 4ppt SE, at 163,000 Euro).

[39] Appendix Table D.7 shows that the capital-labor ratio increases by about 7 percentile ranks (SE $\tilde{2}.5$). Mandating worker board representation increases the probability of exceeding the 25th percentile of the control group distribution (which lies at 3,360 Euro of fixed assets per worker) by 10ppt (SE 3ppt), with similar results for the median (12,050 Euro of fixed assets per worker), and also a 10ppt effect (SE 3ppt) of exceeding the 90th percentile cutoff (corresponding to a large level of around 360,000 Euro of fixed assets per worker and hence rationalizing the large quantitative effects given the skewed distribution of the continuous variables related to firm scale).

causal effect, our placebo analyses in Appendix Table D.12 show substantially smaller and statistically not significant effects on the capital-labor ratio for placebo reforms in 1998 and 2002.

Total Factor Productivity In column 5 of Table 4, we further study effects on log total factor productivity (TFP, which we construct based on fixed assets as detailed in Appendix Section B.3). Firm-level TFP essentially stays flat, with zero or very small, noisily negative effects. We would have expected the efficiency measure to be strongly negative if the additional capital in shared governance firms were unproductive (e.g., investments in land not used in production, simply reflecting mismeasured book values, or unproductive amenities for workers). Moreover, the TFP result is interesting in its own right as some theories reviewed in Section 2 would perhaps have shown up through TFP (although our TFP estimates have large confidence intervals so we cannot rule out these alternative theories).

Capital Share We now study the capital share of each sample firm, calculated as one minus the wage bill divided by value added (see column 1 of Table 4). Column 6 reports a large and statistically significant increase in the capital share, of around 7 to 8 ppt (control mean: 0.30).[40] In addition, the placebo analyses in Appendix Table D.12 show no effects on the capital share for placebo reforms in 1998 and 2002.

Overall, these pieces of evidence are consistent with shared-governance firms having shifted towards a more-capital-intensive mode of production.[41] This additional result is again in sharp contrast to the disinvestment predicted by the simple hold-up view of shared governance (unless one is willing to believe that shared governance raises the worker bargaining power in wage setting). The result is also a validation of the previous measurement of capital intensity, because the capital income share measure stems only from payroll and value added rather from capital stock information.

7.3 Outsourcing and Skill Structure

Next we shed further light on firms' mode of production, tracing effects of shared governance on outsourcing and intermediate input use, and the structure of labor demand such as the skill and occupational structure of the workforce, reported in Table 5.

[40] Appendix Table D.8 shows an average increase of 8.4 to 9.6 percentile ranks (SE $\tilde{3}$). This effect appears driven by a 14ppt (SE 5ppt) higher probability of the treated firms shifting from below to above the median capital share level of the control group distribution (i.e. 0.24), and a 15ppt higher probability (SE 5ppt) of exceeding the 75th percentile (i.e. 0.46).

[41] In unreported results, we also generated a capital-intensity index at the occupation level, finding positive but very noisy support for the channel in that design.

Inhouse Production Before moving to effects on the structure of the workforce, we study effects on outsourcing using firm-level data in column 7 of Table 4. Higher capital intensity could emerge because firms respond to labor power by outsourcing steps of the value added chain that may be particularly labor-intensive.[42] We study this possibility by estimating effects on the firm-level ratio of value added to revenue, as a proxy for in-house production. We find that this share of sales produced in-house actually *increases* by 12 to 17 percentage points (SE 0.06 to 0.07), off a control mean of 0.43, statistically significant across all specifications.[43] From this perspective, more standard outsourcing of labor-intensive tasks is unlikely to explain the capital intensity. Instead, perhaps in practice shared governance firms may purchase and own capital assets (e.g., buildings, land or machines), rather than rent or lease, perhaps consistent with longer-term investments. We also assess placebo reforms in 1998 and 2002 and find substantially smaller and statistically not significant effects (see Appendix Table D.12).

Outsourceable Occupations For outsourcing to explain the capital intensity, the marginal task not outsourced in shared governance would need to be substantially more capital-intensive than the average task rather than following the pattern of outsourcing of labor-intensive tasks (Goldschmidt and Schmieder, 2017). We can directly test for this outsourcing channel by drawing on our matched employer-employee data and classifying occupations associated with outsourcing in Germany (e.g., Goldschmidt and Schmieder, 2017) (cleaning, food services). This result is reported in column 7 of Table 5, where we dissect the skill distribution of the workforce. While not precisely estimated (t-statistics of around 0.6-1.0), the share of such labor-intensive outsourceable occupations exhibits positive point estimates, thereby if anything pointing to less rather than more of such labor-intensive outsourcing out of shared governance firms.

Skill Structure In the remaining columns of Table 5, we study the effects of shared governance on the skill and occupational structure of the firms. In columns 1 through 3, we

[42] Another mechanism raising capital intensity may be that owners strategically substitute into labor-substituting capital (Acemoglu, 2002) to offset worker participation. However, we have, if anything, already documented a positive albeit statistically insignificant effect on employment, not consistent with the substitution channel.

[43] In our complementary analysis in Appendix Table D.8, we document an increase in the percentile rank between 7.1 and 7.8 (SE between 3.2 and 4.2). We further find that the effect is particularly pronounced around the margin of the 75th and 90th percentile of the control group distribution. We find an 11.5 (SE 5.5) percentage point increase in the probability of crossing the 75th percentile of the control distribution (where value added makes up a share of 57% of revenue). We find a 14.2 (SE 4.7) percentage point increase in the probability of crossing the 90th percentile (74% of revenue). The confidence interval for this effect is between 5 and 23.4 percentage points. We find substantially smaller effects for crossing the lower percentiles of the control group distribution, where our confidence intervals include zero across specifications.

find some evidence for a shift from lower-skilled into higher skilled worker groups, perhaps consistent with a labor-complementing capital interpretation. The analysis uses the employer-reported education measure, which distinguishes (i) low-skilled workers with no vocational training (in baseline making up 13% of the workforce of shareholder corporations); (ii) medium-skilled workers with a finished school degree and a vocational qualification (baseline of 59%); and (iii) high-skilled workers with a degree from a university or university of applied sciences (*Fachhochschule*) (baseline of 26%). We find evidence that shared governance lowers the share of low-skilled workers by about 1.5 to 1.8 percentage points, implying a 10 to 15% reduction. The effects are marginally significant ($p < 0.10$) in the specifications without industry effects and significant at the 5%-level when we add industry or industry-year effects. Our estimates also allow us to rule out effects larger in magnitude than -3.6 percentage points. The pattern of effects for the other skill groups suggests that the decreased share of low-skilled workers is offset by a roughly equal increase in high-skilled workers, although the effects are less precisely estimated.[44]

Occupational Structure We next analyze the occupation structure in columns 4-6 of Table 5. We study occupations following the Blossfeld (1987) categorization of occupations, which is commonly used to classify occupations in the German labor market. We find positive point estimates consistent with shifts towards skilled manual labor (consisting of the Blossfeld categories of qualified manual occupations, technicians and engineers) perhaps further consistent with a more capital intensive production, although the confidence intervals for each specification include zero.

Tenure and Separations Finally, in Table 6, we report effects of shared governance on tenure and separation rates. Columns 1 and 2 report negative effects of around half a year of tenure in a given cross section of workers (off a baseline of 7.5), which is marginally significant, and around a 6% effect in logs, which is less precisely estimated. These results are perhaps surprising with basic intuitions that more capital or more skills should result in longer tenure (Oi, 1962) or the idea that giving workers voice may reduce exit (Hirschman, 1970; Freeman, 1980). Zooming into year-to-year separation rates, we find a small and statistically insignificant effect of 1 to 2 percentage points off a baseline of 0.20 in column 3.[45] In columns 3-5, we separately study separation rates by tenure, and document a negative and economically large reduction in separation rates among higher-tenured workers (.2 percentage

[44] In unreported results, we also find that shared governance does not appear to affect share of current apprentices (workers in vocational training) in total employment.

[45] This result, with wide confidence intervals, would be in contrast to a view by which employees on the board may induce a capital structure that lowers risk of large swings in labor employment and layoff risk (consistent with evidence by Kim, Maug, and Schneider (2018)).

points of a 1.6 base), which is marginally significant, whereas the decomposition reveals low-tenure workers to have slightly higher separation rates. In our sample, average tenure is high (7-8 years). This pattern, though imprecisely estimated, may be consistent with insider/outside dynamics (Lindbeck and Snower, 1989) or with higher-tenured workers' skills being complemented by the capital boost. Given that tenure can serve as a measure of job quality, the absence of positive effects may suggest that shared governance does not measurably increase retention and perhaps job valuation by employees.

We therefore conclude that, overall, shared governance appears to raise capital intensity without negative effects on employment, pointing towards scale increases and a shift to higher capital intensity in production. Jointly considering our (imprecisley estimated) results on skill composition with the strong positive effects on fixed assets, one consistent interpretation works through capital/skill complementarity, specifically between long-term assets, e.g., machines and equipment, and workers with vocational training compared to unskilled workers. Since shared governance jointly affects these outcomes in our research design, we cannot separately disentangle whether worker participation in firm governance affects the skill composition through its effects on long-term capital, or vice versa, or whether there are separate, direct effects of the institution on these outcomes.

8 Dividing the Pie: Wages, Rent-Sharing, Profitability and External Finance

Lastly, we study the division of income generated by the firms, between labor and capital, and within each factor. We start with wages, as wage increases are the transmission mechanism through which hold-up discourages capital investments, whereby labor grabs a larger share of the value-added pie once sunk capital is installed, as well as an important outcome variable in its own right. We investigate the effect on wages drawing on the Orbis-ADIAB administrative data. In contrast to the hold-up view, we do not find wage increases (or decreases) or increased rent sharing – consistent with and in fact rationalizing our first key finding that capital formation is not curbed in shared governance firms. We then turn to capital income, studying profitability as well as other financial outcomes, in particular proxies for external finance capacity and firms' debt structure.

8.1 Wages and Wage Structure

We start with studying average wages, as well as its distribution as worker representation has been hypothesized to compress wages and reduce inequality inside the firm (see, e.g., Freeman and Medoff, 1984, p. 82-85), perhaps also indirectly affected by informal norm establishment as in the case of unions (see, e.g., DiNardo, Hallock, and Pischke, 2000; Western and Rosenfeld, 2011). While collective bargaining sets wage floors, there is substantial scope for firm-specific deviations.[46]

Average Wages We start with wage effects of shared governance, and report results in Table 7. We first investigate effects on log mean wages at the firm level and find point estimates ranging between 0.03 and 0.05 with standard errors of 0.04. The confidence intervals include zero and allow us to reject effects on mean wages larger than 0.12. Importantly, these effects could reflect actual pay premia as well as selection effects.

AKM Firm Fixed Effects Next, we analyze firm pay premia drawn from Abowd, Kramarz, and Margolis (1999) specifications with worker and firm effects. By drawing on a wage measure that has been residualized by worker effects, we can study wages net of worker selections which is particularly important as we documented composition effects. Concretely, we calculate pay premia analogous to Card, Heining, and Kline (2013) for the time period between 1990 and 2009, but using firms rather than establishments as the workplace unit. We find a 0.008 effect of shared governance on the firm premium with standard errors of 0.02, allowing us to rule out that firm pay premia increased by more than 0.04.

Wage Structure We also analyze the wage structure as the absence of effects on averages wages or pay premia may shroud wage compression effects (see, e.g., Freeman and Medoff, 1984; Saez, Schoefer, and Seim, 2018, p. 82-85). We study wages at the 25th, 50th, and 75th percentile at the firm level. We report outcomes in columns 3 through 5 of Table 7 and find similar point estimates across the same percentiles, ranging from 0.03 in the specification without controls to about 0.045 in the specifications with indusry-year effects. The estimates thus do not indicate any effect on pay compression. As an additional measure of pay compression, we also investigate whether shared governance affects the share of wages above the social security earnings cap. About 13% of workers in post-reform-incorporated shareholder corporations have earnings above the social security earnings cap. We find that

[46]The fraction of employment covered by collective bargaining agreements has decreased substantially and the prevalence of opening clauses, allowing firms covered by an agreement to pay below-CBA wages, has risen (Brändle, Heinbach, and Maier, 2011; Dustmann et al., 2014). See also Jäger and Heining (2019) who provide evidence that firm-specific shocks affect wages in the German context.

the share is not affected, with a point estimate of 0.009 and a standard error of 0.014 allowing us to reject increases above 0.036. All in all, we find no evidence for wage compression based on the administrative data.

Executive Pay We have attempted but concluded we cannot credibly study effects on executive pay due to data limitations. Executive pay is an interesting firm outcome in principle over which the supervisory board has direct formal control. To pursue this angle, we have sourced a data set on executive compensation (which is not available readily in our firm sample; and our administrative data would miss executive compensation due to the social security cap), which we merge to our firm sample. However, due to the very small sample size of matched observations incorporated in the two-year window around the 1994 reform, we cannot estimate effects on executive compensation with precision.[47]

8.2 Rent Sharing

We explore rent sharing by assessing whether the relationship between firm-level productivity and firm-level wages differs between firms with and without shared governance. This concept essentially uses cross-sectional variation to provide an estimate of the degree to which labor receives idiosyncratic firm-level productivity differences, perhaps reflecting investment, product market rents or efficiency differences. It therefore also provides one direct measure of the very mechanism by which hold-up occurs.

Here, we study persistent productivity differences across firms and relate them to AKM firm effects (as in Card et al., 2018, Table 4). Since we study AKM firm premia as outcome variables, our rent-sharing estimates will not mechanically reflect compositional changes in the workforce. Importantly, the rent sharing elasticities will reflect a different concept from our measured decline in the labor share insofar as the rent sharing coefficient measures the relationship between wages at a particular firm (adjusted for composition and estimated off

[47]The data is collected by Kienbaum Consulting, a leading consulting firm for human resources and executive search and compensation, covering 4,055 German firms. We thank Sebastian Pacher and the Kienbaum Consulting AG for the kind provision of the executive compensation data. See Dyballa and Kraft (2015) for cross-sectional evidence based on Kienbaum data showing that codetermination increases performance-based components of compensation. The data feature information from 2000 to 2015 and we match firms based on string similarity and by hand to the Bureau van Dijk Orbis data. This allows us to consider executive compensation as an outcome measure, even though the analysis is limited by the fact that only few firms were incorporated around the reform cutoff. For the analysis, we also extended the horizon to a four-year window around the reform cutoff so that we capture 188 matched firms of both corporate form types we consider. We calculate the log average executive compensation and find a point estimate of -0.017; due to the wide standard errors of 0.121 we cannot rule out large or small effects on executive wages, similarly for a measure of executive payroll in total payroll (where our sample further shrinks, and we winsorize at 5% due to outliers).

movers) and cross-sectional dispersion in value added per worker (within-firm average over all observations for a given firm) within a given firm group (where value added per worker increases in the treatment group without a tantamount increase in wages, pushing down the labor share).

In Figure 7, panel (a), we first plot the relationship in the whole sample independent of legal form and incorporation date. We find a slope of 0.088 (SE 0.004), implying that a 10% increase in value-added per worker is associated with a 0.88% increase in wages. While no previous worker-and-firm-level rent-sharing estimates for Germany have been reported in the literature, the elasticity is similar to what has been documented in other countries (Card et al., 2018; Jäger et al., 2019).

We next dissect the rent-sharing elasticity in panel (b) and find no detectable difference in rent-sharing induced by shared governance. That is, we find a DiD estimate of 0.002 (SE 0.024), indicating that we can rule out increases in the rent-sharing elasticity of more than 0.05. The DiD estimate is the coefficient on the interaction between value added per worker and an indicator for shareholder corporations incorporated before August 10, 1994 in a model where we also include base effects of value added interacted with cohort and legal form and base effects for these two indicators as well. In conclusion, we find no evidence for workers capturing a larger part of value added per worker when they have board representation – consistent and perhaps underlying in the first place the absence of hold-up patterns in capital formation.

Finally, we also assess whether the wage and value added effects that we found can be rationalized in a rent-sharing model, such as the one we outlined in Section 2. In our most fine-grained specification in Table 4, we found an effect on value added per employee of 0.187. We also found a rent sharing elasticity of 0.088. Taken together, these estimates would imply an effect of $0.187 \times 0.088 = 0.016$ on wages through a rent-sharing channel. As Table 7 showed, our actual, estimated effect on pay premia of 0.008 (SE 0.021) is close to the implied effect and the confidence interval includes the model prediction.

8.3 Profitability and External Finance

We close our distributional analysis with the effect of shared governance on profits (our measure of the income of owners) as well as potential effects on sources of external finance more generally, studying debt and its costs and proxies for external finance capacity and constraints.

Profitability The long-standing debate about the appropriateness of shared governance has centered around profitability: by the influential argument by Jensen and Meckling (1979),

firm owners would adopt shared governance voluntarily if it were profitable. We consider three measures of profitability: EBITDA over revenue (the "profit margin"), and two "return on assets" measures: EBIT/equity and EBIT/total assets ratios. EBITDA referes to earnings before interest, tax, depreciation and amortization while EBIT refers to earnings before interest and taxation.

We report results in Table 8 and find mixed effects on these profitability measures (Appendix Table D.13 presents placebo reform analyses). We find a reduction in the profit margin by about 4.5 percentage points if computed as a ratio over revenue, and an order of magnitude smaller if over total assets, insignificant in all but one of 16 specifications. When measured as a return on equity, the point estimates are largely positive, up to 0.3, but again insignificant. Throughout, EBIT – which ignores depreciation – yields more positive effects than EBITDA, consistent with the larger capital stock and associated depreciation.

Overall, we conclude that we do not find consistent evidence for shared governance to lower shareholder profits. While it would be interesting to measure market values and actual dividend payments, we cannot comprehensively study in our sample of firms that are not typically publicly traded how these profits are distributed to shareholders rather than, for example, kept and reinvested in the firm.

Debt Structure and Leverage In Table 9 we report effects on various financial outcomes (Appendix Table D.14 presents placebo form analyses). Here we find negative (yet imprecisely estimated) debt to asset ratios. Most importantly, we find a negative effect of the average cost of debt, measured as interest payment over face value of debt, of three to five percentage points (baseline of 0.17 in control shareholder corporations), which is stable across most specifications although not statistically significant. This result suggests that external finance suppliers do not charge shared governance firms a premium – although we also document no increase in leverage (and only an insignificantly negative decrease in liabilities over total assets, again probably largely driven by an increase in assets as we documented rather than a decrease in debt). Together, the findings are consistent with shared governance firms perhaps running less risky operations (as perhaps preferred by labor representatives), or higher collateral levels as suggested by the positive effects on overall assets.

Liquid Assets In column 5 of Table 9, we also check whether owners leave liquid assets in the firm, perhaps as an indication of a potential severity of free cash flow problems. We find an imprecisely estimated shift from cash (over total assets), perhaps reflecting the shift from liquid to fixed assets or owners being less willing to store cash inside the firm (rather than

in illiquid, fixed assets).[48]

Indicators of Debt Capacity and Financial Constraints We next consider measures of financial constraints, debt capacity and distress, in Table 10. We consider five variables, the construction of which we describe in Appendix Section B.3, building in part on Hillegeist et al. (2004) and Farre-Mensa and Ljungqvist (2016). These indices take as arguments standard firm-level accounting variables and generate a scalar measure representing risk or constraints.[49] We first compute the median of each measure by year and firm legal type (i.e. shareholder corporation vs. limited liability company) in the control group (i.e. incorporated on or after the reform cutoff date). We generate indicators for each index in our baseline sample, having one indicate above-median values of risk of distress or financial constraints. The coefficients therefore correspond to probability effects on entering the top half of the score distribution (i.e. higher distress or constraint risk). In Panel A, we present these regressions on the median-cut indicator variables. In Panel B, we further probe an alternative cutoff of the top 20% rather than the top 50%.

In Table 10 Panel A for the median cutoff, we find essentially zero effects of shared governance for the HP index. While imprecisely estimated, coefficients for both z-scores range from 0.038 to 0.096. Effects for the KZ index and O-scores are slightly negative, but we do not detect a statistically significant effect for any specification. The WW index yields a positive effect that is initially high but goes towards an insignificant zero with industry fixed effects. The results in Panel B, where we impose a stricter definition of the top 20% of the score for the indicator rather than the top 50%, yield a similar picture, while the four-variable variant falls back towards zero. Here, the HP and 5-variable Z-score indices interestingly turn significant with 0.089-0.113 point estimates.

There are two interpretations for this result. Firms could indeed be riskier from the perspective of external finance. Alternatively, taken together with the previous results on similar realized leverage and *lower* cost of debt, the standard indicators used here may perhaps indicate that the shared governance firms are indeed perceived as safer by capital markets than by the indices.

[48] Our results are consistent with Redeker (2019) who finds a reduction in cash-holding when firms cross the 2000-employee threshold requiring them to adopt parity codetermination.

[49] For financial constraints, we consider the Whited-Wu index (Whited and Wu, 2006), the Kaplan-Zingales index (Kaplan and Zingales, 1997), and the HP index (Hadlock and Pierce, 2010). For bankruptcy and financial distress risk, we use the Altman z-score (Altman, 2000), where we present version of the model that extends to private firms and comprehensively applies to our firm data and we further distinguish two versions, as well as the o-score (Ohlson, 1980).

9 Conclusion

We have studied a natural experiment in form of a reform that mandated worker representation on supervisory boards for some cohorts of corporations while abolishing it for their slightly younger peers. The context is Germany, which has a long history of mandating at least a third of workers on shareholder corporation's supervisory boards, but which abolished this requirement sharply in most new shareholder corporations incorporated on or after August 10, 1994. The discontinuity generated by the reform lends itself to a difference-in-differences design, comparing firms incorporated right before and right after the threshold. This quasi-experiment has provided a credibly identified empirical answer to the long-standing debate on how expanding worker voice and formal authority in corporate decisions may effect firm and worker outcomes.

Our core results are that shared governance is associated with an increase in capital formation and a shift towards more capital intensive production – sharply contradicting the predicted disinvestment following the hold-up and agency cost views of shared governance (see, e.g., Grout, 1984; Jensen and Meckling, 1979). At the same time, we do not find that installing worker representatives in German supervisory boards increased wages in these firms, nor did it lead to more rent sharing. The wage moderation accompanying increased worker power is consistent with and may in fact rationalize our first key finding that capital formation is not curbed.

While the evidence is inconsistent with the classical hold-up mechanism as a dominant channel, we offered a richer model of bargaining over inputs that could account for our findings. Here, boosting worker bargaining power over investment *increases* capital formation and ameliorates or even overturns the underinvestment problem. A prediction of such a model is that workers prefer higher capital investments, consistent with anecdotal evidence as well as stated objectives of worker representatives, for example:

> shared governance per se opposes short-term shareholder interests. The focus is on the long-term safeguarding of the company through investments and innovations with participation of the employees[50]
>
> Berthold Huber, 2004, VP of IG Metall (Metalworker's Union) at the time Worker Board Representative, Deputy Chairman Siemens

Such anecdotal evidence is also consistent with a view according to which worker representatives may take a longer-term perspective. We further speculate that shared governance may

[50]Source: Frankfurter Allgemeine Zeitung, November 15, 2004, Nr. 267, p. 13, English translation by authors.

crowd in investment by facilitating cooperation between the firm and its workforce, perhaps by institutionalizing communication and repeated interactions. This reading of worker representation as a cooperative institution that helps overcome coordination issues could hence also rationalize our findings, including through channels such as improved information flows (Hirschman, 1970; Freeman and Medoff, 1984; Freeman and Lazear, 1995; Englmaier and Segal, 2012) or the fostering of long-term employment relationships and the enforcement of implicit contracts (Malcomson, 1983; Hogan, 2001). While we do not provide direct evidence adjudicating between these specific channels, we have documented a sharp rejection of the disinvestment prediction of the canonical hold-up view, which at least in the context of this institution and this reform, failed to hold up.

An open question difficult to assess empirically is whether the additional capital stock is in the interest of owners, or may reflect yet another agency conflict (and whether it may bring an hold-up economy closer to social efficiency). Workers may then lead codetermined firms to lock in resources into fixed capital at the expense of dividend payouts to the owners to boost wages or to secure employment stability for entrenched insiders. Workers may also aggravate agency conflicts of an imperfectly incentivized management engaging in empire building and hence overinvestment.[51] Such an interpretation may explain why at least individual capitalists may not voluntarily adopt codetermination Jensen and Meckling (1979); Levine and Tyson (1990); Freeman and Lazear (1995).

We close with some reflections on the institutional context of our experiment. Our cohort-based difference-in-differences design assigns a permanent corporate governance regime from firm entry onward, addressing the longer-run institutional scenario rather than an alternative experiment that would impose shared governance onto already-existing companies. The effects of such reforms without grandfathering may differ from ours. Moreover, our experiment occurred in the shadow of and perhaps interacted with existing establishment-level worker participation through works councils, an institution with a long history in Germany and the second lever of shared governance. On the one hand, the interaction may increase effects of shared corporate governance through information sharing or by providing the worker-supervisors with leverage beyond their vote and voice on the board. On the other hand, the incremental effect of supervisory board seats may duplicate some channels by which works councils already affect firm outcomes.

One may be tempted to conclude that the absence of evidence of rent-extraction resulting from the inclusion of workers on corporate boards may be due to "responsible" or moder-

[51] For example, we provide one variant of the standard hold-up model in which shared governance increases workers' decision rights over capital choices. Hold-up is still active at the wage setting stage, and this very prospect of wage bargaining drives workers' pushing for more investment, thereby lowering shareholder profits.

ate unions in the German context. Perhaps, however, it is the very institution of shared governance and minority participation of workers in corporate boards that may facilitate cooperative labor relations (Thelen, 1991) or even tame labor. In particular, radical labor representatives with demands perceived as excessive could always be outvoted by shareholders since the capital side remains the majority of seats. Thus, in order to exert influence, labor representatives may have to be moderates in order to successfully build coalitions with the shareholder representatives. As a consequence, shared governance may be one root cause of the cooperative labor relations in Germany.

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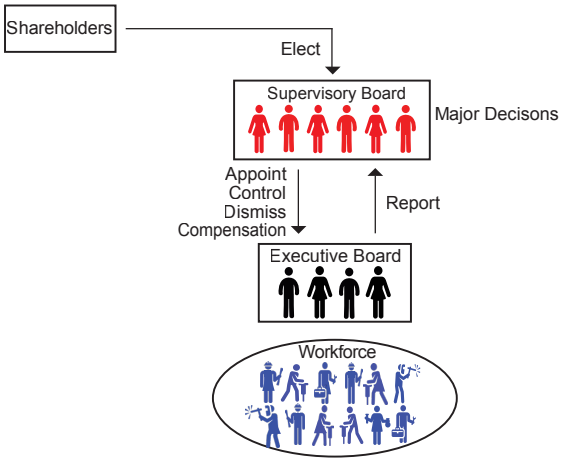
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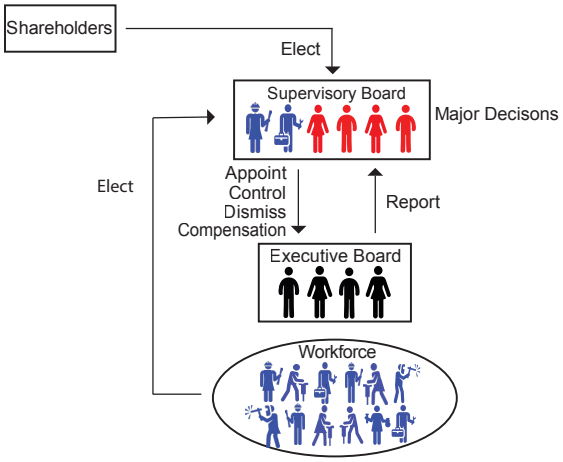
Figures

Figure 1: Corporate Governance and Worker Representation on Supervisory Board

(a) No Worker Representation on Supervisory Board



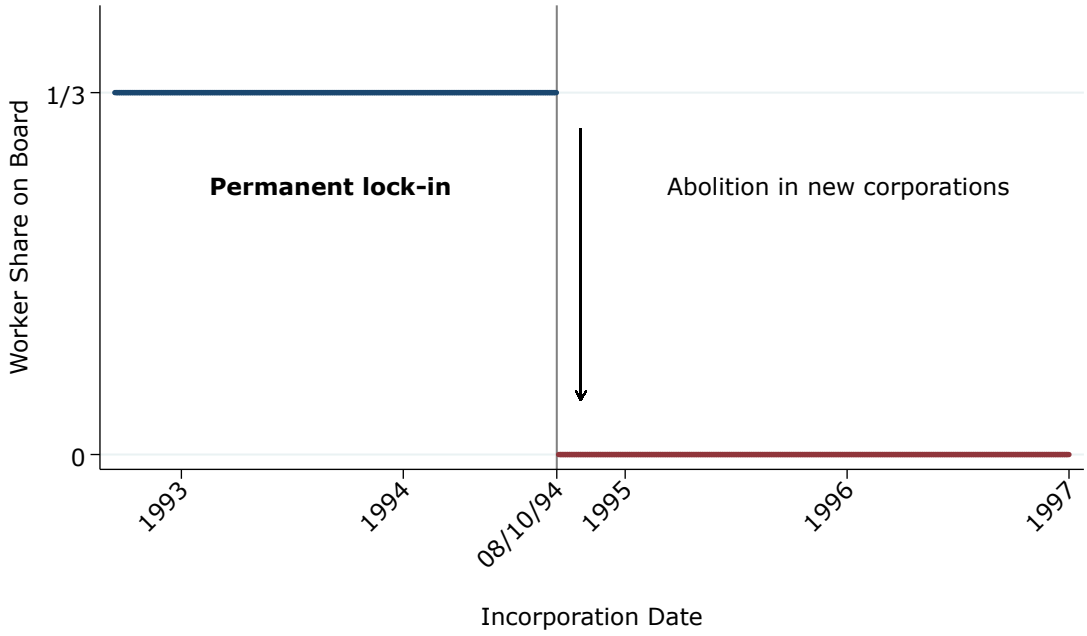
(b) One-Third Worker Representatives on Supervisory Board



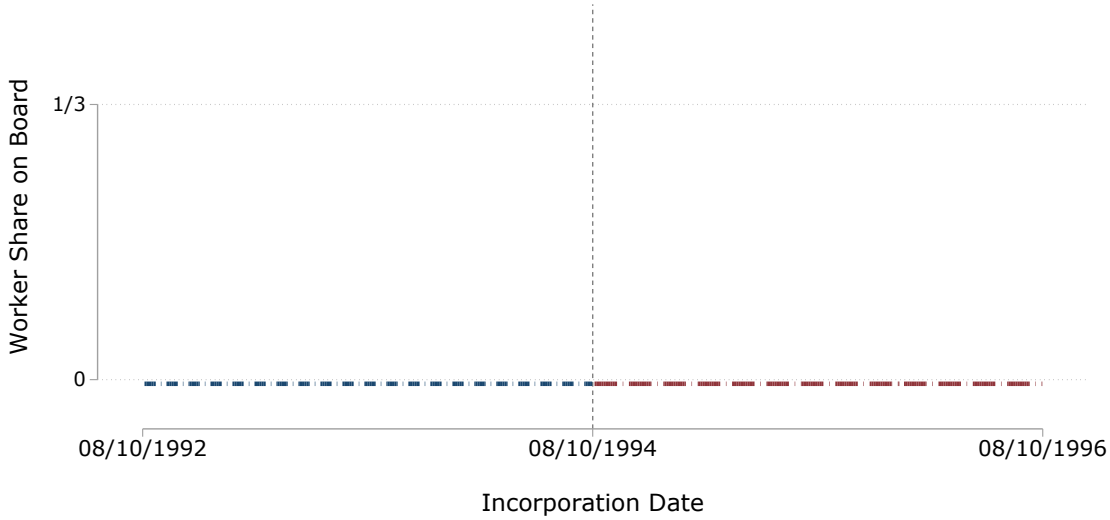
Note: The figures illustrate the supervisory board composition and election process in German corporations with and without worker-elected supervisory board directors. Shareholder corporations incorporated on or after August 10, 1994 as well as family firms have no worker representatives on the supervisory board, as illustrated in panel (a), unless they regularly employ more than 500 workers. Shareholder corporations incorporated before August 10, 1994 have one-third worker representatives on the supervisory board, as illustrated in panel (b), even when the employ fewer than 500 workers. Regardless of incorporation date or family ownership, firms between 500 and 2000 employees are mandated to have one-third worker-elected directors and firms with more than 2000 employees have equal representation of worker and shareholder representatives on the supervisory board.

