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Labor Participation in Corporate Policy-making Decisions: West Germany's Experience with Codetermination*

I. Introduction

During the recent past, West Germany, the Netherlands, Norway, Sweden, Austria, Denmark, and Luxembourg introduced or expanded legislation requiring corporations to grant worker representatives voting power on their governing boards (Furubotn 1978, p. 131). This paper analyzes the effect of legally mandating these codetermination rights on corporate operations and performance.

Codetermination is frequently praised as supportive of workers' self-development and self-esteem. It "tends to reduce frustration and im-

If workers are wealth maximizers, codetermination should lead to less risky investments, smaller dividends, reduced firm leverage, higher and more stable salaries, and more capital-intensive production processes. Unless codetermination also increases productivity by raising workers' morale and satisfaction or reduces information asymmetries within the firm, shareholder wealth and firm value will decline. An analysis of West Germany's case, however, indicates that codetermination has little, if any, effect on corporate operations and performance.

potence among workers by giving them steady access to and influence on company power centers. It gives them the ability to help determine their own fates" (Furlong 1977, p. 135). Some supporters favor codetermination, arguing that it humanizes the corporate system and makes it politically more acceptable. According to former German chancellor Willy Brandt, "Codetermination belongs to the substance of the democratization process of our society" (Monissen 1978, p. 57); even Pope John XXIII embraced the idea of industrial democracy in *mater and magistra*, citing the justified rights of workers in determining the efficient running and development of the enterprise (Fitzgerald 1969, p. 117). Other supporters argue that more harmonious cooperation of labor and capital and improved communication within the firm will lead to sizable productivity gains. Although not a supporter of codetermination, Furubotn concedes that, under certain conditions, "a reorganization permitting labor representation on the firm's board can overcome informational problems and lead to Pareto-efficient solutions" (Furobotn and Wiggins 1984, p. 1). Still a third group of supporters sees codetermination as a step toward a different society. According to O. Brenner, former president of the International Metal Worker's Federation, "When we call for extension of codetermination today, this does not mean that we have made our peace with existing conditions. Codetermination is a promising tool for changing these conditions. It is the appropriate instrument for removal of abitrary authority and unnecessary subordination and for reducing the employer's power to make decisions without reference to other people's interests" (Brenner 1974, p. 101).

Opponents, however, argue that codetermination expropriates firm owners, furthers the separation of ownership and control of productive resources, reduces investment incentives, and worsens the working environment.[1] According to Jensen and Meckling (1979, p. 9), "The fact that stockholders must be forced by law to accept codetermination is the best evidence we have that they are adversely affected by it." Moreover, "It is reasonable to conjecture that codetermination questions the owner's right to claim and dispose of profits. Clearly, the role of profits in directing resources is ignored. The institutional arrangements of codetermination reflect the view that profits emerge from the exploitation of labor and are the legitimate object of redistribution" (Pejovich 1978, p. 18). Finally, and perhaps more ominously, "Given the interventionist political climate, an initial failure of codetermination [to lead to a Pareto improvement] could be disastrous, since it would probably mean that further regulation and control of the system

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1. For a discussion of the arguments made by supporters and opponents of codetermination, see Monissen (1978) and Pejovich (1978).

would be undertaken by the state. Then, a cumulative movement away from traditional organization may well be started, and capitalist economies could be transformed into something quite different from the relatively free systems currently known in Western Europe and the United States'' (Furubotn 1978, pp. 131–32).

In the United States, unions show little interest in codetermination. As Thomas H. Donahue, executive assistant to the president of the AFL-CIO explained in May 1976: ''We do not seek to be a partner in management—to be, most likely, the junior partner in success and the senior partner in failure'' (Kuehne 1980, p. 103). Leonard Woodcock, the former president of the United States Automobile Worker's Union, however, predicted that codetermination, whether mandated by law or negotiated, will become more popular: ''In coming years, workers of the new generation will inevitably seek a participatory role in all areas of decision making, not out of some ideological compulsion to destroy the 'system' but out of a pragmatic interest in protecting themselves and their families from the multiple insecurities and inequities the current governance of the system breeds'' (Woodcock 1974, p. 215).