Figure 2: Shared Governance on Supervisory Board by Incorporation Date

(a) Shareholder Corporations



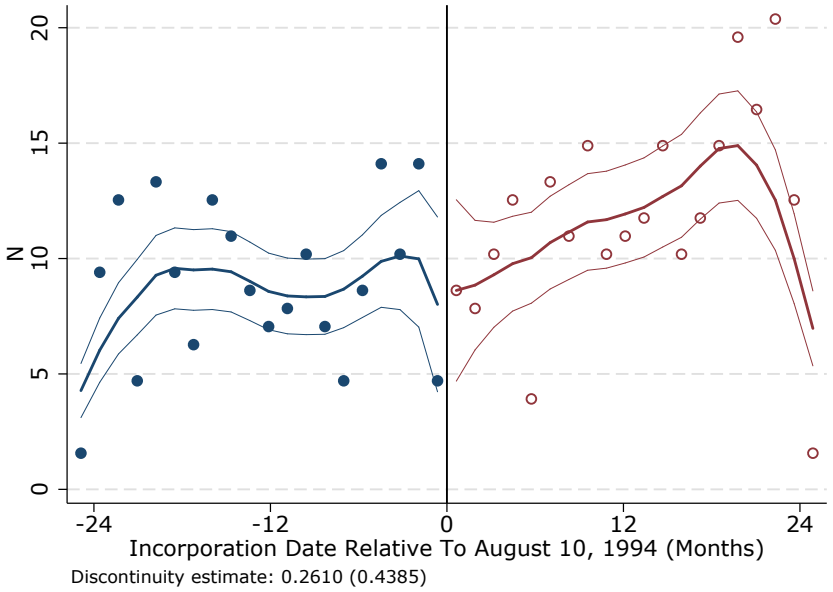
(b) Non-Shareholder Corporations



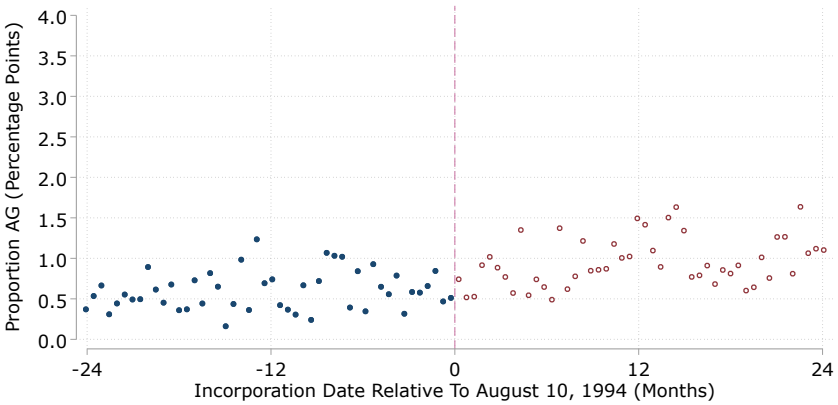
Note: The figure illustrates the mandates for shared governance by incorporation date in corporations with fewer than 501 employees (see Table 1 and Appendix Figure C.1 for rules for larger firms). Shareholder corporations incorporated before August 10, 1994 are mandated to have one-third worker representation on the supervisory board. Family firms with fewer than 500 employees are exempt from shared governance unless they reach 500 employees. Shareholder corporations incorporated on or after August 10, 1994 cannot have workers on the supervisory board if they have less than 501 employees. The rules for non-shareholder corporations follow those for shareholder corporations incorporated on or after August 10, 1994, and were not changed as part of the reform.

Figure 3: Frequency of Incorporation Around Reform Cutoff Date and Selection Into Shareholder Corporation Status

(a) Frequency of Incorporation and McCrary (2008) Test (Sample: Shareholder Corporations)

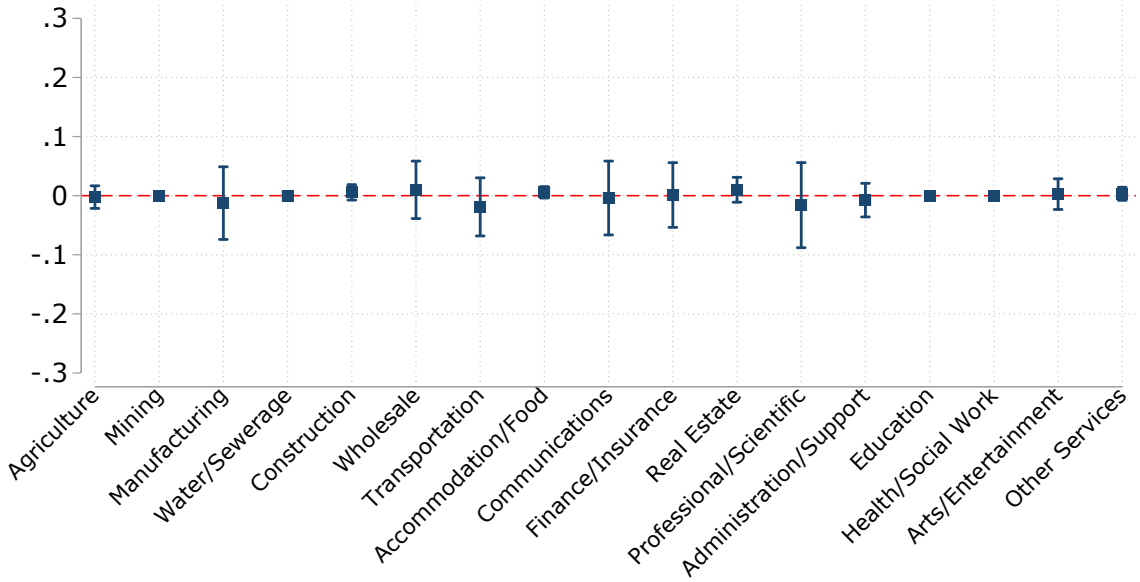


(b) Selection Into Shareholder Corporation Status



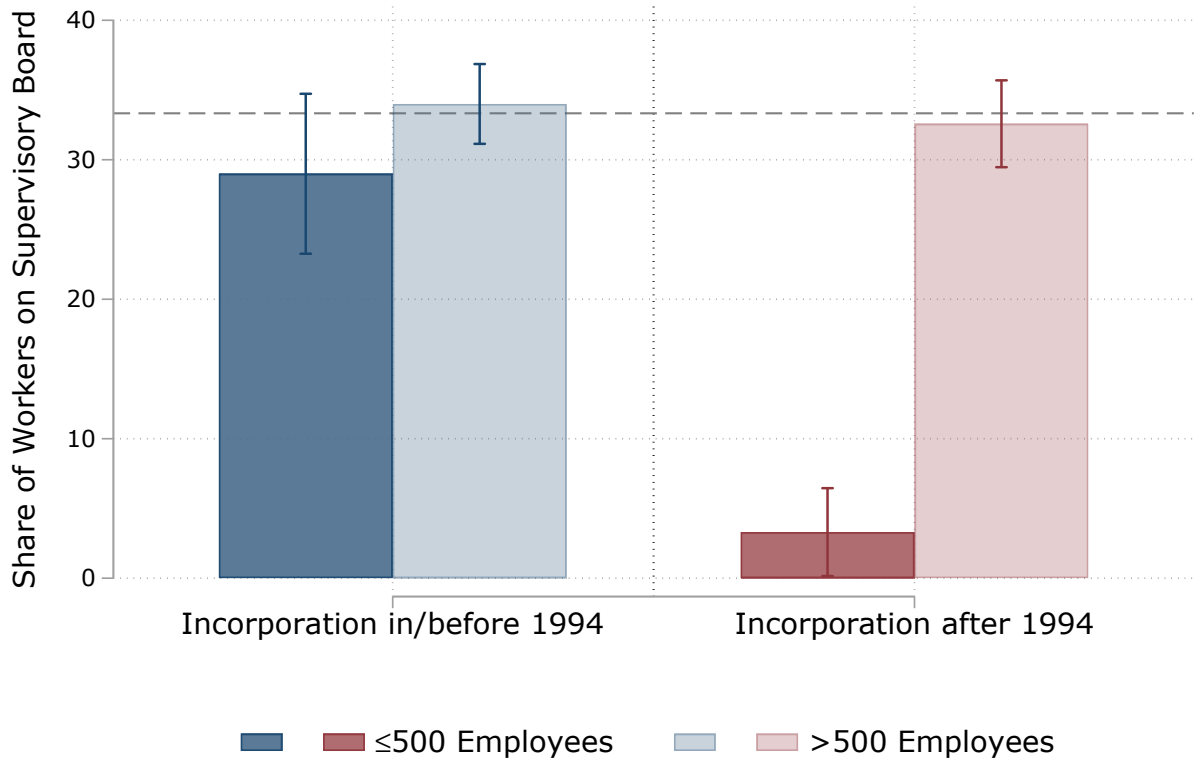
Note: Drawing on data from the Mannheim Enterprise Panel, panel (a) plots the frequency of the incorporation of shareholder corporations around the August 10, 1994 cutoff date which has been normalized to zero. The mandate for shared governance was relaxed for shareholder corporations incorporated after the cutoff date. The figure also reports the result of the McCrary (2008) test for a jump in the density at the discontinuity. Panel (b) visualizes the selection into shareholder corporation status around the reform. Specifically, it plots the average of an indicator function for shareholder corporation status in a sample of all corporations by incorporation date based on Bureau van Dijk data.

Figure 4: Balance of Industry Composition



Note: The figure plots difference-in-differences coefficients and associated 95% confidence intervals for specifications as in (12). Each coefficient is from a specification using an indicator for the respective industry as an outcome variable and can be interpreted as the effect of shared governance on the share of shareholder corporations incorporating in that industry (relative to non-shareholder corporations). We use NACE Rev. 2 Classification 1 industry designations. An F-test of joint significance shows no statistically significant compositional changes ($p = 0.97$). See Appendix Table D.3 for the differences-in-differences estimates for this figure and additional specifications with quarter-of-incorporation fixed effects.

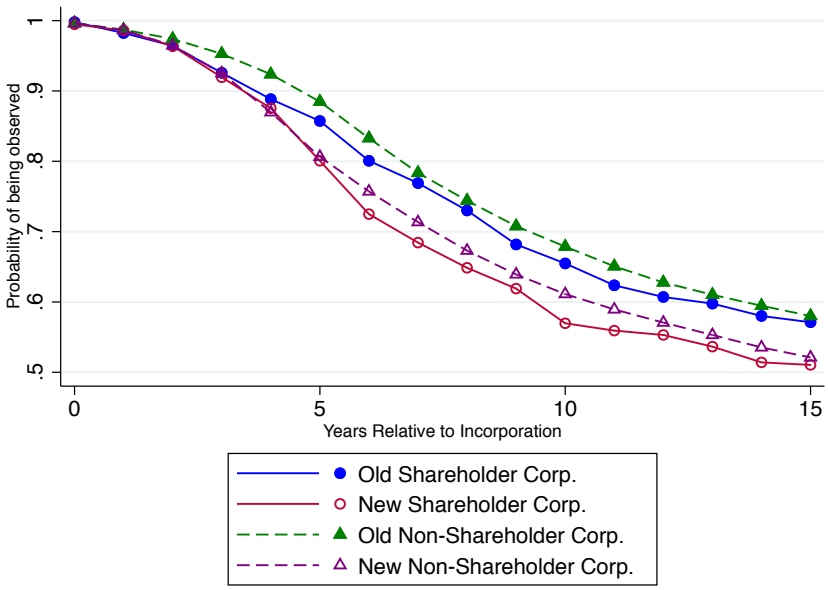
Figure 5: Share of Workers on the Supervisory Board



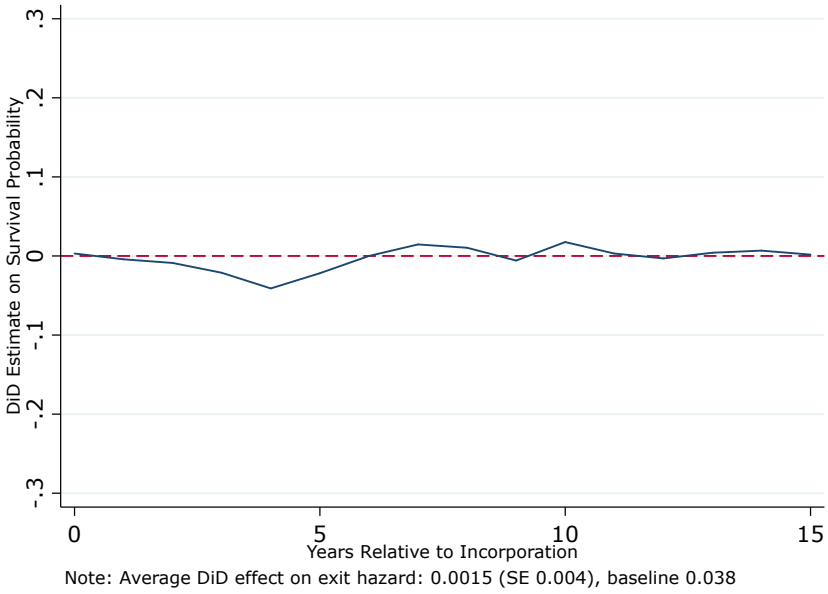
Note: The figure shows the share of workers on the supervisory board of shareholder corporations based on data from the Hoppenstedt Aktienführer. We restrict the sample to shareholder corporations founded between 1989 and 1999 for which board composition data and the incorporation year is reported. The two columns on the left report statistics for corporations with at most 500 employees, the two columns on the right for those with more than 500 employees. The navy-colored bars represent corporations incorporated during or before 1994, the maroon-colored bars represent corporations incorporated during or after 1995. The dashed horizontal line at 33.33% indicates the mandated worker share under one-third codetermination.

Figure 6: Firm Survival Shares by Incorporation Date and Corporation Type

(a) Levels by Group



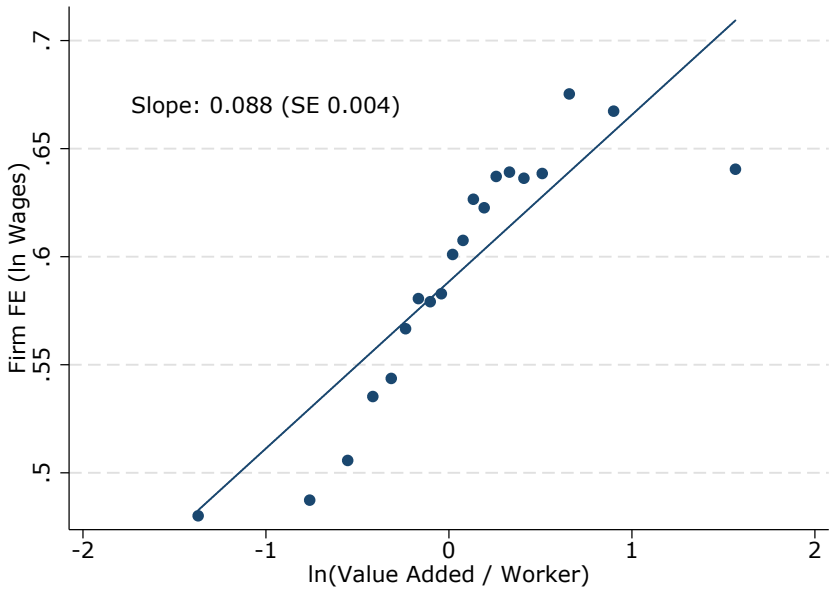
(b) Difference-in-Differences Estimate on Survival by Firm Age



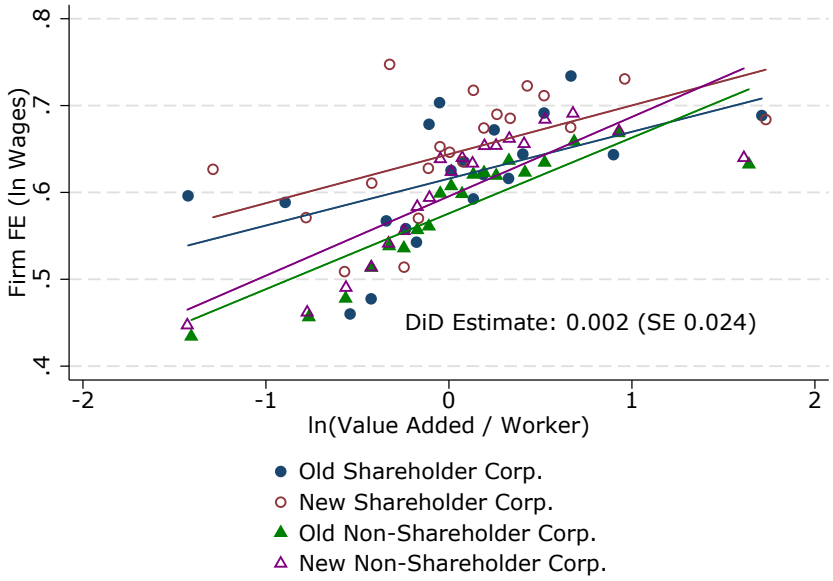
Note: The figure is based on the Mannheim Enterprise Panel, ZEW, Mannheim. Panel (a) shows firm survival probabilities of firms incorporated within a two-year window of August 10, 1994 separately for firms incorporated before or after the cutoff date and for shareholder and non-shareholder corporations. The running variable is time since incorporation in years. Panel (b) shows differences: old minus new shareholder corporations, minus the difference among non-shareholder corporations.

Figure 7: Rent-Sharing: Firms' Pay Premia and Value-Added per Worker

(a) Rent-Sharing



(b) Rent-Sharing By Legal Form and Incorporation Date



Note: The figure is based on the Orbis-ADIAB data and shows a binned scatter plot of firm's AKM pay premia plotted against ln(Value Added per Worker).

Tables

Table 1: Codetermination Rules: Share of Worker Representatives on Supervisory Board

	Shareholder Corporations		Non-Shareholder Corporations	
Firm Size	Incorporated		Incorporated	
	before 08/10/1994	on/after 08/10/1994	before 08/10/1994	on/after 08/10/1994
1 to 500	**1/3**	**0**	**0**	**0**
501 to 2000	1/3		1/3	
$\geq$ 2001	1/2*		1/2*	

Note: The table documents the share of worker representatives on the supervisory board by firm size, legal form, and incorporation date as mandated by codetermination law (*MitbestG* and *DrittelbG*). For firms with more than 2000 employees, workers have 1/2 of the supervisory board seats although the chairperson, typically a shareholder representative, can break ties. In the mining, coal and steel industry, there is complete parity on the supervisory board between worker and shareholder representatives without tie-breaking by the chair. Shareholder corporations wholly owned by a family are exempt from the lock-in for smaller corporations incorporated before August 10, 1994. See Section 3 for more information.

Table 2: Effect of Shared Governance on Board Composition

	𝟙(Women > 0) (1)	Share Women (2)	𝟙(PhD/Profs > 0) (3)	Share PhD/Profs (4)	𝟙(Nobility > 0) (5)	Share Nobility (6)
			Panel A: Supervisory Board			
Diff-in-Diff	0.145*	0.047	0.029	-0.031	-0.038	-0.014**
	(0.075)	(0.030)	(0.076)	(0.033)	(0.028)	(0.007)
DiD	0.158**	0.053	0.029	-0.037	-0.039	-0.013*
Industry FE	(0.079)	(0.032)	(0.079)	(0.036)	(0.030)	(0.007)
Control Mean: Sh. Corp.	0.350	0.125	0.570	0.231	0.083	0.023
″, Non-Sh. Corp.	0.567	0.156	0.547	0.135	0.030	0.006
N, Firm-Years	726	726	726	726	726	726
N, Sh. Corp.	322	322	322	322	322	322
N, Non-Sh. Corp.	404	404	404	404	404	404
			Panel B: Executive Board			
Diff-in-Diff	0.038	-0.002	0.081*	0.032*	-0.031**	-0.001
	(0.053)	(0.021)	(0.048)	(0.017)	(0.014)	(0.001)
DiD	0.044	-0.004	0.083*	0.032*	-0.029**	-0.001
Industry FE	(0.053)	(0.022)	(0.047)	(0.017)	(0.014)	(0.001)
Control Mean: Sh. Corp.	0.595	0.160	0.312	0.067	0.060	0.004
″, Non-Sh. Corp.	0.425	0.186	0.071	0.023	0.012	0.001
N, Firm-Years	32,578	32,578	32,578	32,578	32,578	32,578
N, Sh. Corp.	366	366	366	366	366	366
N, Non-Sh. Corp.	32,212	32,212	32,212	32,212	32,212	32,212

Note: The table reports the effect of shared governance on the outcomes reported in each column. We report the results of DiD specifications as in (12). The sample is restricted to shareholder corporations (*Aktiengesellschaften*) and non-shareholder corporations (*GmbHs*) with 10 or more employees incorporated within two years of the reform date of August 10, 1994. We use 2-digit NACE designations for industry fixed effects. See Appendix Section B for more information on the sample construction and Appendix Figures C.5 and C.6 for the specification with industry fixed effects at additional bandwidths and winsorization levels. The control means refer to observations of firms incorporated *on or after* August 10, 1994. Robust standard errors are reported in parentheses; we do not cluster here as we only have one observation per firm. Stars denote statistical significance: * $p < 0.10$, ** $p < 0.05$, *** $p < 0.01$.

Table 3: Effect of Shared Governance on Scale

	Log Revenue (1)	Log Value Added (2)	Log Emp (Orbis) (3)	Log Emp (IAB) (4)	𝟙(Emp> 500) (Orbis) (5)	𝟙(Emp> 500) (IAB) (6)	Log Fixed A. (7)	Log Tang. A. (8)	Log Materials (9)
Diff-in-Diff	0.537*	0.079	0.132	0.081	0.015	-0.019	0.434**	0.193	-0.872*
	(0.300)	(0.223)	(0.133)	(0.119)	(0.032)	(0.023)	(0.219)	(0.244)	(0.514)
DiD	-0.090	0.037	0.108	0.083	0.013	-0.019	0.427*	0.183	-1.158**
Year FE	(0.211)	(0.212)	(0.131)	(0.119)	(0.032)	(0.023)	(0.226)	(0.243)	(0.492)
DiD	0.290	0.113	0.096	0.062	0.013	-0.020	0.466**	0.213	-0.708
Industry FE	(0.304)	(0.232)	(0.132)	(0.116)	(0.033)	(0.022)	(0.204)	(0.227)	(0.451)
DiD	-0.101	0.091	0.051	0.063	0.007	-0.020	0.472**	0.229	-1.015**
Industry-Year FE	(0.199)	(0.198)	(0.127)	(0.116)	(0.033)	(0.022)	(0.212)	(0.219)	(0.429)
Control Mean: Sh. Corp.	14.018	14.978	4.288	4.025	0.142	0.119	13.726	12.605	14.695
″, Non-Sh. Corp.	11.059	14.790	3.354	3.347	0.022	0.021	12.506	12.200	14.825
N, Firm-Years	207,418	40,066	278,878	154,963	278,878	154,963	114,844	113,291	22,834
N, Sh. Corp.	529	246	616	380	616	380	360	360	163
N, Non-Sh. Corp.	40,046	8,334	45,801	24,095	45,801	24,095	24,625	24,411	6,022

Note: The table reports the effect of shared governance on the outcomes related to firm scale. We report the results of DiD specifications as in (12). The sample is restricted to shareholder corporations (*Aktiengesellschaften*) and non-shareholder corporations (*GmbHs*) with 10 or more employees incorporated within two years of the reform date of August 10, 1994. We use 2-digit NACE designations for industry fixed effects. Non-indicator outcomes are winsorized at the 1% level by year. See Appendix Section B for more information on the sample construction and Appendix Figure C.7 for the specification with industry-year fixed effects at additional bandwidths and winsorization levels. The control means refer to observations of firms incorporated *on or after* August 10, 1994. Standard errors clustered at the firm level are reported in parentheses. Stars denote statistical significance: * $p < 0.10$, ** $p < 0.05$, *** $p < 0.01$.

Table 4: Effect of Shared Governance on Productivity and Capital Intensity

	Value Add. per Emp (1)	Log VA per Emp (2)	Fixed A. per Emp (3)	Log Fixed A. per Emp (4)	TFP (Fixed A.) (5)	Capital Share (6)	Value Added /Revenue (7)
Diff-in-Diff	34.897***	0.163	69.434***	0.400**	-0.009	0.071**	0.163**
	(11.789)	(0.241)	(25.731)	(0.195)	(0.282)	(0.032)	(0.066)
DiD	35.112***	0.159	70.170***	0.434**	0.010	0.071**	0.159**
Year FE	(12.075)	(0.166)	(25.985)	(0.185)	(0.227)	(0.032)	(0.062)
DiD	39.671***	0.218	71.162***	0.436**	-0.034	0.079***	0.167***
Industry FE	(11.153)	(0.233)	(24.140)	(0.191)	(0.179)	(0.029)	(0.058)
DiD	40.064***	0.216	72.127***	0.487***	-0.030	0.081***	0.119**
Industry-Year FE	(12.110)	(0.135)	(25.556)	(0.174)	(0.110)	(0.029)	(0.055)
Control Mean: Sh. Corp.	81.190	9.863	99.730	9.170	6.849	0.300	0.435
″, Non-Sh. Corp.	67.363	10.472	34.031	8.991	7.629	0.257	0.360
N, Firm-Years	40,066	40,066	116,018	114,844	38,135	39,110	27,722
N, Sh. Corp.	246	246	360	360	240	249	227
N, Non-Sh. Corp.	8,334	8,334	24,850	24,625	7,804	8,213	7,086

Note: The table reports the effect of shared governance on the outcomes related to productivity and capital intensity. We report the results of DiD specifications as in (12). The sample is restricted to shareholder corporations (*Aktiengesellschaften*) and non-shareholder corporations (*GmbHs*) with 10 or more employees incorporated within two years of the reform date of August 10, 1994. We use 2-digit NACE designations for industry fixed effects. Non-indicator outcomes are winsorized at the 1% level by year. See Appendix Section B for more information on the sample construction and Appendix Figure C.8 for the specification with industry-year fixed effects at additional bandwidths and winsorization levels. The control means refer to observations of firms incorporated *on or after* August 10, 1994. Standard errors are clustered at the firm level are reported in parentheses. Stars denote statistical significance: * $p < 0.10$, ** $p < 0.05$, *** $p < 0.01$.

Table 5: Effect of Shared Governance on Skill Structure (Matched Employer-Employee Data)

	Low-Skilled %	Med-Skilled %	High-Skilled %	% Qualified Manual	Qualified Service	All Managers	Outsource-able (FSCL)
Diff-in-Diff	-0.015*	0.002	0.016	0.038	0.005	-0.008	0.085
	(0.009)	(0.023)	(0.024)	(0.025)	(0.006)	(0.010)	(0.145)
DiD	-0.015*	0.002	0.016	0.039	0.005	-0.008	0.082
Year FE	(0.009)	(0.023)	(0.024)	(0.025)	(0.006)	(0.010)	(0.145)
DiD	-0.017**	-0.002	0.023	0.026	0.005	-0.007	0.138
Industry FE	(0.009)	(0.020)	(0.021)	(0.022)	(0.006)	(0.010)	(0.130)
DiD	-0.018**	-0.002	0.023	0.026	0.005	-0.007	0.136
Industry-Year FE	(0.009)	(0.020)	(0.021)	(0.022)	(0.006)	(0.010)	(0.130)
Ctr. Mean: Sh. C.	0.127	0.593	0.261	0.171	0.041	0.085	-3.582
″, Non-Sh. Corp.	0.116	0.729	0.126	0.261	0.026	0.032	-2.320
N, Firm-Years	154963	154963	154963	154963	154963	154963	88659
N, Sh. Corp.	380	380	380	380	380	380	275
N, Non-Sh. Corp.	24095	24095	24095	24095	24095	24095	16544

Note: The table reports the effect of shared governance on the skill structure of firms. We consider (i) low-skilled workers with no vocational training, (ii) medium-skilled worker with a finished school degree and a vocational qualification, and (iii) high-skilled workers with a university degree and report the results of DiD specifications as in (12). The sample is restricted to shareholder corporations (*Aktiengesellschaften*) and non-shareholder corporations (*GmbHs*) with 10 or more employees incorporated within two years of the reform date of August 10, 1994. We use 2-digit NACE designations for industry fixed effects. See Appendix Section B for more information on the sample construction and Appendix Figure C.9 for the specification with industry-year fixed effects at additional bandwidths and winsorization levels. The control means refer to observations of firms incorporated *on or after* August 10, 1994. Standard errors clustered at the firm level are reported in parentheses. Stars denote statistical significance: * $p < 0.10$, ** $p < 0.05$, *** $p < 0.01$.

Table 6: Effect of Shared Governance on Tenure (Matched Employer-Employee Data)

		Log	Separations			
	Tenure	Tenure	All	<4 Yrs Tenure	4-9 Yrs Tenure	>9 Yrs Tenure
Diff-in-Diff	-0.488*	-0.062	0.016	0.014	0.003	-0.003*
	(0.274)	(0.039)	(0.010)	(0.009)	(0.003)	(0.001)
DiD	-0.482*	-0.061	0.015	0.014	0.003	-0.002*
Year FE	(0.273)	(0.039)	(0.010)	(0.009)	(0.003)	(0.001)
DiD	-0.465*	-0.060	0.013	0.012	0.003	-0.002*
Industry FE	(0.254)	(0.037)	(0.010)	(0.009)	(0.003)	(0.001)
DiD	-0.462*	-0.059	0.013	0.012	0.003	-0.002*
Industry-Year FE	(0.254)	(0.036)	(0.010)	(0.009)	(0.003)	(0.001)
Control Mean: Sh. Corp.	7.464	7.836	0.201	0.141	0.045	0.016
″, Non-Sh. Corp.	8.100	7.904	0.184	0.128	0.040	0.014
N, Firm-Years	154963	154963	135083	135083	135083	135083
N, Sh. Corp.	380	380	372	372	372	372
N, Non-Sh. Corp.	24095	24095	23609	23609	23609	23609

Note: The table reports the effect of shared governance on worker tenure at firms. We consider (i) low-skilled workers with no vocational training, (ii) medium-skilled worker with a finished school degree and a vocational qualification, and (iii) high-skilled workers with a university degree and report the results of DiD specifications as in (12). The sample is restricted to shareholder corporations (*Aktiengesellschaften*) and non-shareholder corporations (*GmbHs*) with 10 or more employees incorporated within two years of the reform date of August 10, 1994. We use 2-digit NACE designations for industry fixed effects. See Appendix Section B for more information on the sample construction and Appendix Section B for more information on the sample construction and Appendix Figure C.10 for the specification with industry-year fixed effects at additional bandwidths and winsorization levels. The control means refer to observations of firms incorporated *on or after* August 10, 1994. Standard errors clustered at the firm level are reported in parentheses. Stars denote statistical significance: * $p < 0.10$, ** $p < 0.05$, *** $p < 0.01$.

Table 7: Effect of Shared Governance on Wages

	Log Mean Wage	AKM Firm Effects	Log Wage, 25th Pct	Log Med. Wage	Log Wage, 75th Pct	% Above SS Maximum
Diff-in-Diff	0.034	-0.002	0.029	0.026	0.028	0.005
	(0.040)	(0.020)	(0.037)	(0.037)	(0.035)	(0.014)
DiD	0.036	-0.001	0.031	0.028	0.030	0.005
Year FE	(0.040)	(0.020)	(0.037)	(0.037)	(0.035)	(0.014)
DiD	0.050	0.006	0.045	0.040	0.041	0.009
Industry FE	(0.039)	(0.021)	(0.036)	(0.037)	(0.035)	(0.014)
DiD	0.052	0.008	0.047	0.042	0.043	0.009
Industry-Year FE	(0.039)	(0.021)	(0.036)	(0.037)	(0.035)	(0.014)
Control Mean: Sh. Corp.	4.712	0.528	4.400	4.618	4.833	0.129
″, Non-Sh. Corp.	4.379	0.425	4.149	4.315	4.488	0.039
N, Firm-Years	153402	45104	153402	153402	153402	154963
N, Sh. Corp.	380	311	380	380	380	380
N, Non-Sh. Corp.	23936	16366	23936	23936	23936	24095

Note: The table reports the effect of shared governance on wages. We report the results of DiD specifications as in (12). The sample is restricted to shareholder corporations (*Aktiengesellschaften*) and non-shareholder corporations (*GmbHs*) with 10 or more employees incorporated within two years of the reform date of August 10, 1994. We use 2-digit NACE designations for industry fixed effects. All outcomes are winsorized at the 1% level by year. See Appendix Section B for more information on the sample construction and Appendix Figure C.12 for specifications at additional bandwidths and winsorization levels. The control means refer to observations of firms incorporated *on or after* August 10, 1994. Standard errors are clustered at the firm level are reported in parentheses. Stars denote statistical significance: * $p < 0.10$, ** $p < 0.05$, *** $p < 0.01$.

Table 8: Effect of Shared Governance on Profitability

	EBITDA /Revenue (1)	EBIT /Revenue (2)	Net Income /Revenue (3)	P&L /Revenue (4)	EBITDA /Equity (5)	EBIT /Equity (6)	Net Income /Equity (7)	P&L /Equity (8)	EBITDA /Total A. (9)	EBIT /Total A. (10)	Net Income /Total A. (11)	P&L /Total A. (12)
Diff-in-Diff	-0.045	-0.050	0.068*	0.090**	0.241	0.122	0.124**	0.173**	-0.0006	-0.003	0.018	0.024
	(0.029)	(0.033)	(0.037)	(0.039)	(0.199)	(0.163)	(0.060)	(0.074)	(0.019)	(0.018)	(0.016)	(0.017)
DiD	-0.042	-0.049	0.072**	0.089**	0.274	0.124	0.128**	0.169**	-0.0003	-0.003	0.017	0.023
Year FE	(0.029)	(0.032)	(0.037)	(0.038)	(0.204)	(0.164)	(0.060)	(0.073)	(0.019)	(0.018)	(0.016)	(0.017)
DiD	-0.044	-0.050	0.072**	0.095**	0.222	0.131	0.119*	0.167**	-0.001	-0.001	0.022	0.027
Industry FE	(0.029)	(0.032)	(0.037)	(0.039)	(0.234)	(0.179)	(0.061)	(0.075)	(0.019)	(0.018)	(0.015)	(0.017)
DiD	-0.045	-0.054*	0.111*	0.085**	0.105	-0.017	0.063	0.112	-0.006	-0.005	0.018	0.023
Industry-Year FE	(0.028)	(0.030)	(0.065)	(0.036)	(0.254)	(0.185)	(0.061)	(0.082)	(0.018)	(0.018)	(0.014)	(0.016)
Control Mean: Sh. Corp.	0.019	-0.024	-0.016	-0.014	0.188	0.031	-0.036	-0.031	0.085	0.051	0.017	0.020
Ş, Non-Sh. Corp.	0.070	0.037	0.012	0.026	1.743	1.032	0.321	0.344	0.142	0.095	0.054	0.057
N, Firm-Years	28,271	28,099	25,550	24,870	37,447	37,241	35,130	34,293	39,686	39,454	37,505	36,656
N, Sh. Corp.	236	236	234	234	249	248	247	247	254	253	252	252
N, Non-Sh. Corp.	7,109	7,097	6,905	6,766	7,798	7,784	7,634	7,477	8,305	8,290	8,149	7,996

Note: The table reports the effect of shared governance on profitability. We report the results of DiD specifications as in (12). The sample is restricted to shareholder corporations (*Aktiengesellschaften*) and non-shareholder corporations (*GmbHs*) with 10 or more employees incorporated within two years of the reform date of August 10, 1994. We use 2-digit NACE designations for industry fixed effects. Outcomes are winsorized at the 1% level by year. See Appendix Section B for more information on the sample construction and Appendix Figure C.11 for the specification with industry-year fixed effects at additional bandwidths and winsorization levels. The control means refer to observations of firms incorporated *on or after* August 10, 1994. Standard errors clustered at the firm level are reported in parentheses. Stars denote statistical significance: * $p < 0.10$, ** $p < 0.05$, *** $p < 0.01$.

Table 9: Effect of Shared Governance on Capital Structure, Leverage, and Cost of Debt

	Liabilites /Total A. (1)	Leverage (2)	Cost of Debt (3)	Long-Term Debt /Total Debt (4)	Cash /Total A. (5)
Diff-in-Diff	-0.025	-0.007	-0.043	-0.005	-0.022
	(0.025)	(0.029)	(0.030)	(0.038)	(0.019)
DiD	-0.024	-0.003	-0.046	-0.011	-0.021
Year FE	(0.025)	(0.029)	(0.029)	(0.037)	(0.019)
DiD	-0.029	-0.023	-0.033	-0.013	-0.022
Industry FE	(0.024)	(0.029)	(0.028)	(0.037)	(0.018)
DiD	-0.025	-0.018	-0.048*	-0.012	-0.023
Industry-Year FE	(0.025)	(0.029)	(0.027)	(0.037)	(0.018)
Control Mean: Sh. Corp.	0.570	0.278	0.167	0.733	0.175
″, Non-Sh. Corp.	0.671	0.372	0.117	0.821	0.158
N, Firm-Years	115,883	68,313	23,970	49,300	113,963
N, Sh. Corp.	360	330	219	290	361
N, Non-Sh. Corp.	24,843	19,424	6,304	15,486	24,578

Note: The table reports the effect of shared governance on capital structure, leverage, and the cost of debt. We report the results of DiD specifications as in (12). The sample is restricted to shareholder corporations (*Aktiengesellschaften*) and non-shareholder corporations (*GmbHs*) with 10 or more employees incorporated within two years of the reform date of August 10, 1994. We use 2-digit NACE designations for industry fixed effects. Outcomes are winsorized at the 1% level by year. See Appendix Section B for more information on the sample construction and Appendix Figure C.13 for specifications at additional bandwidths and winsorization levels. The control means refer to observations of firms incorporated *on or after* August 10, 1994. Standard errors clustered at the firm level are reported in parentheses. Stars denote statistical significance: * $p < 0.10$, ** $p < 0.05$, *** $p < 0.01$.

Table 10: Effect of Shared Governance on Indices Predicting Financial Constraints and Distress

	HP Index (1)	KZ Index (2)	Z Score, 5 Vars (3)	Z Score, 4 Vars (4)	O Score (5)	WW Score (6)
			Panel A: 𝟙(Above Median)			
Diff-in-Diff	-0.0002	-0.029	0.085	0.060	-0.037	0.094
	(0.040)	(0.062)	(0.061)	(0.053)	(0.057)	(0.078)
DiD	0.004	-0.022	0.081	0.057	-0.036	0.101
Year FE	(0.041)	(0.061)	(0.061)	(0.053)	(0.057)	(0.078)
DiD	0.011	-0.042	0.093*	0.038	-0.058	0.012
Industry FE	(0.039)	(0.057)	(0.055)	(0.054)	(0.056)	(0.055)
DiD	0.020	-0.026	0.096*	0.041	-0.056	0.008
Industry-Year FE	(0.041)	(0.058)	(0.057)	(0.056)	(0.058)	(0.055)
Control Mean: Sh. Corp.	0.504	0.507	0.508	0.507	0.509	0.509
″, Non-Sh. Corp.	0.500	0.500	0.500	0.500	0.500	0.501
N, Firm-Years	116,059	28,314	27,103	37,925	28,657	19,426
N, Sh. Corp.	361	237	227	244	228	219
N, Non-Sh. Corp.	24,856	6,904	6,921	8,083	6,608	5,866
			Panel B: 𝟙(Above 80th Percentile)			
Diff-in-Diff	0.089**	-0.028	0.095*	0.035	0.026	0.077
	(0.040)	(0.042)	(0.050)	(0.043)	(0.042)	(0.062)
DiD	0.090**	-0.025	0.088*	0.029	0.026	0.075
Year FE	(0.040)	(0.043)	(0.050)	(0.043)	(0.042)	(0.062)
DiD	0.097***	-0.030	0.113**	0.025	0.007	0.040
Industry FE	(0.038)	(0.043)	(0.047)	(0.043)	(0.040)	(0.044)
DiD	0.101**	-0.027	0.108**	0.017	0.020	0.026
Industry-Year FE	(0.040)	(0.044)	(0.049)	(0.044)	(0.040)	(0.043)
Control Mean: Sh. Corp.	0.206	0.211	0.213	0.210	0.212	0.214
″, Non-Sh. Corp.	0.200	0.201	0.201	0.201	0.201	0.201
N, Firm-Years	116,059	28,314	27,103	37,925	28,657	19,426
N, Sh. Corp.	361	237	227	244	228	219
N, Non-Sh. Corp.	24,856	6,904	6,921	8,083	6,608	5,866

Note: The table reports the effect of shared governance financial distress risk—the Altman z-score (Altman, 2000), and the Ohlson o-score (Ohlson, 1980)—and financial constraints—the WW index (Whited and Wu, 2006), the KZ index (Kaplan and Zingales, 1997), and the HP index (Hadlock and Pierce, 2010). See Appendix Section B.3 on the construction of the indices. The indices are split into binary indicators by median (Panel A) or 80th percentile (Panel B) in our baseline sample control group in a year-by-legal-form cell, with 1 indicating higher risk or constraints. We report the results of DiD specifications as in (12). The sample is restricted to corporations incorporated within two years of the reform date of August 10, 1994. See Appendix Section B for details on the sample construction and Appendix Figures C.14 and C.15 for specifications at additional bandwidths and winsorization levels. The control means refer to observations of firms incorporated *on or after* August 10, 1994. Standard errors clustered at the firm level are in parentheses. Stars denote statistical significance: * $p < 0.10$, ** $p < 0.05$, *** $p < 0.01$.

Online Appendix of:
Labor in the Boardroom

By Simon Jäger, Benjamin Schoefer and Jörg Heining

A Theoretical Appendix

A.1 Baseline Hold-Up Model: Comparative Statics of Investment to Bargaining Power Parameters ϕ and ι

We here formally derive the properties of the comparative static of capital stock choice K^* to worker bargaining power parameters ϕ (in wage setting) and ι (in input choice).

Capital Choice In period 1, the objective function in the bargaining is:

$$\max_K \{\iota \log S^{1W}(\phi, K) + (1-\iota) \log S^{1F}(\phi, K)\}, \tag{A.1}$$

where w^* is the wage determined in period 2 by Nash bargaining:

$$w^* = \arg\max_w \{\phi \log S^{2W}(w, L, K) + (1-\phi) \log S^{2F}(w, L, K)\} \tag{A.2}$$

$$= b + \phi \frac{1}{L}(F(K, L) - bL - c'K). \tag{A.3}$$

The optimality condition for K is:

$$\iota \frac{S_K^{1W}}{S^{1W}} + (1-\iota)\frac{S_K^{1F}}{S^{1F}} = 0. \tag{A.4}$$

Where the subscript K indicates the partial derivative of the function with respect to K. The second-order condition, a property we will use for the comparative statics below and the value of which we define as B, is:

$$\underbrace{\iota \left(\frac{S_{KK}^{1W} S^{1W} - S_K^{1W} S_K^{1W}}{S^{1W} S^{1W}} \right) + (1-\iota) \left(\frac{S_{KK}^{1F} S^{1F} - S_K^{1F} S_K^{1F}}{S^{1F} S^{1F}} \right)}_{\equiv B} < 0. \tag{A.5}$$

The Effect of Worker Bargaining Power in Wage-Setting, ϕ, on K^* To characterize the effect of K^* on ϕ totally differentiate first-order condition (A.4) with respect to K^* and ϕ in the neighborhood of K^*:

$$B \times dK^* + \underbrace{\left[\iota \left(\frac{S_{K\phi}^{1W} S^{1W} - S_K^{1W} S_\phi^{1W}}{S^{1W} S^{1W}} \right) + (1-\iota) \left(\frac{S_{K\phi}^{1F} S^{1F} - S_K^{1W} S_\phi^{1F}}{S^{1F} S^{1F}} \right) \right]}_{\equiv A} d\phi = 0. \tag{A.6}$$

And therefore,

$$\frac{dK^*}{d\phi} = \frac{A}{-B}. \tag{A.7}$$

By SOC (A.5), $-B > 0$. We will now evaluate A and hence the sign of $\frac{dK^*}{d\phi}$.

Recall that $S^2 = F(K, \bar{L}) - b\bar{L} - c'K$, that Nash bargaining in stage 2 yields $S^{2W} = \phi S^2$ and $S^{2F} = (1-\phi)S^2$, and that $S^{1W} = S^{2W}$ while $S^{1F} = S^{1F} + (c' - c)K$. It follows that

$$S^{1W} = \phi S^2 \qquad S^{1F} = (1-\phi)S^2 + (c'-c)K \tag{A.8}$$

$$S^{1W}_{\phi} = S^2 \qquad S^{1F}_{\phi} = -S^2 \tag{A.9}$$

$$S^{1W}_{K} = \phi S^2_K \qquad S^{1F}_{K} = (1-\phi)S^2_K + (c'-c) \tag{A.10}$$

$$S^{1W}_{K\phi} = S^{1W}_{\phi K} = S^2_K \qquad S^{1W}_{K\phi} = S^{1F}_{\phi K} = -S^2_K. \tag{A.11}$$

Therefore

$$S^{1W}_{K\phi} S^{1W} - S^{1W}_{K} S^{1W}_{\phi} = S^2_K \phi S^2 - \phi S^2_K S^2 = 0 \tag{A.12}$$

(the first parenthesis in $A = 0$). Recall also that from FOC (A.4), $\frac{S^{1F}_K}{S^{1F}} = -\frac{\iota}{1-\iota}\frac{S^{1W}_K}{S^{1W}}$. Note also that $S^{1F}_{\phi} = -S^{1W}_{\phi}$ and $S^{1F}_{K\phi} = -S^{1W}_{K\phi}$. Therefore, A becomes:

$$A = \left[\iota\left(\frac{S^{1W}_{K\phi}S^{1W} - S^{1W}_{K}S^{1W}_{\phi}}{S^{1W}S^{1W}}\right) + (1-\iota)\left(\frac{S^{1F}_{K\phi}S^{1F} - S^{1F}_{K}S^{1F}_{\phi}}{S^{1F}S^{1F}}\right)\right] \tag{A.13}$$

$$= (1-\iota)\left(\frac{S^{1F}_{K\phi}}{S^{1F}} - \frac{S^{1F}_{K}}{S^{1F}}\frac{S^{1F}_{\phi}}{S^{1F}}\right) \tag{A.14}$$

$$= -(1-\iota)\frac{S^{1W}}{S^{1F}}\left(\frac{S^{1W}_{K\phi}}{S^{1W}} + \frac{\iota}{1-\iota}\frac{S^{1W}_{K}}{S^{1W}}\frac{S^{1W}_{\phi}}{S^{1W}}\right) \tag{A.15}$$

$$= -(1-\iota)\frac{S^{1W}}{S^{1F}}\left(\frac{1}{1-\iota}\frac{S^2_K}{S^{1W}}\right) \tag{A.16}$$

$$= -\left[\frac{S^2_K}{(1-\phi)S^2 + (c'-c)K}\right]\frac{(1-\iota)\phi S^2}{(1-\iota)\phi S^2} \tag{A.17}$$

$$< 0, \tag{A.18}$$

provided that $\iota < 1$, $\phi > 0$, $S^2 > 0$.

Since $A < 0$ and $-B > 0$, we have now shown that

$$\frac{dK^*}{d\phi} < 0 \tag{A.19}$$

for any level of $\iota < 1$, provided that $\phi > 0$ and $S^2 > 0$.

The Effect of Worker Bargaining Power in Investment, ι, on K^* We totally differentiate FOC (A.4) with respect to K^* and ι:

$$B \times dK^* + \underbrace{\left[\frac{S_K^{1W}}{S^{1W}} - \frac{S_K^{1F}}{S^{1F}}\right]}_{\equiv C} d\iota = 0. \tag{A.20}$$

so,

$$\frac{dK^*}{d\iota} = \frac{C}{-B}. \tag{A.21}$$

Again by SOC (A.5), $-B > 0$. We will now evaluate the sign of C, which determines the sign of $\frac{dK^*}{d\iota}$.

Recall that from FOC (A.4), $\frac{S_K^{1F}}{S^{1F}} = -\frac{\iota}{1-\iota}\frac{S_K^{1W}}{S^{1W}}$. Therefore, C becomes:

$$\begin{aligned} C &= \left[\frac{S_K^{1W}}{S^{1W}} - \frac{S_K^{1F}}{S^{1F}}\right] && \text{(A.22)} \\ &= \left[\frac{S_K^{1W}}{S^{1W}} + \frac{\iota}{1-\iota}\frac{S_K^{1W}}{S^{1W}}\right] && \text{(A.23)} \\ &= \frac{1}{1-\iota}\frac{S_K^{1W}}{S^{1W}} && \text{(A.24)} \\ &= \frac{1}{1-\iota}\frac{\phi S_K^2}{\phi S^2} && \text{(A.25)} \\ &> 0. && \text{(A.26)} \end{aligned}$$

Since $C > 0$ and $-B > 0$,

$$\frac{dK^*}{d\iota} > 0 \tag{A.27}$$

for any level of $1 > \phi > 0$. If $\phi = 0$, i.e workers have no power in setting the wage, then w^* is equal to b and does not depend on K. Therefore, for $\iota = 1$ any K is a solution, while for $\iota < 1$ we have efficiency ($F_K = c$) and K^* does not depend on ι ($\frac{dK^*}{d\iota} = 0$).

A.2 Endogenous Labor

Here we relax the assumption of exogenous labor, and assume instead that labor L is chosen contemporaneously to K with the same bargaining parameter ι. The stage 1 objective

function in Nash bargaining is now

$$\max_{K,L}\{\iota \log S^{1W}(\phi, K, L) + (1-\iota)\log S^{1F}(\phi, K, L)\}, \tag{A.28}$$

where stage-2 surplus is anticipated to be Nash bargained following rule (A.3). Note that L only enters the surplus of the respective parties through aggregate period-2 surplus: $S^{1W}(\phi, K, L) = \phi S^2(K, L)$ and $S^{1F}(\phi, K, L) = (1-\phi)S^2(K, L) + (c'-c)K$, where $S^2(K, L) = F(K, L) - bL - c'K$. Hence, both parties will agree on choosing the optimal level of L regardless of bargaining powers, given by:

$$\iota \frac{S_L^{1W}}{S^{1W}} + (1-\iota)\frac{S_L^{1F}}{S^{1F}} = 0 \Leftrightarrow S_L^2 \left[\iota \frac{\phi}{U} + (1-\iota)\frac{(1-\phi)}{V}\right] \Leftrightarrow S_L^2 = 0 \Leftrightarrow F_K = b. \tag{A.29}$$

L^* does not depend on ϕ or ι directly but only through K; for any change in K, L^* adjusts such that $F_L(K, L) = b$ and hence:

$$\frac{dL^*}{dK} = -\frac{F_{LK}}{F_{LL}}. \tag{A.30}$$

Moreover, the results (A.19) on $\frac{dK^*}{d\phi} < 0$ and (A.27) on $\frac{dK^*}{d\iota} > 0$ continue to hold in the case with endogenous L. The formulae (A.7) and (A.21) still hold, with B now being a function of the Hessian of the objective function which we can again sign by appealing to the second order condition.[52]

As a result, employment effects inherit the qualitative properties of the capital effects in this extended setting as long as $F_{LK} > 0$. Going forward, we therefore consider the general setting with endogenous labor. Therefore, the results derived for capital effects with fixed labor above correspond to the partial effects $\frac{\partial K}{\partial \phi} = \frac{A}{-B}$ and $\frac{\partial K}{\partial \iota} = \frac{C}{-B}$ in the model with endogenous labor (with the seemingly fixed labor level set to the originally optimal one). However, the total capital effects $\frac{dK}{d\phi} = \frac{A}{-\tilde{B}}$ and $\frac{dK}{d\iota} = \frac{C}{-\tilde{B}}$ (while having the same sign as in the fixed-labor setting) also reflect endogenous adjustment in labor (with $\tilde{B}$ defined in Footnote 52).

[52] To see this, take the total derivative of the FOCs (A.4) – now with endogenous labor – and (A.29) with respect to L, K and the parameter of interest. Use the latter to replace dL as a function of dK in the former. This yields (A.6) and (A.20), with

$$\tilde{B} = \left[\frac{\partial^2 \Omega}{\partial L^2}\right]^{-1}\left[\frac{\partial^2 \Omega}{\partial K^2}\frac{\partial^2 \Omega}{\partial L^2} - \frac{\partial^2 \Omega}{\partial K \partial L}\frac{\partial^2 \Omega}{\partial L \partial K}\right]$$

where $\Omega(K, L; \phi, \iota) = \iota \log S^{1W}(\phi, K, L) + (1-\iota)\log S^{1F}(\phi, K, L)$ is the objective function of the bargaining. Note that $\tilde{B} < 0$ by SOC.

A.3 Additional Comparative Statics: Capital-Labor Ratio, and Profits

We now derive the additional comparative statics of profit and the capital labor ratio, and do so in the aforementioned extended model with endogenous labor.

The Effect of Worker Bargaining Power on $\frac{K}{L}$ Denote the bargained capital-labor ratio by $R = \frac{K}{L}$. The effect of a parameter $\psi \in \{\phi, \iota\}$ on R is:

$$\frac{dR}{d\psi} = \frac{1}{L}\frac{dK}{d\psi} - \frac{K}{L^2}\frac{dL}{d\psi} \tag{A.31}$$

$$= \frac{1}{L}\left[1 + \frac{K}{L}\frac{F_{LK}}{F_{LL}}\right]\frac{dK}{d\psi}, \tag{A.32}$$

where the second equality uses (A.30). The capital-labor ratio will move in the same direction as capital, $\text{sign}(\frac{d\frac{K}{L}}{d\psi}) = \text{sign}(\frac{dK^*}{d\psi})$, if and only if $F_{LK} < -\frac{L}{K}F_{LL}$, that is if the complementarity between K and L is not too large for the labor response (to the capital increase) to even outpace the capital response.

Profits and ϕ Recall that profits $\pi(\phi, K, L) \equiv S^{1F}(\phi, K, L) = (1-\phi)S^2(K, L) + (c' - c)K$, where $S^2(K, L) = F(K, L) - bL - c'K$. The effect of ϕ on profits is given by

$$\frac{d\pi}{d\phi} = \frac{\partial \pi}{\partial \phi} + \frac{\partial \pi}{\partial K}\frac{\partial K}{\partial \phi} + \frac{\partial \pi}{\partial L}\frac{\partial L}{\partial \phi}. \tag{A.33}$$

First, $\frac{\partial \pi}{\partial \phi} = -S^2$ is the mechanical effect of ϕ i.e. a transfer of surplus from the firm to the workers holding (K, L) fixed.

Second, we consider $\frac{\partial \pi}{\partial K}\frac{\partial K}{\partial \phi}$. Here, we have already shown that $\frac{\partial K}{\partial \phi} < 0$ in Equation (A.19), a case that extends to the endogenous labor setting as shown in the previous section. Since $\frac{\partial \pi}{\partial K}|_{K=K^*} \leq 0$, we find that $\frac{\partial \pi}{\partial K}\frac{\partial K}{\partial \phi} \geq 0$.[53]

Finally, $\frac{\partial \pi}{\partial L} = (1-\phi)S^2_L = 0$ by FOC (A.29), and therefore $\frac{\partial \pi}{\partial L}\frac{\partial L}{\partial \phi} = 0$.