Unfortunately, the debate surrounding codetermination is often vague, and little effort is made to analyze the actual economic effects of codetermination (for a theoretical analysis, see Furubotn [1978]; Pejovich [1978]; Jensen and Meckling [1979]; and Furubotn [1985]). This paper tries to fill that void. We investigate the effects of codetermination laws in West Germany, a country with a long and varied experience with labor participation in corporate management. For simplicity, attention is focused on legislation providing for parity codetermination; that is, an equal number of voting worker and shareholder representatives on the firm's policy-making boards.

Codetermination is analyzed by assuming that employees maximize the value of their financial claim on the firm. Since that claim is prior to the one of stockholders, workers will favor less risky investments, higher and less variable salaries, reduced dividends and debt-equity ratios, and a more capital-intensive production process. Unless these effects are offset by an increased productivity, shareholder wealth will suffer.

Surprisingly, given the heated debate typically surrounding the issue, we find little evidence that codetermination has any effect. This result suggests that employees are unable or unwilling to affect management decisions, possibly because they lack a common objective. Unlike shareholders' claim, labor's claim on the firm's cash flows is not tradable. With different endowments, time horizons, and tastes for on-the-job consumption, utility maximization on the part of employees can therefore result in contradictory objectives within the firm's labor force.

The remainder of this paper is organized as follows. Section II reviews the evolution of codetermination legislation in Germany. Section III assumes that labor will use codetermination to enhance its welfare and derives testable implications. Section IV presents the test procedure, and the next two sections discuss the data and present the results. Conclusions are drawn in Section VII.

II. Institutional Background

Codetermination is defined as the legislated requirement to seat voting employee representatives on corporate policy-making boards and is unrelated to profit-sharing schemes or employee stock ownership plans.[2] Typically, German corporations have two governing boards: a supervisory board and a management board.[3] The supervisory board's function is mainly that of monitoring. It controls the firm's activities and corporate books. In most cases, the corporate charter requires that major business decisions, such as important financing and investment decisions, be approved by that board. In addition, the supervisory board appoints and dismisses the management board, which is responsible for the day-to-day operation of the firm.

German laws giving employees some management participation rights date as early as World War I (Nutzinger 1982, p. 363). Abolished by the Nazi regime, this type of legislation reappeared in the early 1950s.[4] In 1951, under the threat of nationwide strikes by the unions, legislation was passed providing for parity codetermination in mining and in the iron and steel producing industries (*Montanmitbestimmungsgesetz*, henceforth MBG1). The law applied to most firms with more than 1,000 employees. According to MBG1, the supervisory board has to be composed of an equal number of shareholder and worker representatives. Together, they elect a neutral board member by simple majority; in case of a tie, the appointment is made by shareholders. At the time of its introduction, MBG1 applied to the vast majority of firms (by market share and labor force) in mining and in iron and steel producing industries. At various times, MBG1 was amended to eliminate loopholes.

Unsatisfied with the 1952 Works Constitution Act and its 1972 Amendment, which mandated *minority* codetermination in most firms not subject to MBG1, the largest labor unions consistently tried to

2. In addition, German workers have the right to influence decision at the shop floor level.

3. Until 1870, German corporations had only one policy-making board. They were regulated by corporate laws of the state of incorporation and were required to obtain a licence to operate. The requirement of a specific licence was repealed in 1870, but corporate law mandated the creation of a second board, the supervisory board.

4. See Harrison (1976) and Monissen (1978).

extend parity codetermination to the whole economy. Gradually, codetermination also came to be supported by most political parties and was finally passed into law in May 1976 (*Gesetz ueber die Mitbestimmung der Arbeitnehmer*, hereafter MBG2).[5] The law became effective in July 1976 with a 2-year implementation period. It applies to corporations with more than 2,000 employees that are not already subject to MBG1, including domestic subsidiaries of foreign companies. The law provides that supervisory boards are to include an equal number of shareholder and employee representatives. Chairman and deputy chairman are elected by two-thirds majority. If a majority is not achieved, the shareolders' board members elect the chairman, and the employees' board members elect the deputy. In the event the board is deadlocked on any particular decision, the chairman has the tiebreaking vote. In 1976, the new law was expected to cover 7 million workers in about 650 corporations, or just over one-quarter of the total labor force.