So overall, we can consider three cases. For $\iota = 0$, $\frac{\partial \pi}{\partial K}|_{K=K^*} = 0$ (see Footnote 53), and we only have the mechanical effect: $\frac{d\pi}{d\phi} = \frac{\partial \pi}{\partial \phi} = -S^2 < 0$.

With $1 > \iota > 0$ there is some attenuation of the negative effect of ϕ on profits, but it is

[53] By FOC (A.4), $\iota\frac{S^{1W}_K}{S^{1W}} + (1-\iota)\frac{1}{\pi}\frac{\partial \pi}{\partial K} = 0$. When $\iota = 0$, it reduces to $\frac{\partial \pi}{\partial K} = 0$. When $\iota = 1$, it reduces to $S^{1W}_K(\phi, K, L) = 0$, which implies $S^2_K(K, L) = 0$ and then $\frac{\partial \pi}{\partial K} = (1-\phi)S^2_K(K, L) + (c' - c) = c' - c < 0$. When $\iota \in (0, 1)$, the FOC implies $\frac{\partial \pi}{\partial K} = -\frac{\iota}{1-\iota}\frac{\pi}{S^{1W}}S^{1W}_K < 0$ since $S^{1W}_K|_{K=K^*} = \phi S^2_K = \phi(F_K - c') > 0$.

not sufficient to reverse it: $|-S^2| > \left|\frac{\partial \pi}{\partial K}\frac{dK}{d\phi}\right|$.[54] So we have

$$\frac{d\pi}{d\phi} = -S^2 \text{ for } \iota = 0 \text{ and } -S^2 < \frac{d\pi}{d\phi} < 0 \text{ for } \iota \in (0,1). \tag{A.38}$$

Finally, for $\iota = 1$, the effect of ϕ is inconsequential, as workers always set inputs to maximize $S^{1W} = S^{2W} = \phi S^2$.

Profits and ι The effect of ι on profits is given by

$$\frac{d\pi}{d\iota} = \frac{\partial \pi}{\partial \iota} + \frac{\partial \pi}{\partial K}\frac{\partial K}{\partial \iota} + \frac{\partial \pi}{\partial L}\frac{\partial L}{\partial \iota}. \tag{A.39}$$

First, the direct mechanical effect on profits is zero i.e. $\frac{\partial \pi}{\partial \iota} = 0$. Second, evaluating $\frac{\partial \pi}{\partial K}\frac{\partial K}{\partial \iota}$, we find that $\frac{\partial \pi}{\partial K}|_{K=K^*} \leq 0$ (see Footnote 53) and $\frac{\partial K}{\partial \iota} > 0$ per Equation (A.27) (which extends to the context with endogenous labor). Finally, $\frac{\partial \pi}{\partial L} = (1-\phi)S^2_L = 0$ by FOC in Equation (A.29). So we have (for $\iota > 0$):[55]

$$\frac{d\pi}{d\iota} < 0. \tag{A.40}$$

[54] This derivation is easier using the notation $S^{1F}_K = \frac{\partial \pi}{\partial K}$.

$$\frac{d\pi}{d\phi} < 0 \iff -S^2 + S^{1F}_K \frac{dK}{d\phi} + S^{1F}_L \frac{dL}{d\phi} < 0 \iff -S^2 + S^{1F}_K \frac{S^2_K}{S^{1F}B} + 0 < 0 \iff B < \frac{S^{1F}_K}{S^{1F}}\frac{S^2_K}{S^2} \tag{A.34}$$

$$\iff \iota\left(\frac{S^{1W}_{KK}S^{1W} - S^{1W}_K S^{1W}_K}{S^{1W}S^{1W}}\right) + (1-\iota)\left(\frac{S^{1F}_{KK}S^{1F} - S^{1F}_K S^{1F}_K}{S^{1F}S^{1F}}\right) < \frac{S^{1F}_K}{S^{1F}}\frac{S^2_K}{S^2}, \tag{A.35}$$

where the second implication uses Equations (A.7) and (A.17), and in the second line we use the definition of B in (A.5). Recall that from FOC (A.4), $\frac{S^{1F}_K}{S^{1F}} = -\frac{\iota}{1-\iota}\frac{S^{1W}_K}{S^{1W}} = -\frac{\iota}{1-\iota}\frac{S^2_K}{S^2}$, that $S^{1W}_{KK} = \phi S^2_{KK}$ and that $S^{1F}_{KK} = (1-\phi)S^2_{KK}$. After some replacements and rearrangement, the condition becomes:

$$S^2_{KK}\left(\frac{\iota\phi}{S^{1W}} + \frac{(1-\iota)(1-\phi)}{S^{1F}}\right) - \iota\left(\frac{S^2_K}{S^2}\right)\left(\frac{S^2_K}{S^2}\right) - (1-\iota)\left(-\frac{\iota}{1-\iota}\frac{S^2_K}{S^2}\right)\left(-\frac{\iota}{1-\iota}\frac{S^2_K}{S^2}\right) < -\frac{\iota}{1-\iota}\frac{S^2_K}{S^2}\frac{S^2_K}{S^2} \tag{A.36}$$

$$S^2_{KK}\left(\frac{\iota\phi}{S^{1W}} + \frac{(1-\iota)(1-\phi)}{S^{1F}}\right) - \frac{\iota}{1-\iota}\frac{S^2_K}{S^2}\frac{S^2_K}{S^2} < -\frac{\iota}{1-\iota}\frac{S^2_K}{S^2}\frac{S^2_K}{S^2}. \tag{A.37}$$

Given that at the optimum $S^2_{KK} < 0$ and the parenthesis is positive, the condition holds.

[55] Due to the envelope theorem $\frac{d\pi}{d\iota} = 0$ out of an initial level of $\iota = 0$.

B Data Appendix

B.1 Data Construction

B.1.1 Orbis-ADIAB

For simplicity, we first describe the construction of the Orbis-ADIAB data from IAB below. The construction for our main database is detailes in Appendix Section B.1.2.

Establishment-History-Panel (BHP) Data The Establishment History Panel (Betriebs-Historik-Panel, BHP) data contains aggregations of individual social security records by establishment ID. It is composed of cross-sectional data sets since 1975 for West Germany and 1991 for East Germany. Every cross section contains all establishments in Germany with at least one employee subject to social security on June 30th. Since 1999, also establishments consisting solely of one marginal part-time employee are included. The BHP data contains information about the branch of industry and the location of the establishment. Furthermore, there is the number of employees liable to social security per establishment, as well as marginal part-time employees (since 1999), both in total and broken down by various demographic and skill categories.

Integrated Employment Biographies (IEB) Database The Orbis-ADIAB database contains spells from the Integrated Employment Biographies (IEB), i.e. worker-level information, which for this merged data set is restricted to the years 1990 to 2014. The source is administrative records on employees from the notification process to the social security institutions in Germany as well as from internal processes of the German Federal Employment Agency. Every employer in Germany is obligated to submit at least once a year a notification on each of his employees to the social security institutions. Information submitted includes daily exact information on the start and the end date of employment, along with gender, educational attainment, (qualitative) information on full- or part-time work, occupation, place of residence, and the gross wages paid to the employee for the covered period, among others. If an employee is continuously employed all year, the recorded beginning and end dates of employment are January 1st and December 31st.

Linking the Data Schild (2016) and Antoni et al. (2018) describe the linking process in detail. The data set was created by linking administrative employer-employee data at the establishment level with Orbis financial and production data at the firm level. In a first step, a cross-walk between BvD company IDs and BHP establishments and hence BHP ID was established by applying records linkage techniques based on firms' names, industry and other

characteristics. The match rate for shareholder corporations, i.e. the legal form affected by the reform we study, is the highest among all legal forms at 70.34% (see Schild, 2016; Antoni et al., 2018, , who also describe the linking process and the data set more generally). This BvD ID/establishment ID crosswalk is conducted for cross sections from 2006 to 2014. Based on the resulting crosswalk, additional waves of BHP establishment data for previous years were merged.

Preparation of the Linked Data For the preparation of our final analysis data, we start with the Orbis component of the Orbis-ADIAB data.

1. We exclude all firms with an incorporation date before December 31, 1989. We keep the most recent incorporation date in case there are multiple entries per firm identifier.

2. Our version of the data includes two variables for the incorporation date. One only includes the year of incorporation, while the other contains more detailed information on this date. The detailed variable was extracted from a more recent version of the Orbis database. We restrict the sample to cases in which the year of incorporation in the more recent and detailed variable matches with the year information in the less detailed version of this variable.

3. For the purpose of applying our standard Orbis-based sample restrictions to the pre-Orbis years for which we have IAB matched employer-employee data but no Orbis data (recall that most variables in the Orbis part of the Orbis-ADIAB data are only populated as of 2006, so our ORBIS-ADIAB panel goes back earlier but only for the IAB variables), we extrapolate a given Orbis firm's earliest non-missing Orbis variables to these pre-2006 years. Then, we keep only the firms we observe in the Orbis Historical / WRDS / EBDC / Dafne data (detailed in Appendix Section B.1.2) after we apply our standard sample restrictions and cleaning procedures, which we detail below in Appendix Sections B.2.2 and B.2.3.

4. We aggregate information stemming from the BHP and IEB data to the firm-year level by BvD ID. (For the establishment-level variables, we weight by the establishment's share of total firm employment.)

5. We drop any spells from the worker-level data with earnings of less than 1 Euro per day. We also exclude spells indicating single or lump-sum payments.

6. In order to form occupational groups we rely on the classification introduced by Blossfeld (1987).

7. We construct the firm- and worker-level AKM effects by following Card, Heining, and Kline (2013) but by relying on the firm level rather than establishment-level information and drawing on information from 1990 to 2009. We also conduct this analysis on the basis of the fuller Orbis-ADIAB firm sample before restricting the sample to the firms observed in our main sample, described in Appendix Section B.1.2.

B.1.2 Versions of Bureau van Dijk Orbis Data

This subsection details the construction of our main dataset. To construct the most comprehensive data set of firms' financial information, we draw on several versions of the Bureau van Dijk Orbis data set. **Bureau van Dijk WRDS** data sets are the Orbis data sets pulled from Wharton Research Data Services. **Orbis Historical** data sets have information on additional firms beyond those still included in the BvD data. **EBDC** data sets also have information on firms beyond the 10 years available from BvD and are based on data by the LMU-ifo Economics Business Data Center (EBDC). **Dafne** is a database by Bureau van Dijk with additional information on German firms. Specifically, we draw on the following data sets:

1. **Orbis Historical, legal information**, which contains date of incorporation and corporation type,
2. **Orbis Historical, contact information**, which contains firm location,
3. **Orbis Historical, industry classification**, which contains various industry classifications, including NACE Rev. 2,
4. **Orbis Historical, financial information**, which contains data from income statements and balance sheets,
5. **Orbis Historical, ownership information**, which contains information on shareholders and ultimate owners,
6. **Bureau van Dijk WRDS, ownership**, which also contains information on shareholders and ultimate owners,
7. **Bureau van Dijk WRDS, industry classification**, which contains various industry classifications, including NACE Rev. 2,
8. **Bureau van Dijk WRDS, managers**, which contains information on members of supervisory and executive boards,

9. **EBDC, financial and contact information**, which contains the date of incorporation, corporation type, industry classifications, and information from income statements and balance sheets.

10. **Dafne, trade register entry information**, which contains the date of the firm's first entry into the German Trade Register (*Handelregister*) in the Dafne data set.

B.1.3 Preparing the Financial Data Sets

We begin by identifying the ID numbers of firms incorporated from 1990 through 1999 in both the Orbis Historical and EBDC financial data sets.

We then de-duplicate the financial data for these firms so that there is one observation per year for each firm:

1. Unconsolidated reports take precedence over consolidated reports.

2. If the firm-year has an unconsolidated statement with a consolidated companion (consolidation code: U2) and an unconsolidated statement without a consolidated companion (consolidation code: U1), take the latter.

3. If there are two unconsolidated statements of the same type, take the one that is filed as an annual report.

4. If there are still duplicates within firm-year, take the statement with the latest date in the year.

For the Orbis Historical financial data, we then merge the Orbis Historical and Bureau van Dijk WRDS industry classification files using the BvD ID, specifically the NACE Rev. 2 designations. If the industry classification is missing from the Orbis Historical file, we fill it in with the Bureau van Dijk WRDS file.

B.1.4 Pooling Orbis Historical and EBDC Financial Data Sets

We then pool the Orbis Historical and EBDC financial data. If a firm-year observation exists in both files and has non-missing information in both, we prioritize the (larger and better filled) Orbis Historical data.

For the industry classifications, this then means that our order of priority for industry classification is Orbis Historical, Bureau van Dijk WRDS, and then EBDC.

B.1.5 Incorporation Date Adjustment

Some firms have different incorporation dates in the Orbis Historical and EBDC data sets. In this case, we take the earlier incorporation date.

The 1994 reform of the Corporation Law stipulates that the incorporation date relevant to the worker representation mandate is the date of entry into the German Trade Register (*Handelsregister*). In the 1990s, the firm's date of trade register entry could regularly be up to a few months after the establishment date of its charter (*Feststellung der Satzung*).

To use the most accurate legally relevant incorporation date, we replace the incorporation date in the Orbis Historical/EBDC data sets with the date of first trade register entry from the Dafne dat aset if the date of first trade register entry is within one year (365 days) of the firm's assigned incorporation date. If the Dafne date is more than a year before or after the incorporation date in the Orbis Historical/EBDC data sets, we assume that the first trade register entry date reported in the Dafne data set is not the true first entry date.

B.1.6 Board Composition Data

We use information on board composition from the Bureau van Dijk WRDS data set, which is a cross section from 2018 at the individual-position-firm level. We have access to a similar data set from Orbis Historical, but there were fewer firms and observations were often unfilled. After isolating firms incorporated in the 1990s, we take the following steps to adjust the data to the firm level:

1. We label any position with the words "Aufsichtsrat" or "Supervisory Board" as a supervisory board position. Individuals with both supervisory and non-supervisory positions make up only 0.15% of the data and are dropped. We can then aggregate the data to the firm-individual level, where each individual is either supervisory or non-supervisory.

2. We calculate **tenure** as the number of years between the individual's earliest appointment date and 2018.

3. We calculate **size** as the number of individuals in supervisory and non-supervisory positions.

4. We label individuals as **a PhD/professor** if their name contains "Prof", "Professor", "Doktor", or "Dr."

5. We label **aristocratic names** as those with "von", "v." "Graf", "Gräfin", "Baron", "Baronin", "Freiherr", "Frhr", "Freifrau", "Frfr", or "zu".

6. We identify **gender** from a gender indicator in the data set.

7. We then are able to aggregate to the firm level and thereby measure shares and presence of various groups in supervisory and non-supervisory boards.

B.1.7 Ownership Data

We use information on ownership, i.e. shareholders, from both the Bureau van Dijk Orbis Historical and the Bureau van Dijk WRDS data sets. The procedure to obtain the state and family ownership conditions in each data set is described below. Using the Orbis Historical data set, we additionally drop firms classified as branches from our analysis.

Bureau van Dijk Orbis Historical We first obtain shareholder-subsidiary links, which are separated by year into eleven different files for the period 2007 to 2017. We consider both archived and active links and loop over each file.

We use the GUO 50 variable, which identifies the Global Ultimate Owner of the firm that directly or indirectly controls more than 50% of the voting stock, to identify shareholders classified as "Public Authorities, States, Governments". These are type-S shareholders in the Orbis Historical database. We then tag all firms whose domestic ultimate owner possessing more than 50% of the firm was a type-S shareholder at any point in time. Our state ownership restriction excludes these tagged firms from the analysis.

To construct the 100% family ownership variable, we consider **both direct and indirect ownership**, since a firm can assert the same codetermination exception through indirect ownership (i.e. through an intermediate firm). We can observe the percentage of direct or indirect ownership by year associated to a shareholders BvD ID. First, we drop all firms not classified as AGs or GmbHs. We only consider global ultimate shareholder links classified as families or individuals and obtain their last name. In practice, this is usually the first word of the shareholder name, since the naming convention in the Orbis Historical Ownership files is to order last names first. There are two general exceptions to this that we identified. The first occurs when family names are listed as, e.g. "Familie Porsche". A second exception applies to last names beginning with the word "von". In both of these cases, we simply take the second word in the shareholder name to obtain shareholder last name.

We then aggregate the percentage of direct or indirect ownership by firm, year, and last name. To deal with rounding issues we compute direct or indirect ownership across all shareholders to see if the percentages either add to 100 exactly or to a number between

99.9 (inclusive) and 100. In the second case, if the total for same last name and the total for all shareholders add to the exact same number, we assume there was a rounding error and treat the firm as if it were 100% owned by a single family. This is consistent with the procedure we employed for the WRDS data below. We tag the firms whose aggregate direct or indirect ownership percentage by firm, year, and last name equal 100%. Our family ownership restriction excludes these tagged firms from the analysis.

In addition to the above, we tag firms classified as "Branch" independently of their status as shareholder or non-shareholder corporations. These are type-Q shareholders in the Orbis Historical database. Our branch restriction excludes these tagged firms from the analysis.

Bureau van Dijk WRDS After isolating firms incorporated between 1989 and 1999, we take the following steps to adjust the data to the firm level:

1. A variable contains the share that each shareholder owns in the firm. We convert the non-numerical designations:
   - We remove the symbols >, <, and ±.
   - We convert the following designations to 100%:
     - WO (wholly owned)
     - VE (vessel), which does not appear in our ownership file
     - T (sole trader)
     - FC (foreign company), i.e. marking a foreign firm
   - We convert "NG" (negligible) to 0.01%.
   - We convert "MO" (majority-owned) and "CQP1" (50% + 1 share) to 50.01%.
2. We identify **state shareholders** as those with shareholder type S (public authorities, states, governments) or those with "KfW Bankengruppe" in their name. The KfW is a German state-owned development bank. We consider the total share owned by these shareholders as the **proportion state-owned** in the firm.
3. We define family ownership in two ways:
   (a) If there is only one shareholder, and that shareholder is of shareholder type I (one or more known individuals or families), then the firm is defined as fully family-owned.
   (b) Take the last name of all shareholders of shareholder type I (one or more known individuals or families). In practice, this is the last word of the shareholder name,

since this is either an individual's last name or the family name only (e.g. "Familie Porsche"). Sum the shares owned by each last name for each firm. If a firm has at least 99.99% of all shares owned by one last name, then we designate it as fully family-owned. If it has at least 50% of all shares owned by one last name, we designate it as partially family-owned.

4. We then sum all shares owned by the state and by individuals, aggregating to the firm level.

B.2 Sample Construction

We then construct our analysis sample from the merged Orbis Hitorical / WRDS / EBDC / Dafne data set.

B.2.1 Corporation Type

Before cleaning, we keep all firms ever labeled as one of the following corporation types:

Shareholder corporations

- *Aktiengesellschaft* (Public limited company)
- *KGaA* (Limited partnership by shares)
- *GmbH & Co. KGaA* (Limited liability company and partnership by shares)

Non-shareholder corporations

- *GmbH* (Limited liability company)
- *GmbH & Co. KG* (Limited liability company and partnership)

Our standard analysis sample uses all observations where firms are labeled as one of these corporation types, but we keep all observations for all firms labeled as one of these corporations in their earliest observation and at their earliest (pre-trade register entry adjustment) incorporation date.

B.2.2 Sample Cleaning Procedure

After adding the board composition and ownership data sets, we construct our sample as described below, broadly following the criteria in Gopinath et al. (2017) where applicable to our data set. We slightly depart from the cleaning procedure in Gopinath et al. (2017) in three ways. First, we generally set variable values to missing instead of dropping firm-year

observations. Second, for the internal consistency of balance sheet information, we set each of the variable values in the numerator to missing if the values of the ratios are outside of the $[0.999, 1.001]$ interval, as opposed to dropping firm-year observations that are below the 0.1 percentile or above the 99.9 percentile of the distribution. Third, we also set fixed assets, added value, and wage bill to missing if zero or negative. We detail our sample cleaning procedure as follows:

1. Drop if number of months is less than 12 or observation year precedes incorporation year
2. Set total assets to missing if zero or negative
3. Set operating revenues to missing if zero or negative
4. Set employment to missing if negative
5. Set employment to missing if greater than 2 million
6. Set sales to missing if negative
7. Set tangible assets to missing if negative
8. Set fixed assets to missing if zero or negative
9. Set added value to missing if zero or negative
10. To check for the for the internal consistency of balance sheet information, we generate the following ratios from BvD variables and set the variables in the numerator to missing if less than 0.999 or greater than 1.001, i.e. if the sum is more than 0.1% away from the composite value.
    (a) (Tangible assets + Intangible assets + Other fixed assets) / Fixed assets
    (b) (Stocks + Debtors + Other current assets) / Current assets
    (c) (Fixed assets + Current assets) / Total assets
    (d) (Capital + Other shareholders' funds) / Shareholders' funds
    (e) (Long-term debt + Other non-current liabilities) / Non-current liabilities
    (f) (Loans + Creditors + Other current liabilities) / Current liabilities
    (g) (Non-current liabilities + Current liabilities + Shareholders' funds) / Total shareholders' funds and liabilities
    (h) (EBIT + Depreciation) / EBITDA

11. Set shareholders' funds, total shareholders' funds and liabilities to missing if Total shareholders' funds and liabilities less than Shareholder's funds

12. Generate the following ratio and set all variables in construction to missing if less than 0.9 or greater than 1.1

    (a) (Total shareholders' funds and liabilities - Shareholders' funds) / (Current liabilities + Non-current liabilities)

    (b) (Total assets - Current liabilities - Non-current liabilities) / Shareholders' funds

13. Set to missing if any of the following is negative:

    (a) Current liabilities

    (b) Non-current liabilities

    (c) Current assets

    (d) Loans

    (e) Creditors

    (f) Other current liabilities

    (g) Long-term debts

14. Set long-term debts and liability variables to missing if long-term debts are larger than total liabilities (Current liabilities + Non-current liabilities)

15. Set to missing if wage bill is negative or zero

16. Set to missing if intangible assets are negative

17. Set to missing if tangible assets are zero or missing

18. Set to missing tangible assets if tangible assets are larger than total assets

19. Set to missing if depreciation is negative

20. Construct operating expenses by subtracting EBIT from Operating revenue. Set operating revenue and EBIT to missing if this value is negative or at or above the 99th percentile.

21. Set PLAT and Extraordinary P/L to missing if Extraordinary P/L is exactly equal to PLAT

22. Generate the following ratios and set variables in the construction to missing if it's less than the 0.1th percentile or 99.9th percentile

    (a) Capital / Wage bill

    (b) Tangible assets / Shareholders' funds

    (c) Total assets / Shareholders' funds

23. Set to missing if Shareholders' funds are negative

24. Set other shareholders' funds to missing if Other shareholders' funds is less than the 0.1th percentile

25. Set operating revenue and material costs to missing if operating revenue - material costs are negative

26. Generate the following ratio and set variables in construction to missing if it's less than the 1st percentile or larger than 1.1

    (a) Wage bill / (Operating revenue - Material costs)

27. Set current liabilities, non-current liabilities, long-term debts, and laons to missing if the fraction of total liabilities (Current liabilities + Non-current liabilities) composed of debt (Long-term debt + Loans) is greater than 0% but no more than 1%.

B.2.3 Sample Restrictions

After cleaning and variable construction, we drop the following industries that are either characterized by heavy state involvement or comprised of non-profit or media firms largely exempt from one-third codetermination (§1 (2) *DrittelbG*)[56]:

- Electricity, gas, steam and air conditioning supply (NACE 35)
- Water collection, treatment and supply (NACE 36)
- Sewerage (NACE 37)
- Waste collection, treatment and disposal activities; materials recovery (NACE 38)
- Passenger and freight rail transport (NACE 491 and 492)

[56]Specifically, §1 (2) *DrittelbG* exempts enterprises that predominantly pursue political, coalitional (labor or employer representation), religious, charitable, educational, scientific or artistic goals as well as media organizations.

- Publishing: newspapers and magazines (NACE 5813)
- Broadcasters (NACE 60)
- Scientific Activities (NACE 72)
- Public administration and defence; compulsory social security (NACE 84)
- Education (NACE 85) excluding driving and flying schools (NACE 8553)
- Charities (NACE 87 and 88)
- Activities of membership organisations (NACE 94)
- Activities of households as employers of domestic personnel (NACE 97)
- Undifferentiated goods-and services-producing activities of private households for own use (NACE 98)
- Activities of extraterritorial organisations and bodies (NACE 99)

We then drop firms with more than 50% state ownership, as well as Deutsche Telekom, Deutsche Bahn, and Deutsche Post DHL (the formerly state-owned telecommunications, railway and postal service firms that were privatized in the mid-1990s), as well as the subsidiaries of these firms that we can identify in the data. To do so, we drop firms that have a Domestic Ultimate Ownership link indicating more than 50% ownership by a government entity.

In a similar fashion, we eliminate 78 firms from our analysis on the basis of one of the following criteria:

- Their links to Deutsche Telekom, Deutsche Bahn, or Deutsche Post DHL (where examples include "DB Station & Service Aktiengesellschaft", "Deutsche Telekom Strategic Investments GmbH", "Deutsche Post Grundstücks-Vermietungsgesellschaft beta mbH", etc.); and
- Their contact information indicating their legal residence is outside of Germany (this drops exactly one firm in the Orbis data)

We also drop shareholder corporations wholly owned by individuals with the same last name. The reason is that even before 1994, the law always exempted shareholder corporations wholly owned by one family from one-third codetermination so that such firms were not affected by the 1994 reform. We describe how we identify such family shareholder corporations in Appendix Section B.1 above.

We then exclude all remaining not-for-profit or firms in the data if we can observe their not-for-profit legal status in their names as non-profits are largely exempt from one-third codetermination (§1 (2) *DrittelbG*). In Germany, not-for-profit status can be inferred by observing a letter "g" prefixed to the corporation type "AG" or "GmbH". We thus exclude all firms where we can find either a "gAG" or "gGmbH" string in their name.[57]

Lastly, we drop all firms classified as branches by either the WRDS or the Orbis Historical sources, as well as firms with fewer than 10 employees as locked-in firms with very few employees are exempt from board-level codetermination (Müller-Glöge et al., 2019, DrittelbG §1 Rn. 8).

B.3 Variable Construction

B.3.1 Financial Variables

After cleaning, we construct the following financial variables.

- Debt = Loans + Long-term Debt
- Non-Debt Liabilities = Current Liabilities + Non-Current Liabilities - Debt
- Labor Share = $\frac{\text{Wage Bill}}{\text{Value Added}}$
- Net Cash Flow from Financial Activities
$$= \frac{\text{1-Year Change in Capital} + \text{1-Year Change in Debt}}{\text{Total Assets}}$$
- Cost of Debt = $\frac{\text{Interest Paid}}{\text{Debt}}$
- Leverage = $\frac{\text{Debt}}{\text{Debt+Shareholders' funds}}$
- KZ Index
$$= -1.001909\left(\frac{\text{Profit after Tax (before Extraordinary Items)} + \text{Depreciation}}{\text{Lagged Tangible Fixed Assets}}\right)$$
$$+ 0.2826389\left(\frac{\text{Total Assets - Capital} + \text{Market Value of Equity}}{\text{Total Assets}}\right)$$
$$+ 3.139193\left(\frac{\text{Long Term Debt} + \text{Current Loans}}{\text{Long Term Debt} + \text{Current Loans} + \text{Capital/Shareholder Fund}}\right)$$
$$- 39.3678\left(\frac{\text{Dividends}}{\text{Lagged Tangible Fixed Assets}}\right)$$
$$- 3.139193\left(\frac{\text{Cash}}{\text{Lagged Tangible Fixed Assets}}\right)$$
- HP Index = -0.737(Log (Inflation Adjusted) Total Assets)
$+ 0.043$(Log (Inflation Adjusted) Total Assets)$^2 - 0.040$(Yeas since Incorporation as AG)
- WW Index
$$= -0.091\left(\frac{\text{Profit after Tax (before Extraordinary Items)} + \text{Depreciation}}{\text{Total Assets}}\right)$$

[57] Only few firms carry the "gAG" prefix in our data, therefore our industry restrictions described above are more relevant for excluding firms not subject to codetermination.

$$
\begin{aligned}
&- 0.062(\text{Dummy for positive Dividend}) \\
&+ 0.021(\frac{\text{Long Term Debt}}{\text{Total Assets}}) \\
&- 0.044(\text{Log Total Assets}) \\
&+ 0.103(\text{Average Industry (similar to 3 digit SIC) Growth in } \frac{\text{Turnover - Lagged Turnover}}{\text{Lagged Turnover}}) \\
&- 0.035(\frac{\text{Turnover - Lagged Turnover}}{\text{Lagged Turnover}})
\end{aligned}
$$

- Z-Score for Public Firms

$$
\begin{aligned}
&= 0.012(\frac{\text{Working Capital}}{\text{Total Assets}}) \\
&+ 0.014(\frac{\text{Other Shareholders Funds}}{\text{Total Assets}}) \\
&+ 0.033(\frac{\text{EBIT}}{\text{Total Assets}}) \\
&+ 0.006(\frac{\text{Market Value of Equity}}{\text{Total Shareholder Funds and Liabilities - Shareholders Funds}}) \\
&+ 0.999(\frac{\text{Turnover}}{\text{Total Assets}})
\end{aligned}
$$

- Z-Score for Private Firms

$$
\begin{aligned}
&= 0.717(\frac{\text{Working Capital}}{\text{Total Assets}}) \\
&+ 0.847(\frac{\text{Other Shareholders Funds}}{\text{Total Assets}}) \\
&+ 3.107(\frac{\text{EBIT}}{\text{Total Assets}}) \\
&+ 0.420(\frac{\text{Shareholders Funds}}{\text{Total Shareholder Funds and Liabilities - Shareholders Funds}}) \\
&+ 0.998(\frac{\text{Turnover}}{\text{Total Assets}})
\end{aligned}
$$

- Z-Score four variable for Private Firms

$$
\begin{aligned}
&= 3.25 + 6.56(\frac{\text{Working Capital}}{\text{Total Assets}}) \\
&+ 3.26(\frac{\text{Other Shareholders Funds}}{\text{Total Assets}}) \\
&+ 6.72(\frac{\text{EBIT}}{\text{Total Assets}}) \\
&+ 1.05(\frac{\text{Shareholders Funds}}{\text{Total Shareholder Funds and Liabilities - Shareholders Funds}})
\end{aligned}
$$

- O-Score

$$
\begin{aligned}
&= -1.32 \\
&- 0.407(\text{Log (Inflation Adjusted) Total Assets}) \\
&+ 6.03(\frac{\text{Total Shareholder Funds and Liabilities - Shareholders Funds}}{\text{Total Assets}}) \\
&- 1.43(\frac{\text{Working Capital}}{\text{Total Assets}}) \\
&+ 0.0757(\frac{\text{Current Liabilities}}{\text{Current Assets}}) \\
&- 2.37(\frac{\text{Profit (Loss) for Period}}{\text{Total Assets}}) \\
&- 1.83(\frac{\text{Profit before Taxes + Depreciation}}{\text{Total Shareholder Funds and Liabilities - Shareholders Funds}}) \\
&+ 0.285(\text{Indicator for (Lagged Profit for Period + Two Period Ago Profit for Period)} < 0) \\
&- 1.72(\text{Indicator for (Total Shareholder Funds and Liabilities - Shareholders Funds)} > \text{Total Assets}) \\
&- 0.521(\frac{\text{Profit for Period - Lagged Profit for Period}}{\text{Abs(Profit for Period) + Abs(Lagged Profit for Period)}})
\end{aligned}
$$

- Dummy Low Reserves $= \mathbb{1}_{\{\text{Other Shareholders Funds} < 0.1 * \text{Capital}\}}$

- Dummy Negative Profit $= \mathbb{1}\{\text{Profit for Period} < 0\}$
- Dummy RE more than 1/2 CE $= \mathbb{1}\{\text{Other Shareholders Funds} \geq 0.5 * \text{Capital}\}$
- Retained Profit Share$_t = \dfrac{\text{Other Shareholders Funds}_{t+1} - \text{Other Shareholders Funds}_t}{\text{Profit for Period}_t}$
- Retained Profit Share Excluding Profits$_t$
  $= \dfrac{\text{Other Shareholders Funds}_{t+1} - \text{P/L for Period}_{t+1} - \text{Other Shareholders Funds}_t + \text{P/L for Period}_t}{\text{P/L for Period}_t}$
- Retained Earnings$_t = \dfrac{\text{Other Shareholders Funds}_t}{\text{Total Assets}_t}$
- Average Debt Maturity$_t = \dfrac{\text{Long Term Debt}_t + \text{Loans}_t}{\text{Loans}_t}$

B.3.2 TFP Construction

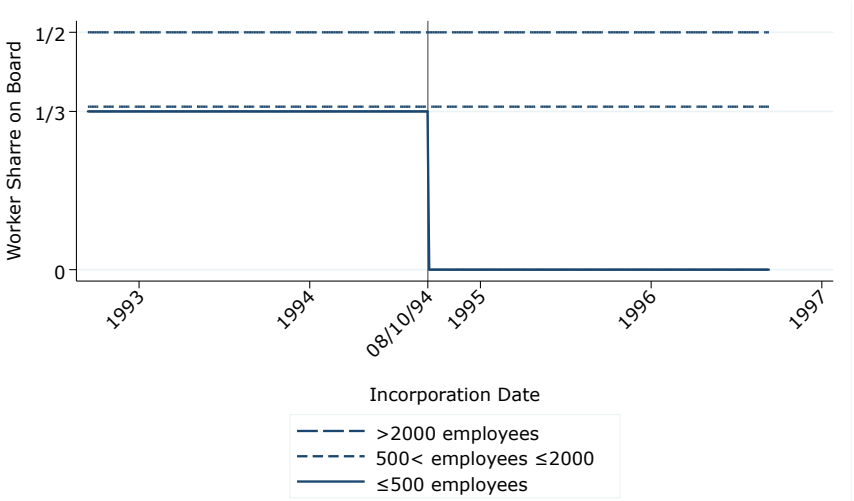
Using the sample of firms incorporated five years around the reform cutoff date (i.e. 1989 to 1999), we keep all observations between 2005 and 2015 with non-missing values for industry classification, wage bill, and value-added. We apply the sample restrictions described in Appendix Section B.2.3. We then calculate industry-specific labor shares:

1. For each 2-digit NACE industry j and year t, we calculate the total wage bill and total value-added and divide the first by the second. Call this α_{jt}.
2. Within j, we replace any $\alpha_{jt} \geq 1$ with the highest α_{jt} among all t that is less than 1.
3. We calculate the industry-specific average share α_j across all years t.
4. We then merge these industry-specific values back into the sample and calculate TFP based on fixed assets for every firm i of industry j and year t:
   (a) $\text{TFP}_{it}^{\text{Fixed A.}} =$
   $\log(\text{Value Added}_{it}) - \alpha_j \log(\text{Employment}_{it}) - (1 - \alpha_j) \log(\text{Fixed Assets}_{it})$

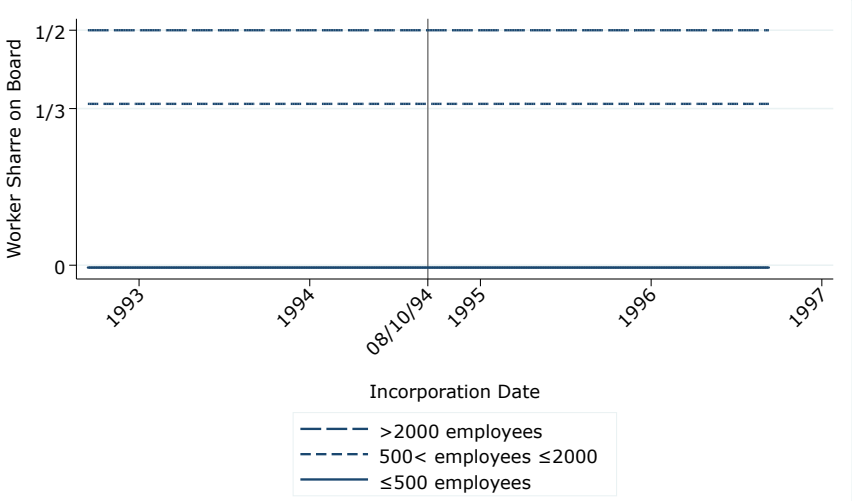
C Additional Figures

Figure C.1: Shared Governance on Supervisory Board by Incorporation Date

(a) Shareholder Corporations



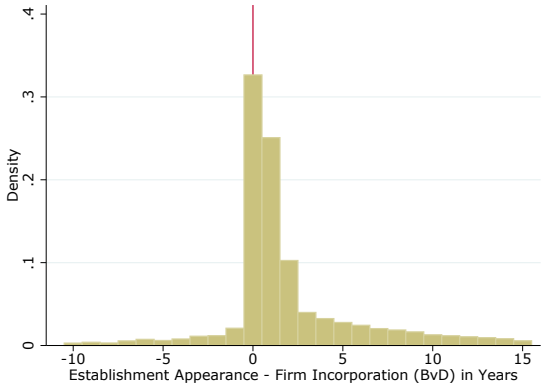
(b) Non-Shareholder Corporations



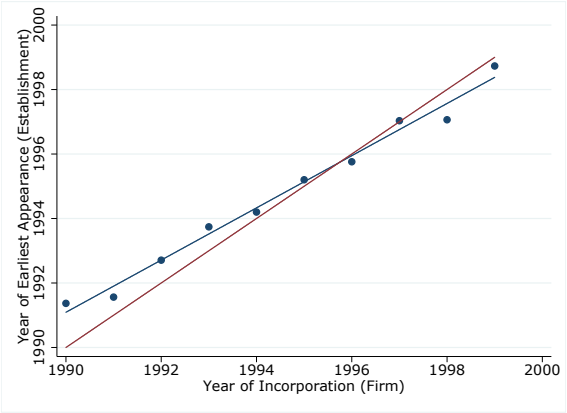
Note: The figure illustrates the worker share on the supervisory board by incorporation date as mandated by codetermination law (*MitbestG* and *DrittelbG*). Shareholder corporations incorporated before August 10, 1994 are mandated to have one-third worker representation on the supervisory board and parity if they have more than 2000 employees. Family firms with fewer than 500 employees are exempt from shared governance unless they reach 500 employees. Shareholder corporations incorporated on or after August 10, 1994 cannot have workers on the supervisory board if they have fewer than 500 employees and are mandated to have one-third worker representation on the supervisory board between 500 and 2000 employees and parity if they have more than 2000 employees. The rules for non-shareholder corporations broadly resemble those for shareholder corporations incorporated on or after August 10, 1994. See Section 3 for more information.

Figure C.2: Validation Exercises in Administrative Data

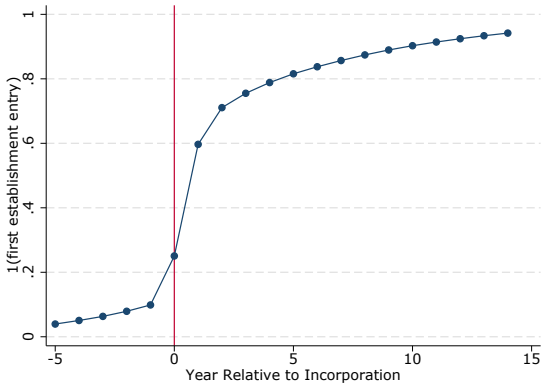
(a) Histogram of First Appearance Date of Establishments - Firms' Incorporation Dates



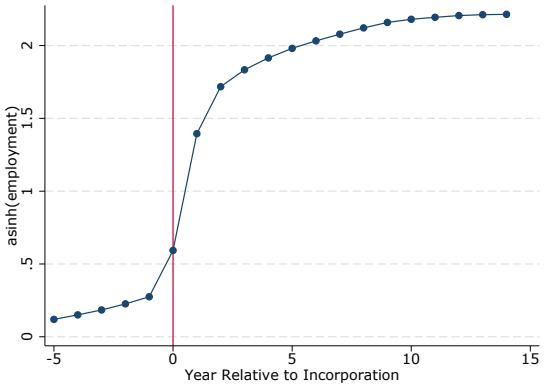
(b) First Appearance Date of Establishments Plotted Against Firms' Incorporation Dates



(c) Establishment Entry Around Incorporation



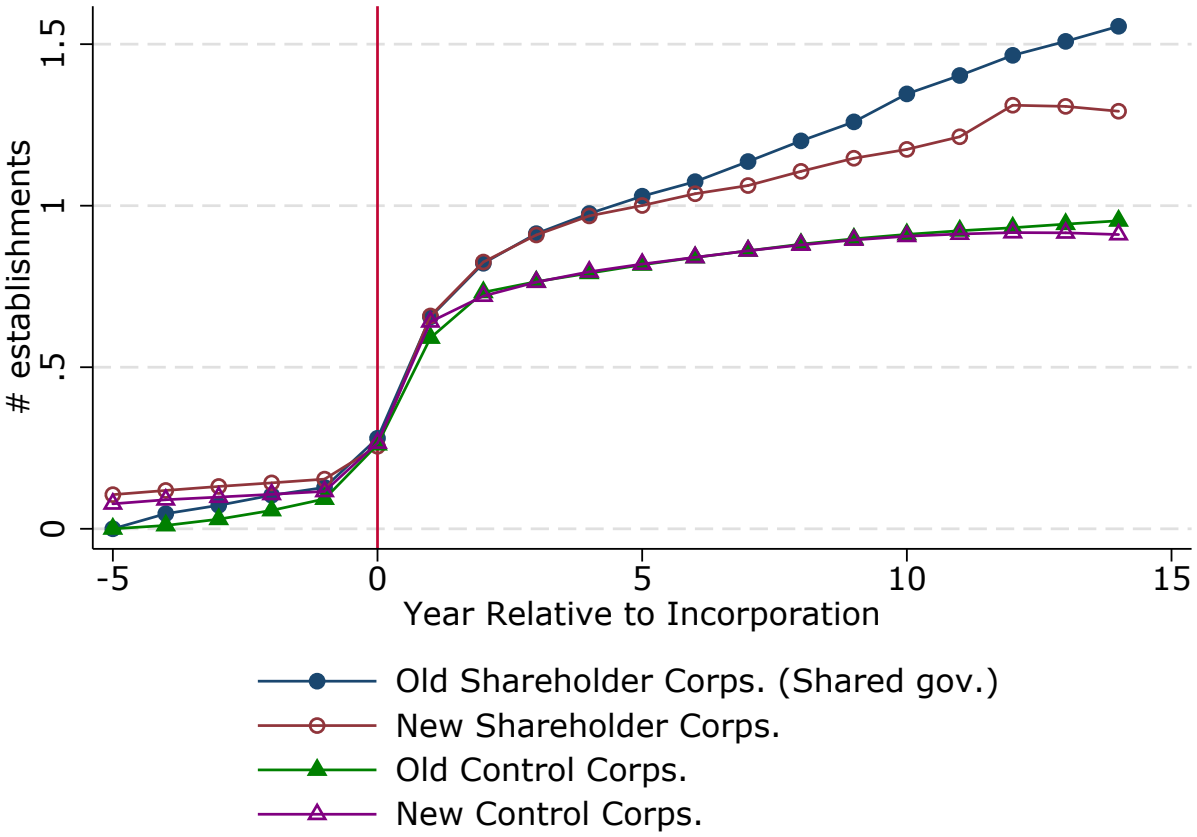
(d) Employment (arcinsh) Around Incorporation



(e) Employment in Orbis and IAB

Note: The figure is based on the Orbis-ADIAB data and shows data for firms incorporated in the 1990s. Panel (a) plots a histogram of the difference between the first appearance of an establishment associated with a firm and that firm's incorporation date. Panel (b) shows the average date of the first appearance of an establishment by firm's incorporation date. Panel (c) plots an indicator for the existence of an associated establishment in the administrative data around a firm's legal incorporation date. Panel (d) plots employment (arcinsh) in the administrative data around a firm's legal incorporation date. Panel (e) plots log employment in the IAB data against log employment in Orbis. The employment concepts differ as Orbis typically includes global employment numbers so that firms with a high share of employment abroad will report larger numbers in Orbis than in the IAB data. In (e), we further plot two regression lines: one for the whole sample and one where we drop observations outside the 10th and 90th percentile of the Orbis employment distribution for robustness against outliers due to differing employment concepts in the two data sets.

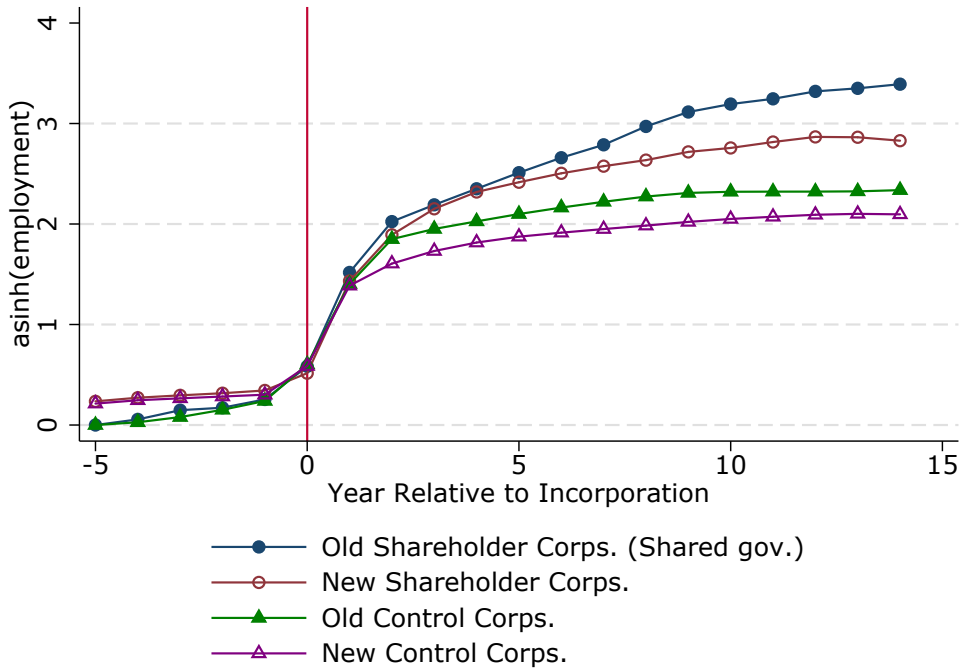
Figure C.3: Time Series of Establishments Relative to Incorporation



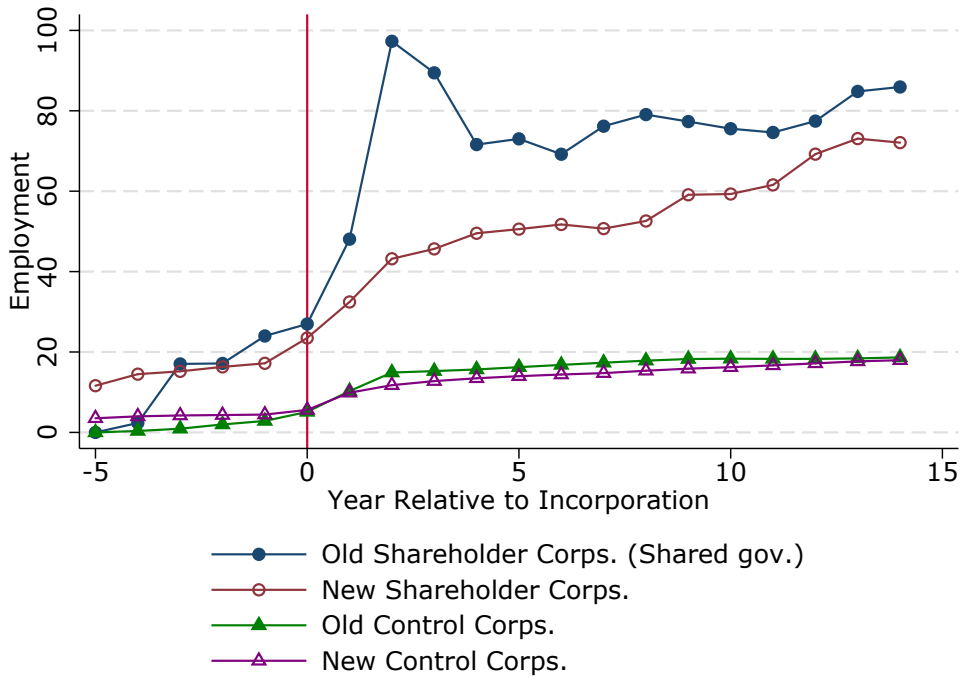
Note: The figure is based on the Orbis-ADIAB data and shows the average number of establishments for firms incorporated in the 1990s. Employment is set to zero when no establishment is observed. The navy line plots the number of establishments for shareholder corporations incorporated before August 10, 1994 and the maroon line the number for shareholder corporations incorporated after the cutoff date.

Figure C.4: Time Series of Employment Relative to Incorporation

(a) arcinsh(Employment)



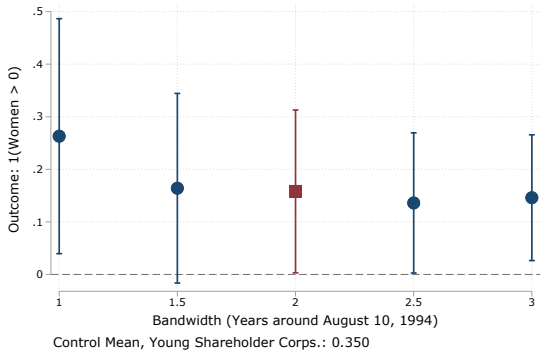
(b) Employment



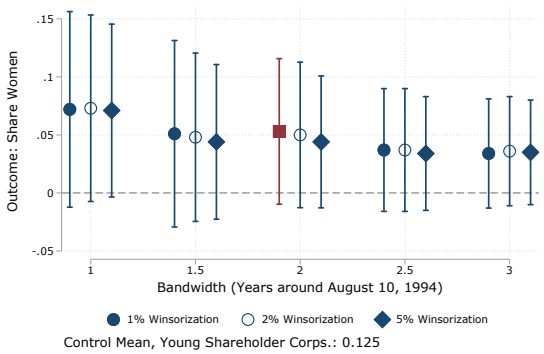
Note: The figure is based on the Orbis-ADIAB data and shows employment data for firms incorporated in the 1990s. Panels (a) and (b) plot employment as arcinsh(employment) and in levels, respectively. The navy line plots employment for shareholder corporations incorporated before August 10, 1994 and the maroon line employment for shareholder corporations incorporated after the cutoff date.

Figure C.5: Effect of Shared Governance on Supervisory Board Composition

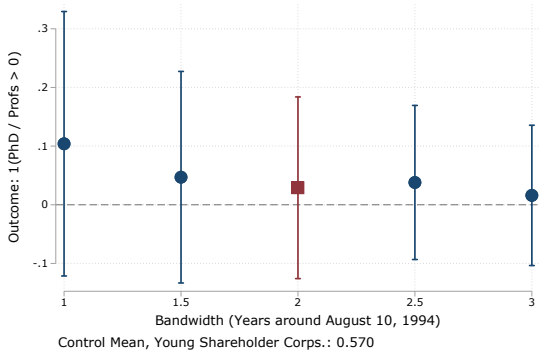
(a) 𝟙(Woman on Board)



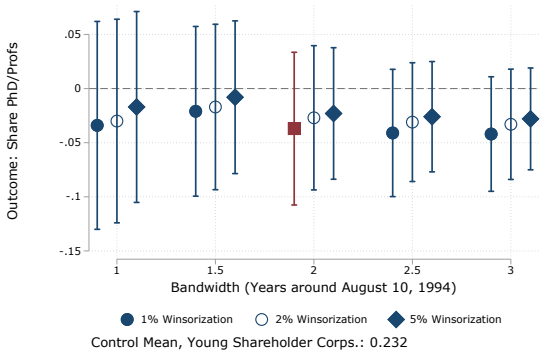
(b) % Women on Board



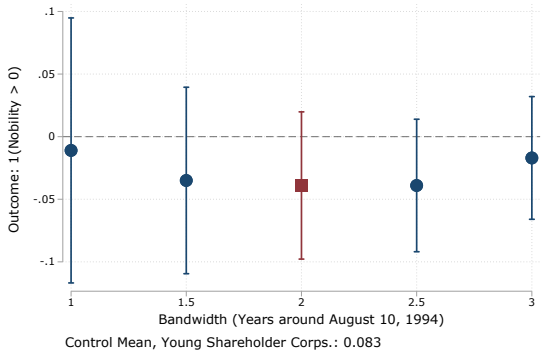
(c) 𝟙(Doctorate Holder on Board)



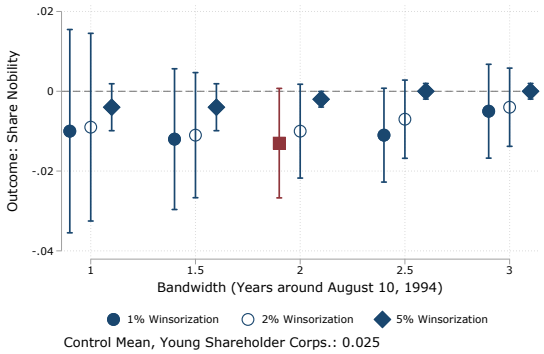
(d) % Doctorate Holder on Board



(e) 𝟙(Aristocrat on Board)



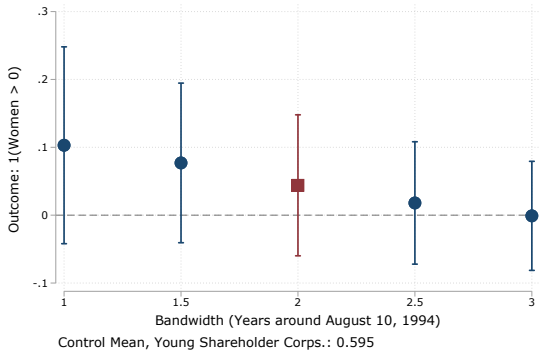
(f) % Aristocrats on Board



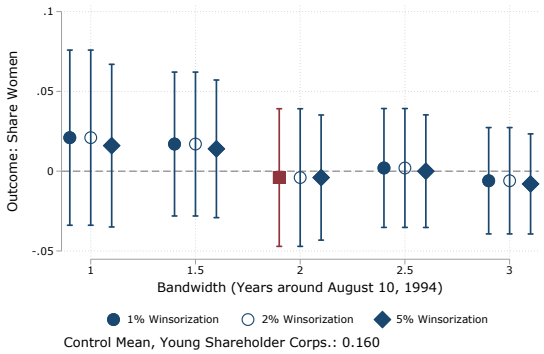
Note: The figure plots difference-in-differences estimates of the reduced-form effect of shared governance on supervisory board composition at different bandwidths of incorporation dates relative to August 10, 1994 and different winsorization levels. All specifications include industry fixed effects. The square maroon marker denotes our preferred 2-year bandwidth and 1% winsorization specification. Indicator outcomes are not winsorized. The vertical bars denote confidence intervals based on standard errors clustered at the firm level.

Figure C.6: Effect of Shared Governance on Executive Board Composition

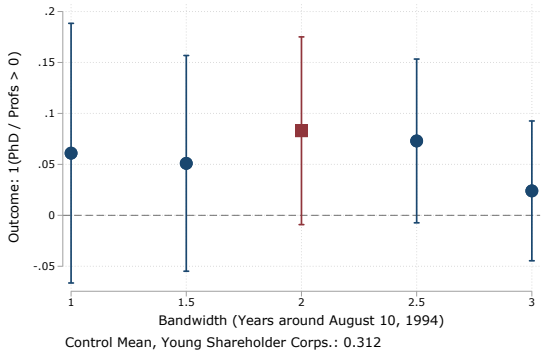
(a) 𝟙(Woman on Board)



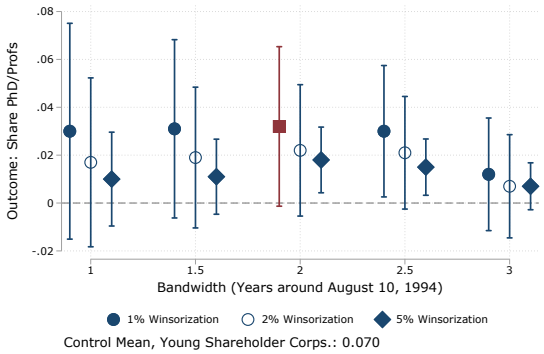
(b) % Women on Board



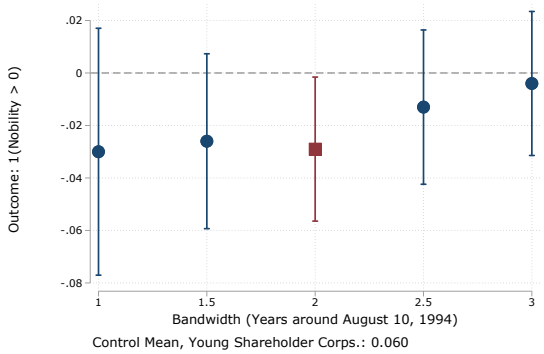
(c) 𝟙(Doctorate Holder on Board)



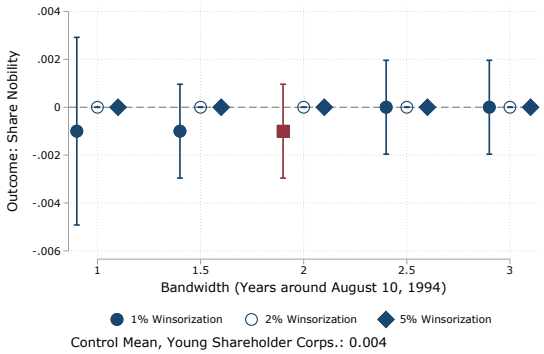
(d) % Doctorate Holder on Board



(e) 𝟙(Aristocrat on Board)



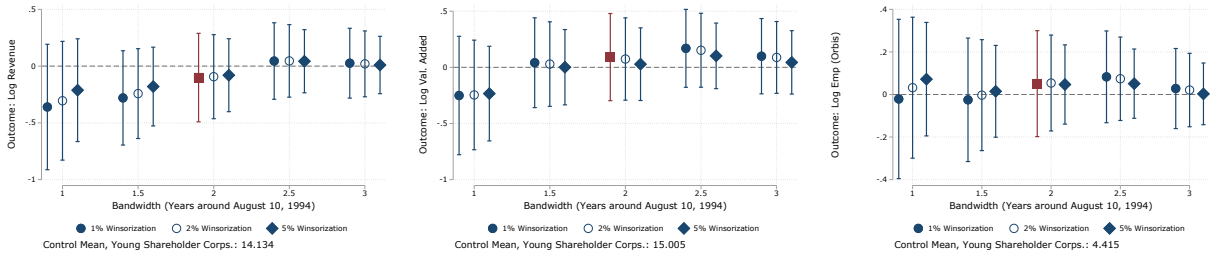
(f) % Aristocrats on Board



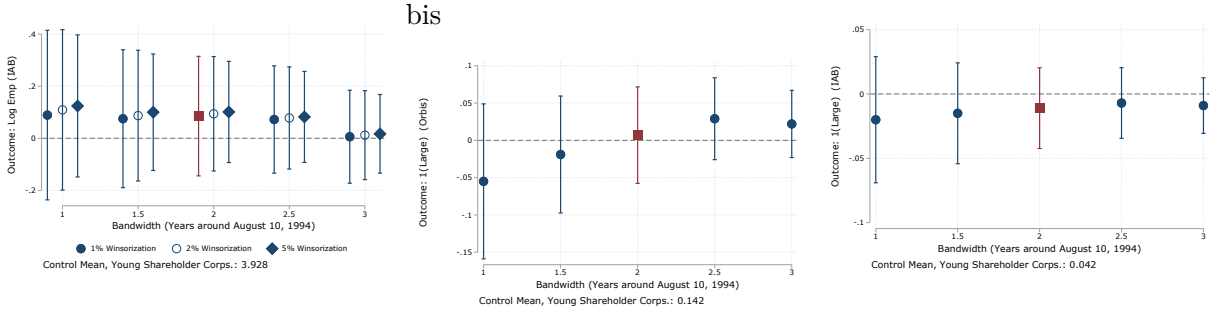
Note: The figure plots difference-in-differences estimates of the reduced-form effect of shared governance on executive board composition at different bandwidths of incorporation dates relative to August 10, 1994 and different winsorization levels. All specifications include industry fixed effects. The square maroon marker denotes our preferred 2-year bandwidth and 1% winsorization specification. Indicator outcomes are not winsorized. The vertical bars denote confidence intervals based on standard errors clustered at the firm level.

Figure C.7: Effect of Shared Governance on Scale

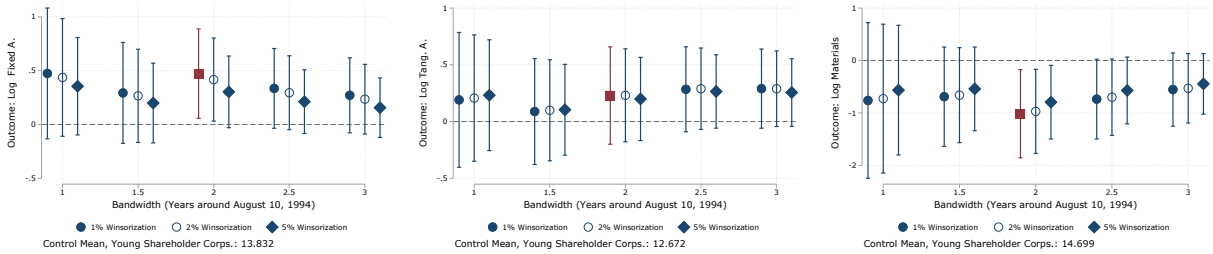
(a) Revenue (Log) (b) Value Added (Log) (c) Employment (Log), Orbis



(d) Employment (Log), IAB (e) $\mathbb{1}$(Employment $>$ 500), Orbis (f) $\mathbb{1}$(Employment $>$ 500), IAB



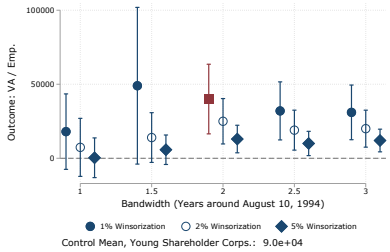
(g) Fixed Assets (Log) (h) Tangible Assets (Log) (i) Materials (Log)



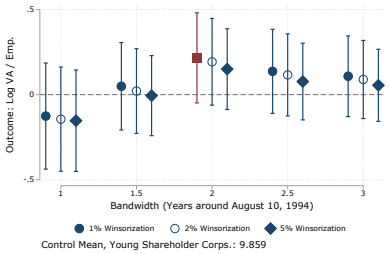
Note: The figure plots difference-in-differences estimates of the reduced-form effect of shared governance on firm scale at different bandwidths of incorporation dates relative to August 10, 1994 and different winsorization levels. The square maroon marker denotes our preferred 2-year bandwidth and 1% winsorization specification. Indicator outcomes are not winsorized. All specifications include industry-by-year fixed effects. The IAB label denotes outcomes from Orbis-ADIAB data. The vertical bars denote confidence intervals based on standard errors clustered at the firm level.

Figure C.8: Effect of Shared Governance on Productivity and Capital Intensity

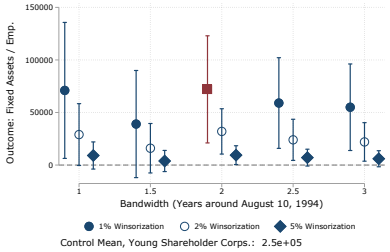
(a) Value Added per Worker



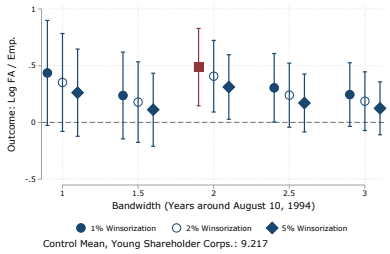
(b) Value Added per Worker (Log)



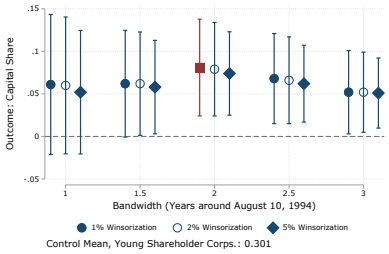
(c) Fixed Assets per Worker



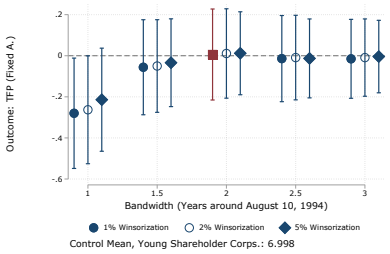
(d) Fixed Assets per Worker (Log)



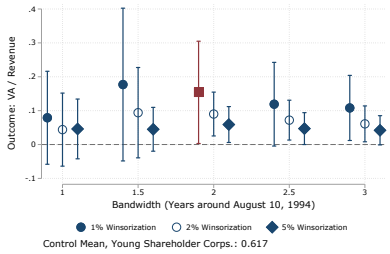
(e) Capital Share



(f) TFP (Fixed Assets)



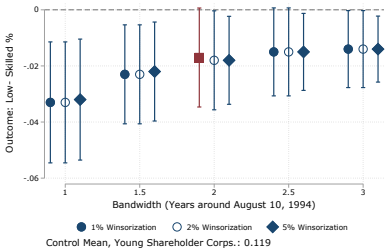
(g) Value Added / Revenue



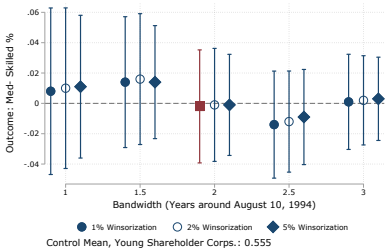
Note: The figure plots difference-in-differences estimates of the reduced-form effect of shared governance on productivity at different bandwidths of incorporation dates relative to August 10, 1994 and different winsorization levels. All specifications include industry-by-year fixed effects. The square maroon marker denotes our preferred 2-year bandwidth and 1% winsorization specification. The vertical bars denote confidence intervals based on standard errors clustered at the firm level.

Figure C.9: Effect of Shared Governance on Skill Structure (Matched Employer-Employee Data)

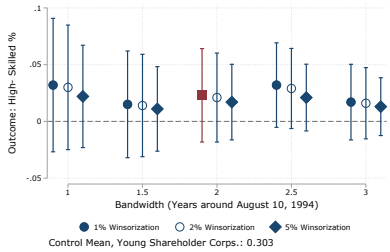
(a) Share Low Skilled



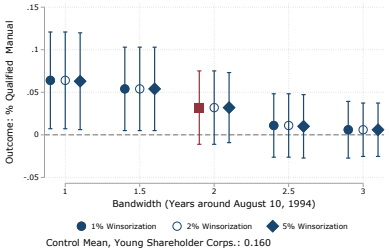
(b) Share Medium Skilled



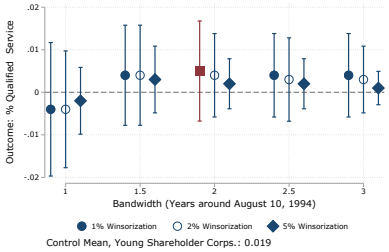
(c) Share High Skilled



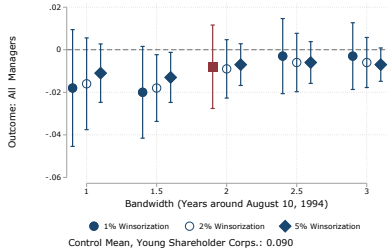
(d) Share Qualified Manual



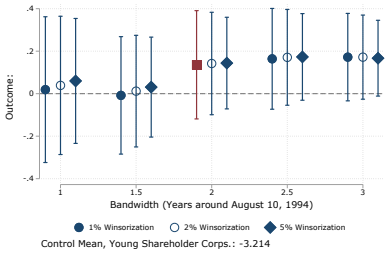
(e) Share Qualified Service



(f) Share All Managers



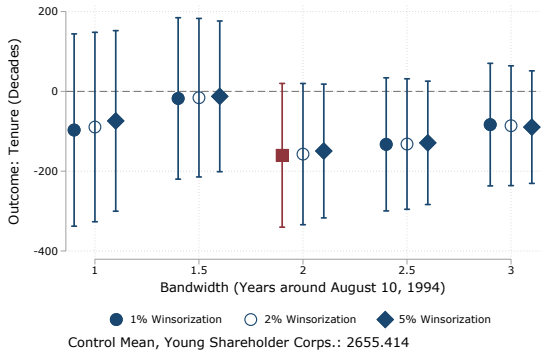
(g) Share Outsourceable



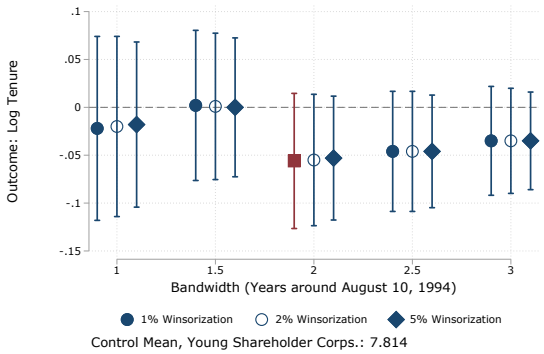
Note: The figure plots difference-in-differences estimates of the reduced-form effect of shared governance on skill structure at different bandwidths of incorporation dates relative to August 10, 1994 and different winsorization levels. All specifications include industry-by-year fixed effects. The square maroon marker denotes our preferred 2-year bandwidth and 1% winsorization specification. The vertical bars denote confidence intervals based on standard errors clustered at the firm level.

Figure C.10: Effect of Shared Governance on Tenure (Matched Employer-Employee Data)

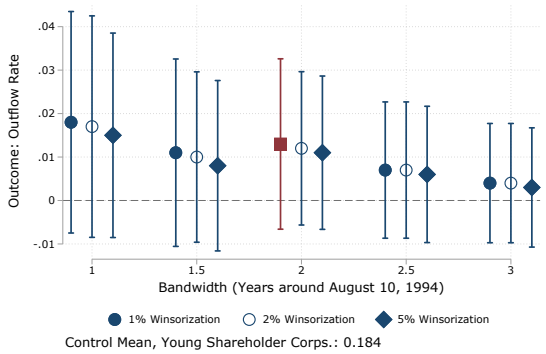
(a) Tenure



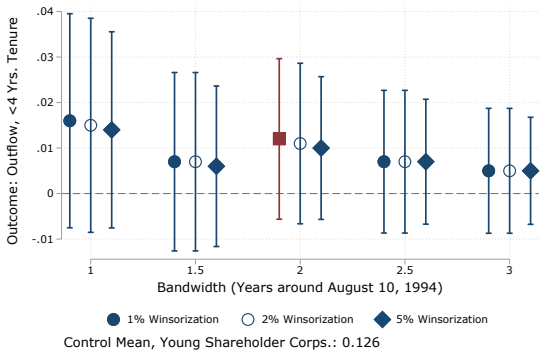
(b) Tenure (Log)



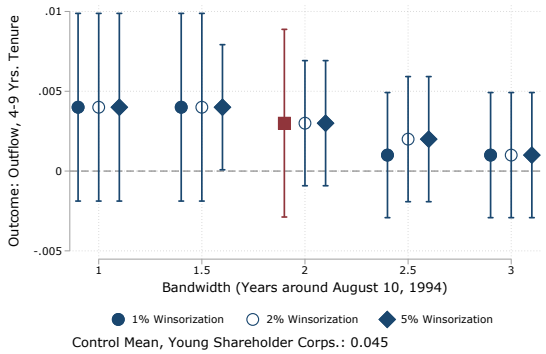
(c) Separations: All



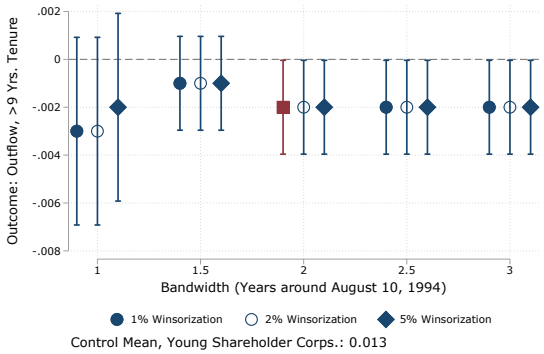
(d) Separations: < 4 Years



(e) Separations: 4-9 Years



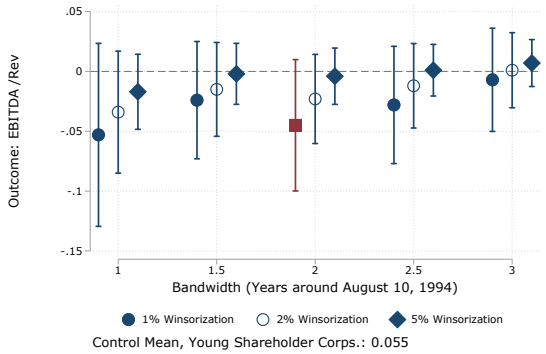
(f) Separations: 9+ Years



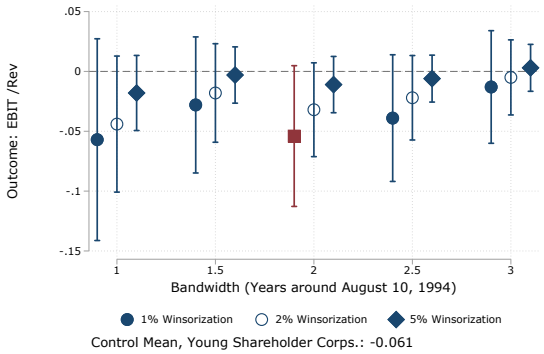
Note: The figure plots difference-in-differences estimates of the reduced-form effect of shared governance on tenure at different bandwidths of incorporation dates relative to August 10, 1994 and different winsorization levels. The square maroon marker denotes our preferred 2-year bandwidth and 1% winsorization specification. Indicator outcomes are not winsorized. All specifications include industry-by-year fixed effects. The vertical bars denote confidence intervals based on standard errors clustered at the firm level.

Figure C.11: Effect of Shared Governance on Profitability

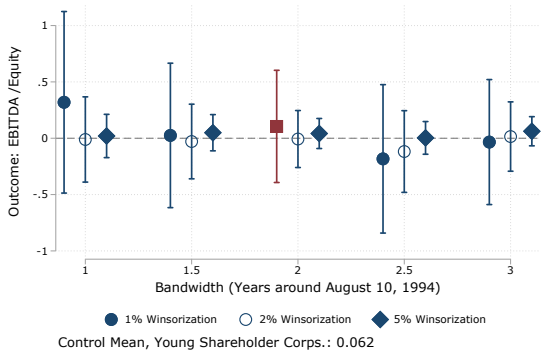
(a) EBITDA/Revenue



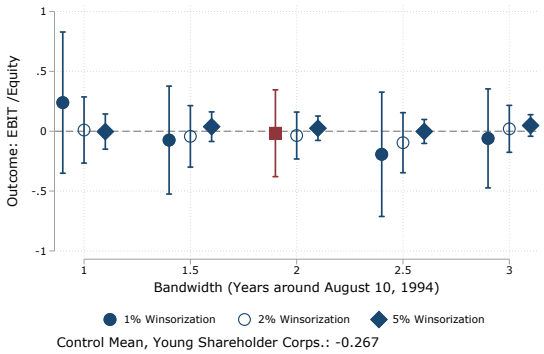
(b) EBIT/Revenue



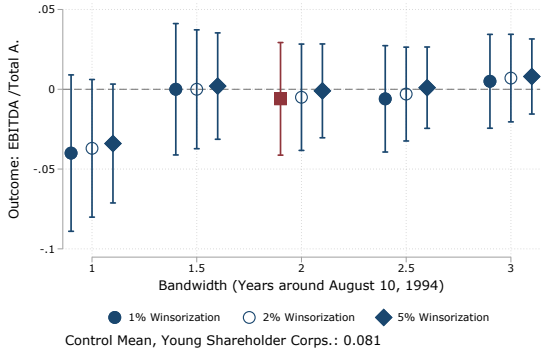
(c) EBITDA/Equity



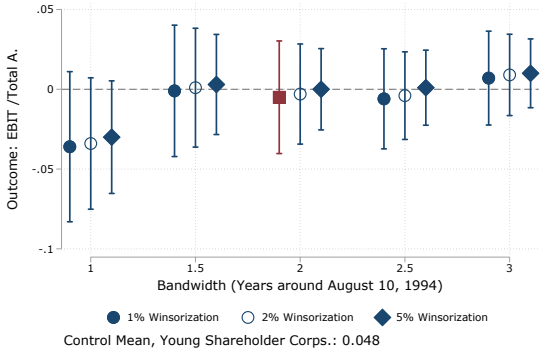
(d) EBIT/Equity



(e) EBITDA/Total Assets



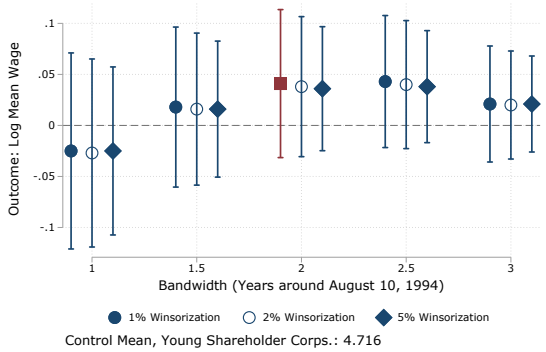
(f) EBIT/Total Assets



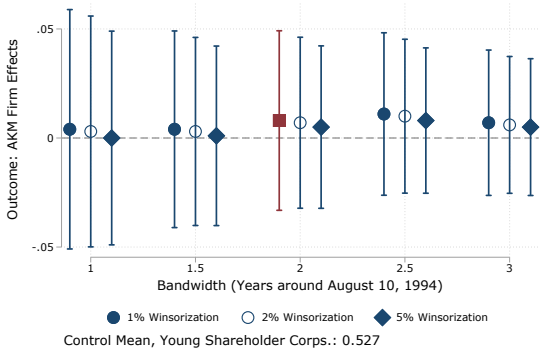
Note: The figure plots difference-in-differences estimates of the reduced-form effect of shared governance on profitability at different bandwidths of incorporation dates relative to August 10, 1994 and different winsorization levels. The square maroon marker denotes our preferred 2-year bandwidth and 1% winsorization specification. All specifications include industry-by-year fixed effects. The vertical bars denote confidence intervals based on standard errors clustered at the firm level.

Figure C.12: Effect of Shared Governance on Wages (Matched Employer-Employee Data)

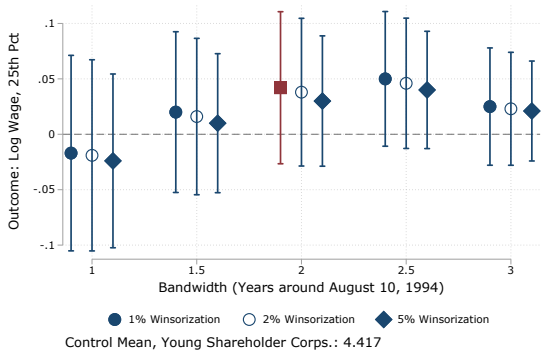
(a) Mean Wage (Log)



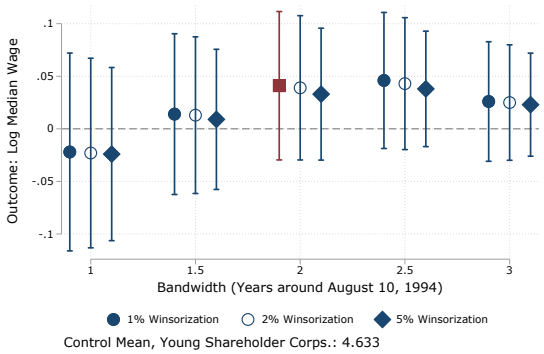
(b) AKM Firm Effects



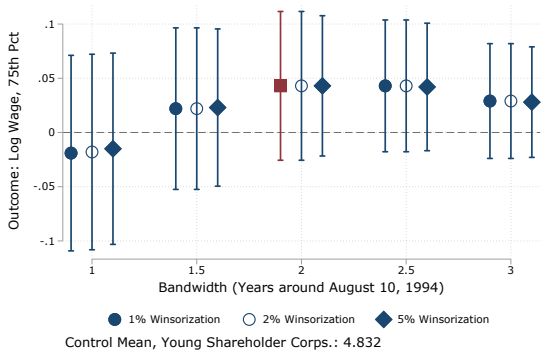
(c) Wage, 25th Pct. (Log)



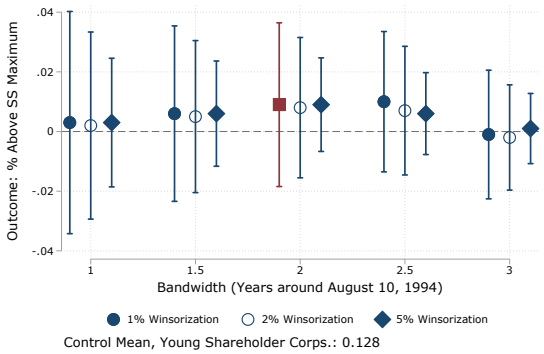
(d) Median Wage (Log)



(e) Wage, 75th Pct. (Log)



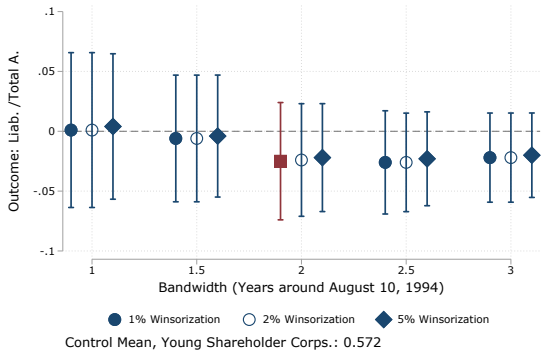
(f) Share Above Social Security Maximum



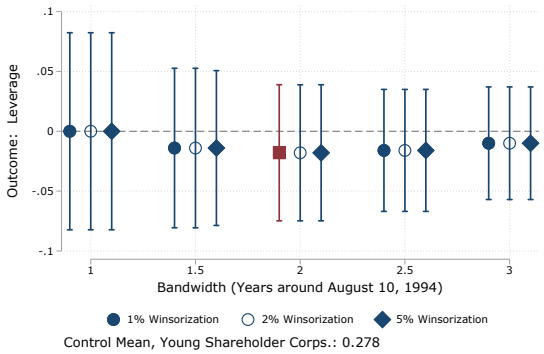
Note: The figure plots difference-in-differences estimates of the reduced-form effect of shared governance on wages at different bandwidths of incorporation dates relative to August 10, 1994 and different winsorization levels. The square maroon marker denotes our preferred 2-year bandwidth and 1% winsorization specification. All specifications include industry-by-year fixed effects. The vertical bars denote confidence intervals based on standard errors clustered at the firm level.

Figure C.13: Effect of Shared Governance on Capital Structure, Leverage, and Cost of Debt

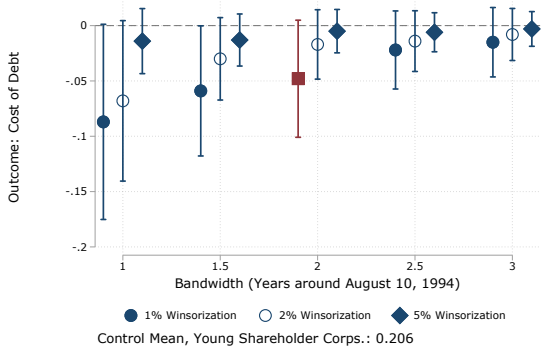
(a) Liabilities / Total Assets



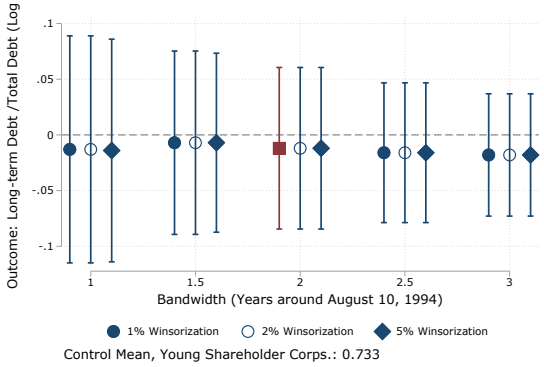
(b) Leverage



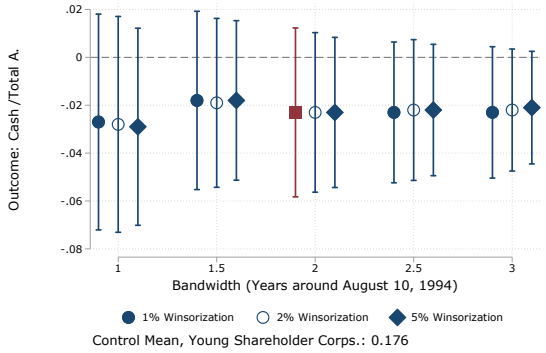
(c) Cost of Debt



(d) Long-term Debt / Total Debt



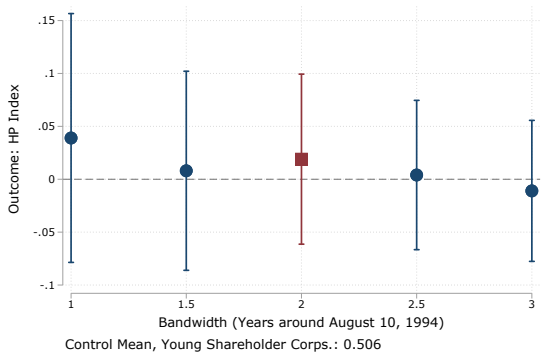
(e) Cash / Total Assets



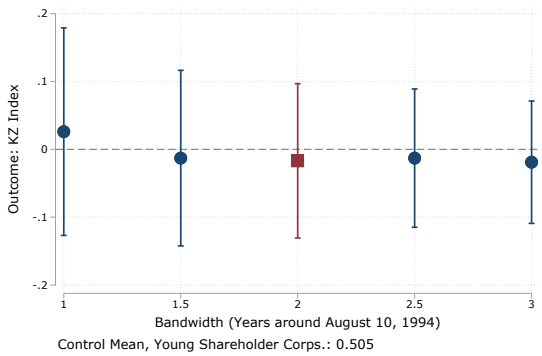
Note: The figure plots difference-in-differences estimates of the reduced-form effect of shared governance on capital structure, leverage, and cost of debt at different bandwidths of incorporation dates relative to August 10, 1994 and different winsorization levels. The square maroon marker denotes our preferred 2-year bandwidth and 1% winsorization specification. All specifications include industry-by-year fixed effects. The vertical bars denote confidence intervals based on standard errors clustered at the firm level.

Figure C.14: Effect of Shared Governance on Financial Distress (Above Median)

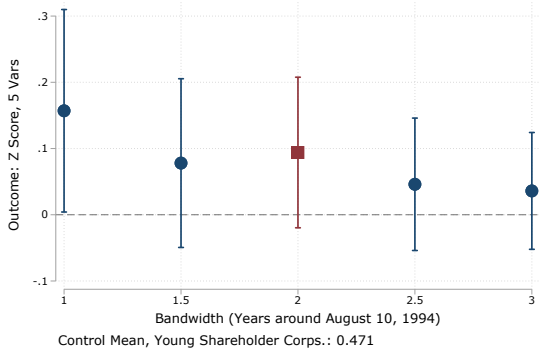
(a) HP Index



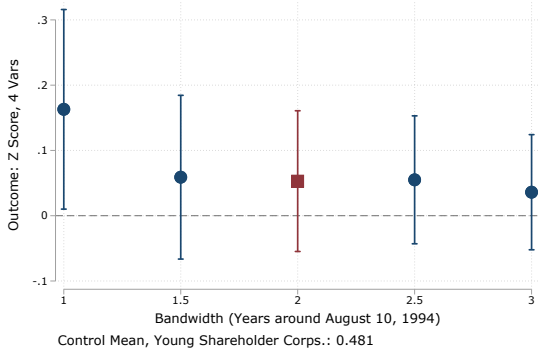
(b) KZ Index



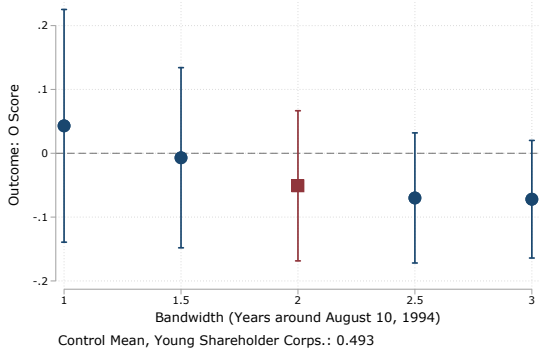
(c) Z Score, 5 Variables



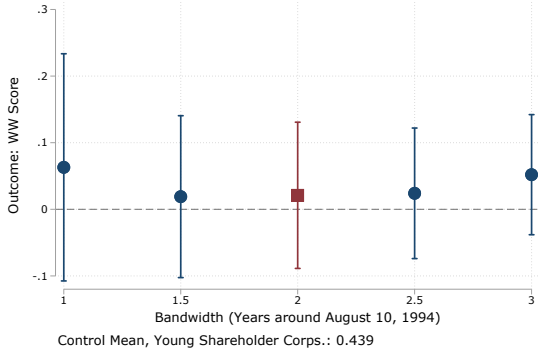
(d) Z Score, 4 Variables



(e) O Score



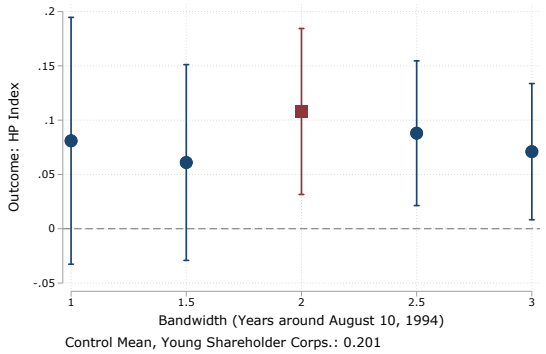
(f) WW Score



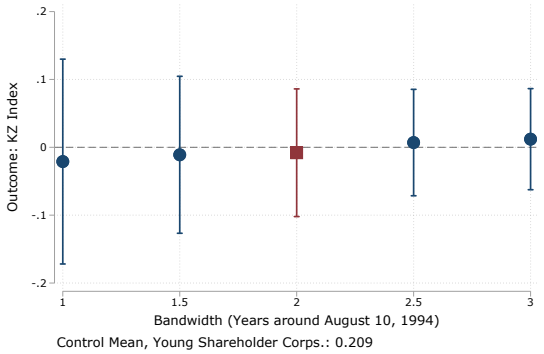
Note: The figure plots difference-in-differences estimates of the reduced-form effect of shared governance on financial distress at different bandwidths of incorporation dates relative to August 10, 1994. The coefficient in maroon denotes our preferred 2-year bandwidth. As in Panel A of Table 10, all specifications refer to binary indicators by median in our baseline sample in a year-by-legal-form cell, with 1 indicating higher risk or constraints. All specifications include industry-by-year fixed effects. The vertical bars denote confidence intervals based on standard errors clustered at the firm level.

Figure C.15: Effect of Shared Governance on Financial Distress (Above 80th Percentile)

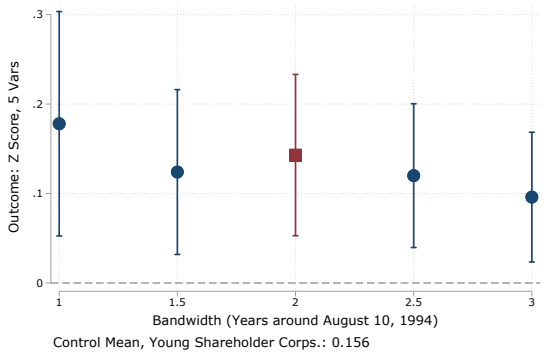
(a) HP Index



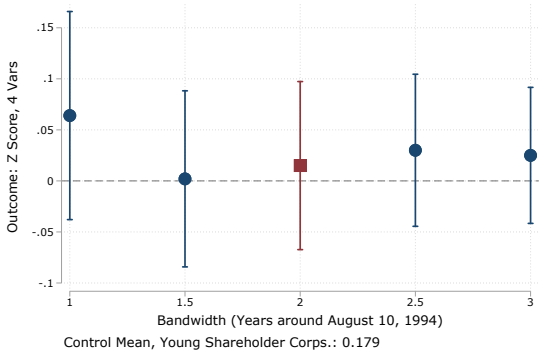
(b) KZ Index



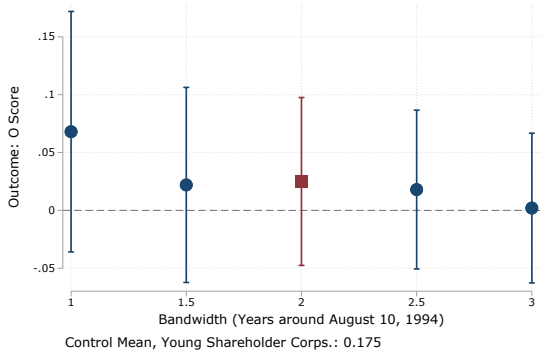
(c) Z Score, 5 Variables



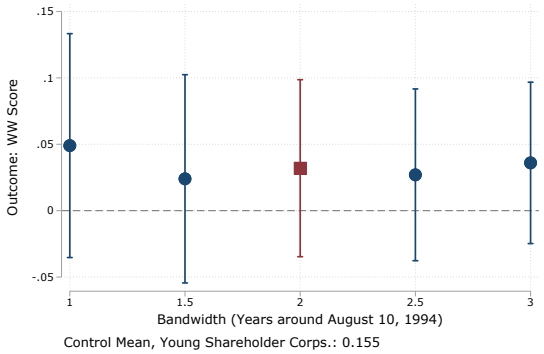
(d) Z Score, 4 Variables



(e) O Score

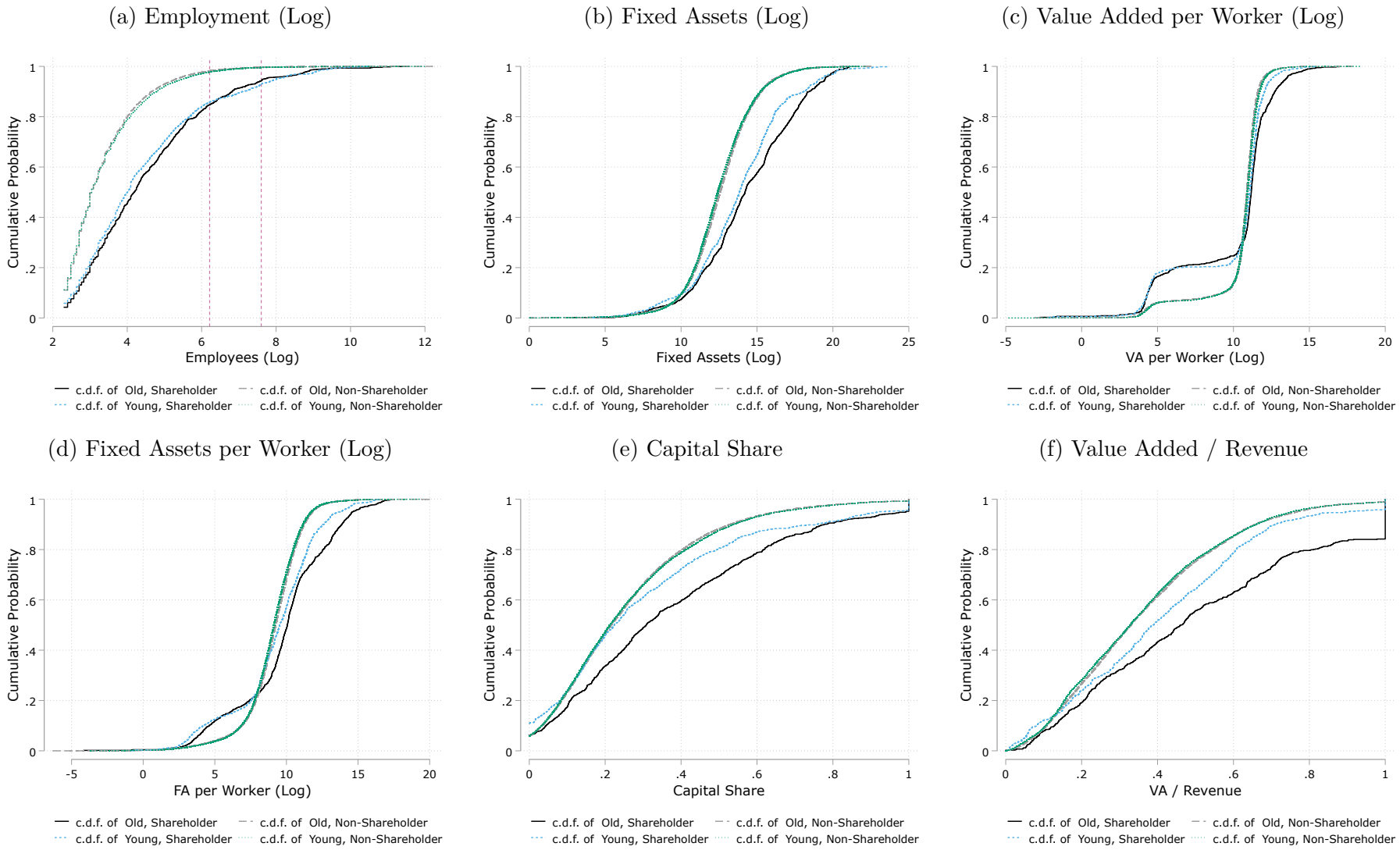


(f) WW Score



Note: The figure plots difference-in-differences estimates of the reduced-form effect of shared governance on financial distress at different bandwidths of incorporation dates relative to August 10, 1994. The coefficient in maroon denotes our preferred 2-year bandwidth. As in Panel B of Table 10, all specifications refer to binary indicators by median in our baseline sample in a year-by-legal-form cell, with 1 indicating higher risk or constraints. All specifications include industry-by-year fixed effects. The vertical bars denote confidence intervals based on standard errors clustered at the firm level.

Figure C.16: Cumulative Distribution Functions of Selected Outcomes



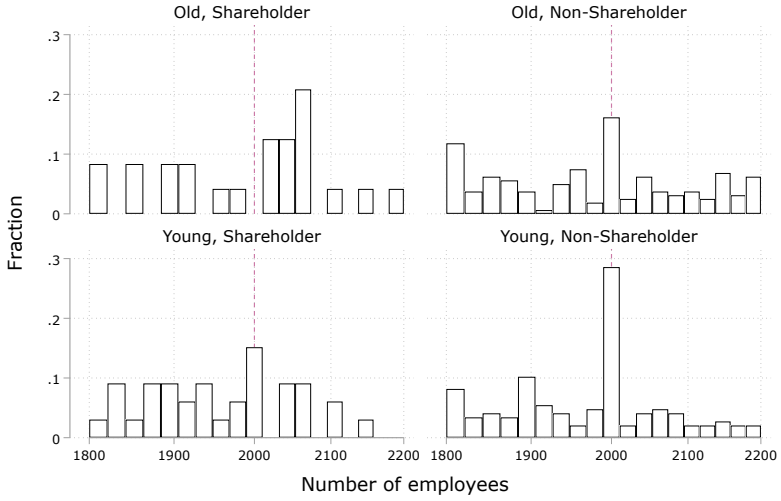
Note: The figures plot the CDFs by legal form and pre/post reform incorporation date for the key outcome variables employment, fixed assets, value added per worker, fixed assets per worker, capital share, and value added/revenue, the distributions of which we additionally study in a regression framework in Tables D.6-D.8. The sample is restricted to shareholder corporations (*Aktiengesellschaften*) and non-shareholder corporations (*GmbHs*) with 10 or more employees incorporated within two years of August 10, 1994. The two vertical bars in Panel (a), which plots the employment distribution, denote the 500- and 2,000-employee cutoffs, for which one-third and one-half of supervisory board seats, respectively, are allocated to workers by law even in the control groups (nonshareholder corporations, and shareholder corporations incorporated after the reform).

Figure C.17: Histograms for Employment

(a) Around 500 Employees



(b) Around 2,000 Employees



Note: Panel (a) presents the histogram for firms having between 300 and 700 employees, with the vertical line presenting the 500 employee benchmark. Panel (b) presents an analogous histogram for firms having between 1,800 and 2,200 employees centered on a 2,000 employee benchmark. The sample is restricted to shareholder corporations (*Aktiengesellschaften*) and non-shareholder corporations (*GmbHs*) with 10 or more employees incorporated within two years of August 10, 1994. The 500- and 2,000-employee benchmarks represent cutoffs for which one-third and one-half of supervisory board seats, respectively, are allocated to workers by law even in the control groups (nonshareholder corporations, and shareholder corporations incorporated after the reform).

D Additional Tables

Table D.1: Corporate Group Structure and Presence of Shared Governance at the Corporate Group Level

	(1)	(2)	(3)
Panel A: Part of	Corporate Group	Domestic Corp. Group	Corp. Group w/ > 2000 Emp.
Diff-in-Diff	0.084**	0.040	-0.005
	(0.036)	(0.038)	(0.021)
DiD	0.092**	0.047	-0.009
Industry FE	(0.037)	(0.039)	(0.022)
Control Mean: Sh. Corp.	0.579	0.532	0.107
″, Non-Sh. Corp.	0.317	0.275	0.044
N, Sh. Corp.	452	452	452
N, Non-Sh. Corp.	37,268	37,268	37,268
Panel B: Parent of	Corporate Group	Domestic Corp. Group	Corp. Group w/ > 2000 Emp.
Diff-in-Diff	0.045	0.022	0.008
	(0.038)	(0.038)	(0.010)
DiD	0.057	0.030	0.009
Industry FE	(0.039)	(0.039)	(0.011)
Control Mean: Sh. Corp.	0.358	0.340	0.026
″, Non-Sh. Corp.	0.136	0.123	0.002
N, Sh. Corp.	452	452	452
N, Non-Sh. Corp.	37,268	37,268	37,268
Panel C: Subsidiary of	Corporate Group	Domestic Corp. Group	Corp. Group w/ > 2000 Emp.
Diff-in-Diff	0.039	0.018	-0.014
	(0.035)	(0.034)	(0.019)
DiD	0.035	0.017	-0.019
Industry FE	(0.035)	(0.034)	(0.019)
Control Mean: Sh. Corp.	0.221	0.193	0.082
″, Non-Sh. Corp.	0.181	0.153	0.042
N, Sh. Corp.	452	452	452
N, Non-Sh. Corp.	37,268	37,268	37,268

Note: Panel A reports specifications with outcomes related to status as either parent or subsidiary of a corporate group. Corporate group refers to a set of business entities ultimately owned (i.e. directly or indirectly) by one corporation with a higher than 50% ownership stake in the other business entities. The indicators for parent (Panel B) or subsidiary (Panel C) indicate that a firm is a subsidiary or a parent of a corporate group, respectively. To shed light on codetermination at the corporate group level, we further distinguish between domestic groups (with a parent firm incorporated in Germany) and those that are ultimately owned by a firm outside of Germany. We also distinguish by corporate group employment of more than 2,000 employees. Domestic corporate group employment is defined as the sum of yearly employment aggregated across all German corporations within the corporate group (where the ultimate corporate owner can be located outside of Germany), regardless of their date of incorporation. We aggregate employment considering all types of firms to build the 2,000-employee indicator. (*The table note continues on the next page.*)

(*Table note continued from previous page.*) The table reports the results of DiD specifications as in (12). The sample is restricted to shareholder corporations (*Aktiengesellschaften*) and non-shareholder corporations (*GmbHs*) with 10 or more employees incorporated within two years of the reform date of August 10, 1994. We use 2-digit NACE designations for industry fixed effects. See Appendix Section B for more information on the sample construction. The control means refer to observations of firms incorporated *on or after* August 10, 1994. Robust standard errors are reported in parentheses. Stars denote statistical significance: * $p < 0.10$, ** $p < 0.05$, *** $p < 0.01$.

In addition to the regression results, which we discuss below, the control means for the indicators in column (3) above are important as they inform whether firms may be subject to codetermination at the group level. Among the shareholder corporations in our sample, 10.7% are part of a corporate group with more than 2,000 domestic employees. These control means suggest that 10.7% of shareholder corporations in our sample incorporated after the 1994 reform are subject to parity codetermination at the corporate group, which kicks in above 2,000 employees. That is, a German corporate group is subject to parity codetermination at the group level if the aggregate domestic employment of business entities in the group exceeds 2,000 employees. Business entities are to be counted as part of a corporate group if the group is the ultimate owner of a majority of the shares (§5 *MitbestG*, §17 *AktG*). Codetermination at the business entity level is not affected by the presence or absence of codetermination at the group level.

We cannot credibly calculate the presence of one-third codetermination at the corporate group level because a stricter legal standard for defining corporate groups applies there: business entities are only counted towards a corporate group for the purposes of one-third codetermination if they are completely integrated into the group (*Eingliederung*) of if a domination agreement of the group over the unit exists (§2 (2) *DrittelbG*). Domination agreements are empirically rare (e.g., Lieder and Hoffmann, 2017, find that 3 to 7% of shareholder corporations are governed by such agreements) and not reported in the data.

The regression results reveal a higher probability of being a part of a corporate group but not on membership in a domestic corporate group or in a group with more than 2,000 employees at domestic business entities. Across specifications, we do not find statistically significant effects and point estimates are close to zero with standard errors of about two to four percentage points.

Table D.2: Differential Trends for Incorporation of Shareholder Corporations

	(1) 𝟙(Incorporated as AG)	(2) 𝟙(Incorporated as AG)
Incorporation Date	0.0023**	0.0019*
	(0.0011)	(0.0011)
𝟙(Post-Reform)	0.0001	0.0000
	(0.0021)	(0.0021)
Inc. Date × 𝟙(Post-Reform)	0.0011	0.0012
	(0.0018)	(0.0018)
Constant	0.0128***	0.0125***
	(0.0014)	(0.0014)
Industry FE	No	Yes
N, Firms	46,417	44,218
N, Sh. Corp.	616	574
N, Non-Sh. Corp.	45,801	43,644
Adj. R^2	0.001	0.039

Note: This table reports estimates of whether the reform had an effect on firms' decision to incorporate as a shareholder corporation. We test for differential trends before and after the reform by interacting an indicator for whether the firm incorporated post-reform with a continuous time trend variable (denominated in years) for incorporation date relative to August 10, 1994. The sample is restricted to shareholder corporations (*Aktiengesellschaften*) and non-shareholder corporations (*GmbHs*) with 10 or more employees incorporated within two years of the reform date of August 10, 1994. Column (1) reports the basic specification, and column (2) includes industry (i.e. 2-digit NACE designations) fixed effects. See Appendix Section B.2 for details on the sample construction. Standard errors clustered at the firm level are reported in parentheses. Stars denote statistical significance: * $p < 0.10$, ** $p < 0.05$, *** $p < 0.01$.

Table D.3: 1994 Reform and Industry Composition of Shareholder Corporations

NACE Industry Classification	(1)	(2)	NACE Industry Classification	(1)	(2)
A: Agriculture, forestry, fishing	-0.002	-0.002	K: Financial and insurance activities	0.001	0.001
	(0.010)	(0.010)		(0.028)	(0.028)
Control Mean: Post-Reform Sh. Corp.	0.009	0.009	Control Mean: Post-Reform Sh. Corp.	0.114	0.114
″, Post-Reform Non-Sh. Corp.	0.013	0.013	″, Post-Reform Non-Sh. Corp.	0.009	0.009
B: Mining and quarrying	-0.0002	-0.0002	L: Real estate activities	0.010	0.010
	(0.0003)	(0.0003)		(0.011)	(0.011)
Control Mean: Post-Reform Sh. Corp.	0.0000	0.0000	Control Mean: Post-Reform Sh. Corp.	0.009	0.009
″, Post-Reform Non-Sh. Corp.	0.0006	0.0006	″, Post-Reform Non-Sh. Corp.	0.009	0.009
C: Manufacturing	-0.013	-0.012	M: Professional, scientific, and technical activities	-0.016	-0.016
	(0.031)	(0.031)		(0.037)	(0.037)
Control Mean: Post-Reform Sh. Corp.	0.154	0.154	Control Mean: Post-Reform Sh. Corp.	0.237	0.237
″, Post-Reform Non-Sh. Corp.	0.196	0.196	″, Post-Reform Non-Sh. Corp.	0.142	0.142
E: Water supply, sewerage, waste management/remediation	-0.0001	-0.0001	N: Administrative and support service activities	-0.008	-0.008
	(0.0001)	(0.0001)		(0.015)	(0.015)
Control Mean: Post-Reform Sh. Corp.	0.0000	0.0000	Control Mean: Post-Reform Sh. Corp.	0.034	0.034
″, Post-Reform Non-Sh. Corp.	0.0001	0.0001	″, Post-Reform Non-Sh. Corp.	0.027	0.027
F: Construction	0.006	0.006	P: Education	-0.0001	-0.0001
	(0.007)	(0.007)		(0.0002)	(0.0002)
Control Mean: Post-Reform Sh. Corp.	0.006	0.006	Control Mean: Post-Reform Sh. Corp.	0.0000	0.0000
″, Post-Reform Non-Sh. Corp.	0.044	0.044	″, Post-Reform Non-Sh. Corp.	0.0002	0.0002
G: Wholesale and retail trade; repair of motor vehicles	0.010	0.010	Q: Human health and social work activities	-0.0007	-0.0009
	(0.025)	(0.025)		(0.003)	(0.003)
Control Mean: Post-Reform Sh. Corp.	0.077	0.077	Control Mean: Post-Reform Sh. Corp.	0.003	0.003
″, Post-Reform Non-Sh. Corp.	0.200	0.200	″, Post-Reform Non-Sh. Corp.	0.012	0.012
H: Transporting and storage	-0.019	-0.019	R: Arts, entertainment, and recreation	0.003	0.003
	(0.025)	(0.025)		(0.013)	(0.013)
Control Mean: Post-Reform Sh. Corp.	0.083	0.083	Control Mean: Post-Reform Sh. Corp.	0.022	0.022
″, Post-Reform Non-Sh. Corp.	0.171	0.171	″, Post-Reform Non-Sh. Corp.	0.032	0.032
I: Accommodation and food service activities	0.006	0.006	S: Other services activities	0.003	0.003
	(0.005)	(0.005)		(0.006)	(0.006)
Control Mean: Post-Reform Sh. Corp.	0.0000	0.0000	Control Mean: Post-Reform Sh. Corp.	0.003	0.003
″, Post-Reform Non-Sh. Corp.	0.029	0.029	″, Post-Reform Non-Sh. Corp.	0.006	0.006
J: Information and communication	-0.004	-0.005	*N*, Firms	44,164	44,164
	(0.032)	(0.032)	*N*, Sh. Corp.	538	538
Control Mean: Post-Reform Sh. Corp.	0.160	0.160	*N*, Non-Sh. Corp.	43,626	43,626
″, Post-Reform Non-Sh. Corp.	0.047	0.047	Joint P-Value	0.972	0.972

Note: This table reports estimates of the effect of shared governance on the industry composition of shareholder corporations. Formally, we use indicators for each NACE Rev. 2 Classification 1 industry code as outcomes for DiD specifications as in equation (12). Column (1) reports the basic specification from equation (12), and column (2) includes quarter-of-incorporation fixed effects. We visually report the estimates from column (1) in Figure 4. See Appendix Section B.2 for details on the sample construction.

Table D.4: Effect of Shared Governance on Scale (Excluding Former East Germany)

	Log Revenue (1)	Log Value Added (2)	Log Emp (Orbis) (3)	𝟙(Emp> 500) (Orbis) (4)	Log Fixed A. (5)	Log Tang. A. (6)	Log Materials (7)
Diff-in-Diff	0.846***	0.040	0.243*	0.023	0.441*	0.193	-0.725
	(0.314)	(0.236)	(0.138)	(0.034)	(0.231)	(0.260)	(0.555)
DiD	0.110	0.019	0.214	0.021	0.433*	0.184	-0.992*
Year FE	(0.226)	(0.228)	(0.137)	(0.034)	(0.239)	(0.259)	(0.531)
DiD	0.466	0.136	0.206	0.022	0.515**	0.252	-0.563
Industry FE	(0.325)	(0.253)	(0.138)	(0.035)	(0.214)	(0.236)	(0.490)
DiD	0.067	0.131	0.159	0.016	0.533**	0.295	-0.866*
Industry-Year FE	(0.214)	(0.216)	(0.134)	(0.035)	(0.225)	(0.231)	(0.452)
Control Mean: Sh. Corp.	13.963	15.059	4.258	0.142	13.720	12.613	14.709
″, Non-Sh. Corp.	10.989	14.770	3.350	0.022	12.465	12.143	14.785
N, Firm-Years	185,554	35,135	254,730	254,730	101,819	100,415	18,882
N, Sh. Corp.	495	222	580	580	329	329	143
N, Non-Sh. Corp.	36,863	7,515	42,591	42,591	22,032	21,835	5,315

Note: The table reports the effect of shared governance on the outcomes related to firm scale. We report the results of DiD specifications as in (12). The sample is restricted to shareholder corporations (*Aktiengesellschaften*) and non-shareholder corporations (*GmbHs*) with 10 or more employees incorporated within two years of the reform date of August 10, 1994 outside of former East Germany. We *exclude* firms whose address is in any of the following NUTS-1 regions (the *Bundesländer* of former East Germany and Berlin, i.e. both East and West Berlin): Mecklenburg-Vorpommern, Brandenburg, Berlin, Sachsen-Anhalt, Thüringen, or Sachsen. We use 2-digit NACE designations for industry fixed effects. Non-indicator outcomes are winsorized at the 1% level by year. See Appendix Section B for more information on the sample construction and Appendix Figure C.7 for the specification with industry-year fixed effects at additional bandwidths and winsorization levels. The control means refer to observations of firms incorporated *on or after* August 10, 1994. Standard errors clustered at the firm level are reported in parentheses. Stars denote statistical significance: * $p < 0.10$, ** $p < 0.05$, *** $p < 0.01$.

Table D.5: Effect of Shared Governance on Productivity and Capital Intensity (Excluding Former East Germany)

	Value Add. per Emp (1)	Log VA per Emp (2)	Fixed A. per Emp (3)	Log Fixed A. per Emp (4)	TFP (Fixed A.) (5)	Capital Share (6)	Value Added /Revenue (7)
Diff-in-Diff	51.043**	0.110	52.896**	0.330	0.086	0.067**	0.241**
	(22.909)	(0.254)	(25.001)	(0.202)	(0.293)	(0.034)	(0.121)
DiD	42.913**	0.141	53.367**	0.391**	0.118	0.066**	0.229**
Year FE	(16.657)	(0.182)	(25.237)	(0.196)	(0.235)	(0.033)	(0.116)
DiD	45.350***	0.205	57.308**	0.399**	-0.030	0.076**	0.254**
Industry FE	(14.014)	(0.248)	(23.816)	(0.198)	(0.190)	(0.031)	(0.117)
DiD	42.251***	0.218	57.429**	0.465**	-0.012	0.075**	0.158*
Industry-Year FE	(13.766)	(0.146)	(25.320)	(0.184)	(0.120)	(0.032)	(0.090)
Control Mean: Sh. Corp.	84.536	9.926	96.063	9.186	6.871	0.294	0.444
″, Non-Sh. Corp.	68.749	10.485	32.182	8.964	7.650	0.255	0.360
N, Firm-Years	35,135	35,135	102,911	101,819	33,282	34,203	23,149
N, Sh. Corp.	222	222	329	329	217	225	204
N, Non-Sh. Corp.	7,515	7,515	22,244	22,032	7,001	7,406	6,270

Note: The table reports the effect of shared governance on the outcomes related to productivity and capital intensity. We report the results of DiD specifications as in (12). The sample is restricted to shareholder corporations (*Aktiengesellschaften*) and non-shareholder corporations (*GmbHs*) with 10 or more employees incorporated within two years of the reform date of August 10, 1994 outside of former East Germany. We *exclude* firms whose address is in any of the following NUTS-1 regions (the *Bundesländer* of former East Germany and Berlin, i.e. both East and West Berlin): Mecklenburg-Vorpommern, Brandenburg, Berlin, Sachsen-Anhalt, Thüringen, or Sachsen. We use 2-digit NACE designations for industry fixed effects. Non-indicator outcomes are winsorized at the 1% level by year. See Appendix Section B for more information on the sample construction and Appendix Figure C.8 for the specification with industry-year fixed effects at additional bandwidths and winsorization levels. The control means refer to observations of firms incorporated *on or after* August 10, 1994. Standard errors are clustered at the firm level are reported in parentheses. Stars denote statistical significance: * $p < 0.10$, ** $p < 0.05$, *** $p < 0.01$.

Table D.6: Effect of Shared Governance on Distribution of Employment and of Fixed Assets

	Rank	$\mathbb{1}$(Above 10^{th} Percentile)	$\mathbb{1}$(Above 25^{th} Percentile)	$\mathbb{1}$(Above 50^{th} Percentile)	$\mathbb{1}$(Above 75^{th} Percentile)	$\mathbb{1}$(Above 90^{th} Percentile)
	(1)	(2)	(3)	(4)	(5)	(6)
Panel A: Employment						
Diff-in-Diff	1.710	-0.021	-0.001	0.017	0.023	-0.006
	(2.583)	(0.017)	(0.030)	(0.041)	(0.038)	(0.025)
DiD	1.678	-0.012	0.004	0.019	0.024	-0.006
Year FE	(2.581)	(0.017)	(0.030)	(0.041)	(0.038)	(0.025)
DiD	1.006	-0.023	-0.012	0.005	0.021	-0.010
Industry FE	(2.550)	(0.018)	(0.030)	(0.040)	(0.038)	(0.025)
DiD	0.428	-0.016	-0.011	-0.0002	0.017	-0.014
Industry-Year FE	(2.513)	(0.018)	(0.030)	(0.040)	(0.038)	(0.025)
Level at Percentile: Sh. Corp.	49.59	13.52	24.18	61.46	231.61	1,311.27
″, Non-Sh. Corp.	49.99	10.55	13.46	22.71	47.94	120.78
N, Firm-Years	278,878	278,878	278,878	278,878	278,878	278,878
N, Sh. Corp.	616	616	616	616	616	616
N, Non-Sh. Corp.	45,801	45,801	45,801	45,801	45,801	45,801
Panel B: Fixed Assets						
Diff-in-Diff	4.449	-0.004	0.038	0.016	0.075*	0.034
	(2.708)	(0.020)	(0.032)	(0.042)	(0.040)	(0.032)
DiD	4.377	0.002	0.042	0.019	0.076*	0.034
Year FE	(2.707)	(0.019)	(0.032)	(0.042)	(0.041)	(0.032)
DiD	4.758*	-0.0008	0.042	0.019	0.074**	0.040
Industry FE	(2.477)	(0.019)	(0.032)	(0.040)	(0.037)	(0.029)
DiD	4.759*	0.007	0.051	0.031	0.082**	0.039
Industry-Year FE	(2.552)	(0.019)	(0.032)	(0.042)	(0.039)	(0.031)
Level at Percentile: Sh. Corp.	47.85	48.85	234.22	1,103.31	6,960.97	75,967.94
″, Non-Sh. Corp.	49.31	14.28	43.72	177.44	824.06	5,617.32
N, Firm-Years	114,844	114,844	114,844	114,844	114,844	114,844
N, Sh. Corp.	360	360	360	360	360	360
N, Non-Sh. Corp.	24,625	24,625	24,625	24,625	24,625	24,625

Note: The table reports the DiD effects of shared governance following specifications (12), with indicators for whether the underlying continuous outcome variable exceeds various percentiles in the control group in a year-by-legal-form cell. In the first column, we construct a rank variable by dividing the relative position of each firm (sorted in ascending order by each outcome) by the number of positions observed in its own year-by-legal-form cell, and then scaling this by a factor of 100. The sample is restricted to shareholder corporations (*Aktiengesellschaften*) and non-shareholder corporations (*GmbHs*) with 10 or more employees incorporated within two years of the reform date of August 10, 1994. We use 2-digit NACE designations for industry fixed effects. Non-indicator outcomes are winsorized at the 1% level by year. See Appendix Section B for more information on the sample construction. For the first column, the level at percentile line refers to the control mean of the rank variable. For columns 2 to 6, this refers to the levels at cutoff percentile refer to the value of the underlying variable in the control group by firm legal type at each percentile cutoff. Standard errors are clustered at the firm level are reported in parentheses. Stars denote statistical significance: * $p < 0.10$, ** $p < 0.05$, *** $p < 0.01$.

Table D.7: Effect of Shared Governance on Distribution of Value Added per Worker and of Fixed Assets per Worker

	Rank	$\mathbb{1}$(Above 10^{th} Percentile)	$\mathbb{1}$(Above 25^{th} Percentile)	$\mathbb{1}$(Above 50^{th} Percentile)	$\mathbb{1}$(Above 75^{th} Percentile)	$\mathbb{1}$(Above 90^{th} Percentile)
	(1)	(2)	(3)	(4)	(5)	(6)
Panel A: Value Added per Worker						
Diff-in-Diff	6.142**	-0.029	0.029	0.053	0.093**	0.093***
	(3.119)	(0.026)	(0.041)	(0.052)	(0.045)	(0.036)
DiD	6.025*	-0.022	0.034	0.055	0.089**	0.089**
Year FE	(3.111)	(0.026)	(0.041)	(0.052)	(0.045)	(0.036)
DiD	8.526***	-0.028	0.046	0.095*	0.123***	0.110***
Industry FE	(3.204)	(0.027)	(0.042)	(0.053)	(0.046)	(0.035)
DiD	8.909***	-0.013	0.072*	0.104*	0.133***	0.116***
Industry-Year FE	(3.276)	(0.027)	(0.042)	(0.054)	(0.047)	(0.036)
Level at Percentile: Sh. Corp.	48.56	19.98	31.63	46.93	77.77	163.00
″, Non-Sh. Corp.	50.80	9.97	17.30	29.41	62.86	98.71
N, Firm-Years	40,066	40,066	40,066	40,066	40,066	40,066
N, Sh. Corp.	246	246	246	246	246	246
N, Non-Sh. Corp.	8,334	8,334	8,334	8,334	8,334	8,334
Panel B: Fixed Assets per Worker						
Diff-in-Diff	6.780***	0.004	0.076**	0.082**	0.027	0.091***
	(2.584)	(0.020)	(0.030)	(0.041)	(0.040)	(0.033)
DiD	6.713***	0.009	0.080***	0.084**	0.026	0.088***
Year FE	(2.580)	(0.020)	(0.030)	(0.041)	(0.040)	(0.033)
DiD	7.360***	0.009	0.084***	0.089**	0.033	0.097***
Industry FE	(2.387)	(0.019)	(0.030)	(0.039)	(0.037)	(0.031)
DiD	7.391***	0.016	0.097***	0.097**	0.036	0.095***
Industry-Year FE	(2.455)	(0.019)	(0.030)	(0.040)	(0.039)	(0.033)
Level at Percentile: Sh. Corp.	46.72	1.49	3.36	12.05	64.46	359.24
″, Non-Sh. Corp.	49.23	0.59	1.60	5.23	18.42	60.65
N, Firm-Years	116,018	116,018	116,018	116,018	116,018	116,018
N, Sh. Corp.	360	360	360	360	360	360
N, Non-Sh. Corp.	24,850	24,850	24,850	24,850	24,850	24,850

Note: See note for Appendix Table D.6.

Table D.8: Effect of Shared Governance on Distribution of Capital Share and Value Added / Revenue

	Rank	$\mathbb{1}$(Above 10^{th} Percentile)	$\mathbb{1}$(Above 25^{th} Percentile)	$\mathbb{1}$(Above 50^{th} Percentile)	$\mathbb{1}$(Above 75^{th} Percentile)	$\mathbb{1}$(Above 90^{th} Percentile)
	(1)	(2)	(3)	(4)	(5)	(6)
Panel A: Capital Share						
Diff-in-Diff	8.440**	-0.016	0.027	0.107**	0.133**	0.059*
	(3.461)	(0.015)	(0.039)	(0.054)	(0.052)	(0.035)
DiD	8.348**	-0.008	0.034	0.112**	0.133**	0.057
Year FE	(3.447)	(0.013)	(0.039)	(0.055)	(0.052)	(0.035)
DiD	9.636***	-0.013	0.043	0.125**	0.144***	0.064*
Industry FE	(3.134)	(0.015)	(0.038)	(0.049)	(0.048)	(0.034)
DiD	9.617***	-0.001	0.053	0.142***	0.148***	0.065*
Industry-Year FE	(3.158)	(0.014)	(0.038)	(0.049)	(0.050)	(0.035)
Level at Percentile: Sh. Corp.	46.77	0.02	0.10	0.24	0.46	0.72
″, Non-Sh. Corp.	50.02	0.03	0.10	0.21	0.37	0.57
N, Firm-Years	39,110	39,110	39,110	39,110	39,110	39,110
N, Sh. Corp.	249	249	249	249	249	249
N, Non-Sh. Corp.	8,213	8,213	8,213	8,213	8,213	8,213
Panel B: Value Added / Revenue						
Diff-in-Diff	7.740*	0.025	-0.021	0.039	0.119**	0.143***
	(4.155)	(0.031)	(0.055)	(0.068)	(0.060)	(0.048)
DiD	7.637*	0.034	-0.014	0.042	0.117**	0.141***
Year FE	(4.141)	(0.031)	(0.055)	(0.068)	(0.060)	(0.048)
DiD	7.864**	0.021	-0.022	0.043	0.123**	0.148***
Industry FE	(3.172)	(0.028)	(0.043)	(0.052)	(0.053)	(0.045)
DiD	7.123**	0.027	-0.023	0.045	0.115**	0.142***
Industry-Year FE	(3.269)	(0.028)	(0.046)	(0.053)	(0.055)	(0.047)
Level at Percentile: Sh. Corp.	46.87	0.08	0.23	0.41	0.57	0.74
″, Non-Sh. Corp.	49.79	0.12	0.21	0.35	0.53	0.69
N, Firm-Years	27,722	27,722	27,722	27,722	27,722	27,722
N, Sh. Corp.	227	227	227	227	227	227
N, Non-Sh. Corp.	7,086	7,086	7,086	7,086	7,086	7,086

Note: See note for Appendix Table D.6.

Table D.9: **Placebo Reforms in 1998 and 2002**: Effect on Supervisory Board Composition

	𝟙(Women > 0) (1)	Share Women (2)	𝟙(PhD/Profs > 0) (3)	Share PhD/Profs (4)	𝟙(Nobility > 0) (5)	Share Nobility (6)
			Panel A: Placebo Reform in 1998			
DiD	-0.089	-0.025	-0.065	0.019	-0.011	-0.006
Industry FE	(0.082)	(0.034)	(0.085)	(0.037)	(0.036)	(0.010)
Control Mean: Sh. Corp.	0.345	0.134	0.477	0.200	0.043	0.012
″, Non-Sh. Corp.	0.575	0.162	0.475	0.144	0.036	0.006
N, Firm-Years	1,064	1,064	1,064	1,064	1,064	1,064
N, Sh. Corp.	794	794	794	794	794	794
N, Non-Sh. Corp.	270	270	270	270	270	270
			Panel B: Placebo Reform in 2002			
DiD	-0.027	-0.046	0.104	0.050	-0.021	-0.0007
Industry FE	(0.081)	(0.033)	(0.082)	(0.037)	(0.036)	(0.009)
Control Mean: Sh. Corp.	0.390	0.151	0.457	0.181	0.077	0.021
″, Non-Sh. Corp.	0.599	0.153	0.516	0.143	0.074	0.014
N, Firm-Years	1,037	1,037	1,037	1,037	1,037	1,037
N, Sh. Corp.	794	794	794	794	794	794
N, Non-Sh. Corp.	243	243	243	243	243	243

Note: The table reports placebo analyses for the specifications for supervisory board composition reported in Table 2. Panels A and B replicate our DiD specification in (12) for placebo samples and placebo reforms on August 10, 1998 and 2002, respectively (rather than August 10, 1994, when the actual reform occurred). We report the results of DiD specifications as in (12). The sample is restricted to shareholder corporations (*Aktiengesellschaften*) and non-shareholder corporations (*GmbHs*) with 10 or more employees incorporated within two years of August 10, 1998 on Panel A and within two years of August 10, 2002 on Panel B. We use 2-digit NACE designations for industry fixed effects. See Appendix Section B for more information on the sample construction. The control means refer to observations of firms incorporated *on or after* August 10, 1998 or August 10, 2002. Robust standard errors are reported in parentheses; we do not cluster here as we only have one observation per firm. Stars denote statistical significance: * $p < 0.10$, ** $p < 0.05$, *** $p < 0.01$.

Table D.10: **Placebo Reforms in 1998 and 2002**: Effect on Executive Board Composition

	𝟙(Women > 0) (1)	Share Women (2)	𝟙(PhD/Profs > 0) (3)	Share PhD/Profs (4)	𝟙(Nobility > 0) (5)	Share Nobility (6)
			Panel A: Placebo Reform in 1998			
DiD	0.046	-0.005	0.023	0.004	-0.002	-0.000009
Industry-Year FE	(0.036)	(0.015)	(0.030)	(0.010)	(0.012)	(0.001)
Control Mean: Sh. Corp.	0.598	0.182	0.291	0.071	0.042	0.004
″, Non-Sh. Corp.	0.418	0.181	0.072	0.023	0.013	0.001
N, Firm-Years	33,435	33,435	33,435	33,435	33,435	33,435
N, Sh. Corp.	1,020	1,020	1,020	1,020	1,020	1,020
N, Non-Sh. Corp.	32,415	32,415	32,415	32,415	32,415	32,415
			Panel B: Placebo Reform in 2002			
DiD	-0.020	-0.015	0.025	0.005	-0.009	-0.001
Industry-Year FE	(0.035)	(0.017)	(0.028)	(0.012)	(0.011)	(0.001)
Control Mean: Sh. Corp.	0.516	0.181	0.209	0.065	0.023	0.003
″, Non-Sh. Corp.	0.383	0.172	0.069	0.024	0.012	0.001
N, Firm-Years	29,074	29,074	29,074	29,074	29,074	29,074
N, Sh. Corp.	933	933	933	933	933	933
N, Non-Sh. Corp.	28,141	28,141	28,141	28,141	28,141	28,141

Note: The table reports placebo analyses for the specifications for executive board composition reported in Table 2. Panels A and B replicate our DiD specification in (12) for placebo samples and placebo reforms on August 10, 1998 and 2002, respectively (rather than August 10, 1994, when the actual reform occurred). We report the results of DiD specifications as in (12). The sample is restricted to shareholder corporations (*Aktiengesellschaften*) and non-shareholder corporations (*GmbHs*) with 10 or more employees incorporated within two years of August 10, 1998 on Panel A and within two years of August 10, 2002 on Panel B. We use 2-digit NACE designations for industry fixed effects. See Appendix Section B for more information on the sample construction. The control means refer to observations of firms incorporated *on or after* August 10, 1998 or August 10, 2002. Robust standard errors are reported in parentheses; we do not cluster here as we only have one observation per firm. Stars denote statistical significance: * $p < 0.10$, ** $p < 0.05$, *** $p < 0.01$.

Table D.11: **Placebo Reforms in 1998 and 2002**: Effect on Scale

	Log Revenue (1)	Log Value Added (2)	Log Emp (Orbis) (3)	𝟙(Emp> 500) (Orbis) (4)	Log Fixed A. (5)	Log Tang. A. (6)	Log Materials (7)
Panel A: Placebo Reform in 1998							
DiD	0.123	-0.215	0.136*	0.022	0.105	-0.172	-0.199
Industry-Year FE	(0.127)	(0.158)	(0.075)	(0.015)	(0.173)	(0.170)	(0.327)
Control Mean: Sh. Corp.	13.602	15.007	3.805	0.047	13.544	12.118	13.929
″, Non-Sh. Corp.	12.435	14.859	3.404	0.026	12.411	12.061	14.819
N, Firm-Years	165,923	41,755	234,862	234,862	120,603	118,606	24,577
N, Sh. Corp.	1,323	514	1,559	1,559	891	880	325
N, Non-Sh. Corp.	37,674	8,822	44,659	44,659	25,968	25,698	6,415
Panel B: Placebo Reform in 2002							
DiD	-0.143	-0.308*	-0.082	-0.029	-0.121	-0.150	-0.189
Industry-Year FE	(0.159)	(0.175)	(0.095)	(0.022)	(0.181)	(0.168)	(0.468)
Control Mean: Sh. Corp.	16.071	15.691	3.809	0.083	13.523	12.518	15.030
″, Non-Sh. Corp.	15.111	14.831	3.396	0.022	12.314	11.980	14.706
N, Firm-Years	75,294	36,733	137,504	137,504	115,764	113,833	21,638
N, Sh. Corp.	812	393	1,090	1,090	894	885	253
N, Non-Sh. Corp.	22,566	8,259	31,438	31,438	26,089	25,751	6,012

Note: The table reports placebo analyses for the specifications reported in Table 3. Panels A and B replicate our DiD specification in (12) for placebo samples and placebo reforms on August 10, 1998 and 2002, respectively (rather than August 10, 1994, when the actual reform occurred). We report the results of DiD specifications as in (12). The sample is restricted to shareholder corporations (*Aktiengesellschaften*) and non-shareholder corporations (*GmbHs*) with 10 or more employees incorporated within two years of August 10, 1998 on Panel A and within two years of August 10, 2002 on Panel B. We use 2-digit NACE designations for industry fixed effects. See Appendix Section B for more information on the sample construction. The control means refer to observations of firms incorporated *on or after* August 10, 1998 or August 10, 2002. Standard errors are clustered at the firm level are reported in parentheses. Stars denote statistical significance: * $p < 0.10$, ** $p < 0.05$, *** $p < 0.01$.

Table D.12: **Placebo Reforms in 1998 and 2002**: Effect on Productivity and Capital Intensity

	Value Add. per Emp (1)	Log VA per Emp (2)	Fixed A. per Emp (3)	Log Fixed A. per Emp (4)	TFP (Fixed A.) (5)	Capital Share (6)	Value Added /Revenue (7)
Panel A: Placebo Reform in 1998							
DiD	-15.718	-0.170	21.094	0.092	-0.215**	0.008	0.055
Industry-Year FE	(13.569)	(0.116)	(26.512)	(0.144)	(0.101)	(0.027)	(0.087)
Control Mean: Sh. Corp.	128.807	10.511	141.021	9.551	7.047	0.352	0.648
″, Non-Sh. Corp.	71.313	10.570	35.017	8.917	7.727	0.252	0.374
N, Firm-Years	41,755	41,755	121,971	120,603	41,183	40,750	30,660
N, Sh. Corp.	514	514	894	891	511	526	467
N, Non-Sh. Corp.	8,822	8,822	26,219	25,968	8,683	8,640	7,687
Panel B: Placebo Reform in 2002							
DiD	-14.677	-0.090	-7.301	-0.072	-0.069	-0.025	0.029
Industry-Year FE	(12.433)	(0.094)	(21.680)	(0.138)	(0.082)	(0.029)	(0.048)
Control Mean: Sh. Corp.	110.152	11.030	102.648	9.671	7.615	0.305	0.435
″, Non-Sh. Corp.	67.581	10.657	35.690	8.898	7.880	0.245	0.378
N, Firm-Years	36,733	36,733	117,698	115,764	36,071	35,486	26,208
N, Sh. Corp.	393	393	902	894	391	396	344
N, Non-Sh. Corp.	8,259	8,259	26,388	26,089	8,145	8,055	7,126

Note: The table reports placebo analyses for the specifications reported in Table 4. Panels A and B replicate our DiD specification in (12) for placebo samples and placebo reforms on August 10, 1998 and 2002, respectively (rather than August 10, 1994, when the actual reform occurred). We report the results of DiD specifications as in (12). The sample is restricted to shareholder corporations (*Aktiengesellschaften*) and non-shareholder corporations (*GmbHs*) with 10 or more employees incorporated within two years of August 10, 1998 on Panel A and within two years of August 10, 2002 on Panel B. We use 2-digit NACE designations for industry fixed effects. See Appendix Section B for more information on the sample construction. The control means refer to observations of firms incorporated *on or after* August 10, 1998 or August 10, 2002. Standard errors are clustered at the firm level are reported in parentheses. Stars denote statistical significance: * $p < 0.10$, ** $p < 0.05$, *** $p < 0.01$.

Table D.13: **Placebo Reforms in 1998 and 2002**: Effect on Profitability

	EBITDA /Revenue (1)	EBIT /Revenue (2)	EBITDA /Equity (3)	EBIT /Equity (4)	EBITDA /Total A. (5)	EBIT /Total A. (6)
	Panel A: Placebo Reform in 1998					
DiD	-0.031	-0.034	0.510	0.363	-0.025	-0.020
Industry-Year FE	(0.036)	(0.040)	(0.511)	(0.411)	(0.017)	(0.016)
Control Mean: Sh. Corp.	-0.060	-0.115	0.346	0.130	0.076	0.039
″, Non-Sh. Corp.	0.061	0.028	1.885	1.075	0.134	0.085
N, Firm-Years	31,297	31,153	38,729	38,525	41,397	41,169
N, Sh. Corp.	495	498	526	528	547	549
N, Non-Sh. Corp.	7,700	7,692	8,215	8,202	8,741	8,723
	Panel B: Placebo Reform in 2002					
DiD	-0.008	-0.009	0.960*	0.768	0.0007	0.005
Industry-Year FE	(0.020)	(0.021)	(0.573)	(0.515)	(0.018)	(0.017)
Control Mean: Sh. Corp.	0.022	-0.014	0.757	0.423	0.094	0.049
″, Non-Sh. Corp.	0.058	0.027	2.382	1.526	0.134	0.084
N, Firm-Years	26,501	26,419	33,329	33,228	35,844	35,726
N, Sh. Corp.	350	350	388	388	399	399
N, Non-Sh. Corp.	7,109	7,107	7,632	7,625	8,132	8,126

Note: The table reports placebo analyses for the specifications reported in Table 8. Panels A and B replicate our DiD specification in (12) for placebo samples and placebo reforms on August 10, 1998 and 2002, respectively (rather than August 10, 1994, when the actual reform occurred). We report the results of DiD specifications as in (12). The sample is restricted to shareholder corporations (*Aktiengesellschaften*) and non-shareholder corporations (*GmbHs*) with 10 or more employees incorporated within two years of August 10, 1998 on Panel A and within two years of August 10, 2002 on Panel B. We use 2-digit NACE designations for industry fixed effects. See Appendix Section B for more information on the sample construction. The control means refer to observations of firms incorporated *on or after* August 10, 1998 or August 10, 2002. Standard errors are clustered at the firm level are reported in parentheses. Stars denote statistical significance: * $p < 0.10$, ** $p < 0.05$, *** $p < 0.01$.

Table D.14: **Placebo Reform in 1998 and 2002**: Effect on Capital Structure, Leverage, and Cost of Debt

	Liabilites /Total A. (1)	Leverage (2)	Cost of Debt (3)	Long-Term Debt /Total Debt (4)	Cash /Total A. (5)
			Panel A: Placebo Reform in 1998		
DiD	-0.016	0.001	-0.010	0.059**	-0.006
Industry-Year FE	(0.020)	(0.024)	(0.019)	(0.025)	(0.014)
Control Mean: Sh. Corp.	0.564	0.284	0.143	0.729	0.194
″, Non-Sh. Corp.	0.674	0.372	0.121	0.822	0.163
N, Firm-Years	121,921	71,239	23,752	49,584	119,463
N, Sh. Corp.	892	776	435	649	889
N, Non-Sh. Corp.	26,221	20,291	6,377	15,896	25,889
			Panel B: Placebo Reform in 2002		
DiD	-0.033*	-0.027	-0.002	-0.033	0.009
Industry-Year FE	(0.018)	(0.025)	(0.020)	(0.029)	(0.014)
Control Mean: Sh. Corp.	0.646	0.372	0.125	0.773	0.171
″, Non-Sh. Corp.	0.698	0.401	0.111	0.828	0.160
N, Firm-Years	117,658	67,994	21,781	48,312	115,044
N, Sh. Corp.	902	775	315	626	894
N, Non-Sh. Corp.	26,384	20,365	6,131	16,009	26,016

Note: The table reports placebo analyses for the specifications reported in Table 9. Panels A and B replicate our DiD specification in (12) for placebo samples and placebo reforms on August 10, 1998 and 2002, respectively (rather than August 10, 1994, when the actual reform occurred). We report the results of DiD specifications as in (12). The sample is restricted to shareholder corporations (*Aktiengesellschaften*) and non-shareholder corporations (*GmbHs*) with 10 or more employees incorporated within two years of August 10, 1998 on Panel A and within two years of August 10, 2002 on Panel B. We use 2-digit NACE designations for industry fixed effects. See Appendix Section B for more information on the sample construction. The control means refer to observations of firms incorporated *on or after* August 10, 1998 or August 10, 2002. Standard errors are clustered at the firm level are reported in parentheses. Stars denote statistical significance: * $p < 0.10$, ** $p < 0.05$, *** $p < 0.01$.

Table D.15: **Placebo Reform in 1998 and 2002**: Effect on Indices Predicting Financial Constraints and Distress (Indicators Above Median)

	HP Index (1)	KZ Index (2)	Z Score, 5 Vars (3)	Z Score, 4 Vars (4)	O Score (5)	WW Score (6)
			Panel A: Placebo Reform in 1998			
DiD	0.039	-0.018	-0.015	0.017	0.065	-0.022
Industry-Year FE	(0.031)	(0.047)	(0.047)	(0.040)	(0.047)	(0.038)
Control Mean: Sh. Corp.	0.502	0.422	0.501	0.481	0.470	0.475
″, Non-Sh. Corp.	0.495	0.487	0.483	0.499	0.499	0.497
N, Firm-Years	122,048	29,075	30,118	39,664	29,267	20,874
N, Sh. Corp.	895	494	471	528	473	428
N, Non-Sh. Corp.	26,228	7,144	7,517	8,504	6,810	6,209
			Panel B: Placebo Reform in 2002			
DiD	-0.031	-0.121**	-0.007	-0.094*	-0.030	0.017
Industry-Year FE	(0.035)	(0.050)	(0.058)	(0.053)	(0.059)	(0.059)
Control Mean: Sh. Corp.	0.523	0.671	0.496	0.627	0.611	0.596
″, Non-Sh. Corp.	0.561	0.517	0.495	0.521	0.549	0.536
N, Firm-Years	117,724	25,906	25,837	34,532	26,279	17,478
N, Sh. Corp.	902	365	342	388	355	300
N, Non-Sh. Corp.	26,389	6,803	6,999	7,965	6,650	5,664

Note: he table reports placebo analyses for the specifications reported in Panel A of Table 10. Panels A and B replicate our DiD specification in (12) for placebo samples and placebo reforms on August 10, 1998 and 2002, respectively (rather than August 10, 1994, when the actual reform occurred). We report the results of DiD specifications as in (12). The sample is restricted to shareholder corporations (*Aktiengesellschaften*) and non-shareholder corporations (*GmbHs*) with 10 or more employees incorporated within two years of August 10, 1998 on Panel A and within two years of August 10, 2002 on Panel B. We use 2-digit NACE designations for industry fixed effects. See Appendix Section B for more information on the sample construction and the note for Table 10 for more information on indicator construction. The control means refer to observations of firms incorporated *on or after* August 10, 1998. Standard errors are clustered at the firm level are reported in parentheses. Stars denote statistical significance: * $p < 0.10$, ** $p < 0.05$, *** $p < 0.01$.

Table D.16: **Placebo Reform in 1998 and 2002**: Effect on Indices Predicting Financial Constraints and Distress (Indicators Above 80^{th} Percentile)

	HP Index (1)	KZ Index (2)	Z Score, 5 Vars (3)	Z Score, 4 Vars (4)	O Score (5)	WW Score (6)
			Panel A: Placebo Reform in 1998			
DiD	0.004	-0.042	-0.018	0.018	0.029	-0.009
Industry-Year FE	(0.029)	(0.029)	(0.034)	(0.030)	(0.035)	(0.036)
Control Mean: Sh. Corp.	0.215	0.167	0.222	0.209	0.189	0.230
″, Non-Sh. Corp.	0.195	0.177	0.191	0.201	0.196	0.190
N, Firm-Years	122,048	29,075	30,118	39,664	29,267	20,874
N, Sh. Corp.	895	494	471	528	473	428
N, Non-Sh. Corp.	26,228	7,144	7,517	8,504	6,810	6,209
			Panel B: Placebo Reform in 2002			
DiD	-0.018	0.038	-0.025	-0.023	-0.014	0.056
Industry-Year FE	(0.032)	(0.049)	(0.051)	(0.043)	(0.048)	(0.042)
Control Mean: Sh. Corp.	0.198	0.239	0.226	0.262	0.269	0.182
″, Non-Sh. Corp.	0.224	0.225	0.207	0.226	0.236	0.230
N, Firm-Years	117,724	25,906	25,837	34,532	26,279	17,478
N, Sh. Corp.	902	365	342	388	355	300
N, Non-Sh. Corp.	26,389	6,803	6,999	7,965	6,650	5,664

Note: The table reports placebo analyses for the specifications reported in Panel B of Table 10. Panels A and B replicate our DiD specification in (12) for placebo samples and placebo reforms on August 10, 1998 and 2002, respectively (rather than August 10, 1994, when the actual reform occurred). We report the results of DiD specifications as in (12). The sample is restricted to shareholder corporations (*Aktiengesellschaften*) and non-shareholder corporations (*GmbHs*) with 10 or more employees incorporated within two years of August 10, 1998 on Panel A and within two years of August 10, 2002 on Panel B. We use 2-digit NACE designations for industry fixed effects. See Appendix Section B for more information on the sample construction and the note for Table 10 for more information on indicator construction. The control means refer to observations of firms incorporated *on or after* August 10, 1998. Standard errors are clustered at the firm level are reported in parentheses. Stars denote statistical significance: * $p < 0.10$, ** $p < 0.05$, *** $p < 0.01$.