III. Theoretical Considerations

While providing for numerical parity of employee and shareholder board representatives, both laws (i.e., MBG1 and MBG2) give shareholders potential control over all decisions requiring a simple majority. As indicated, under MBG1, shareholders can control the election of the supervisory board's neutral member. Under MBG2, the supervisory board's chairman has the tiebreaking vote and, if a two-thirds majority on his election is not achieved, he is elected by board members representing shareholders' interests. Thus, employee representatives can be limited to a voting minority. Nonetheless, they can influence decisions by increasing the cost of running the firm.[6]

This section discusses how employees will influence business policy decisions. We abstract from agency problems between workers and their representatives and assume that employees are a monolithic group. A firm is a nexus of contracts among owners of production factors (Jensen and Meckling 1976) that is arranged, renewed, restructured, and enforced by managers for the production of goods and ser-

5. Interestingly, opinion polls taken in the late 1960s showed that German workers had little interest in codetermination; full employment, social security, and higher wages were more important issues (Niedenhof 1972, pp. 39–42). In neighboring Switzerland, a constitutional amendment providing for codetermination was rejected by popular vote in 1976. For a review of studies on codetermination in Germany, see Niedenhof (1972), Monissen (1978), and Nutzinger (1984).

6. In a different context, Dodd and Ruback (1977) observe that voting shareholder minorities "can impose costs on the controlling shareholders by alleging conflict of interest and legally challenging certain business transactions such as dividend payment" (p. 371). DeAngelo, DeAngelo, and Rice (1984) argue along the same lines to explain why minority shareholders share in the benefits that accrue from "going private."

vices for sale. Each contract gives its owner a claim to the firm's net cash flow. The nature of these financial claims determines the effort of the production factors involved. Their distributional characteristics also determine which policy decisions are value increasing and which ones are not. For instance, unanticipated investments in high-variance projects can benefit shareholders at the expense of bondholders (Fama and Miller 1972; Jensen and Meckling 1976; Myers 1977). Analysis of the nature of labor's claim on the firm's cash flow can therefore establish which policy decisions will be favored and which ones will be opposed by the firm's employees.[7]

Consider first an unlevered firm in which decisions are made by shareholders only. The contract of a typical employee entitles him to a series of fixed income claims at different maturities. By signing the labor contract, shareholders receive a title to the residual, a title to a stream of labor services, and a compound option. At the end of each period, they have the option of either staying in business at least 1 more period by paying labor its promised wage or defaulting—in which case, we assume that the firm is liquidated and that the employees receive the liquidation proceeds.

Assume, for simplicity, that the typical labor contract is tradable. By the above arguments, it is similar in nature to a coupon bond with a sinking fund provision (a problem analyzed by Geske [1977]). Its value is therefore a function of the following arguments:

$$L = L(V, w, T, n, \sigma^2, r),$$

where V is the value of the firm, w is the wage rate, T is the length of the time period between wage payments, n is the negotiated number of periodic wage payments, σ^2 is the variance rate of V, and r is the risk-free rate of return. The properties of the L-function are $\partial L/\partial V$, $\partial L/\partial w$, and $\partial L/\partial n > 0$ and $\partial L/\partial T$, $\partial L/\partial \sigma^2$, and $\partial L/\partial r < 0$. These partial derivatives have an intuitive interpretation. A larger firm value increases the probability that the wage contract will be honored, which raises its value. Similarly, higher and more frequent wages imply a more valuable labor contract. A labor contract with a longer time period between wage payments, however, delays each one of the n wage payments and therefore reduces their present value. Moreover, a larger variance σ^2 increases the probability that shareholders will be unable to meet the promised wage payments, which decreases the value of the labor contract as well. Finally, a higher interest rate lowers the value of L by reducing the present value of future wage.

Consider now the case of a firm with debt outstanding. Secured debt, for instance, has a claim on the firm's assets prior to that of labor.

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7. A similar approach is used in Lewellen, Loderer, and Martin (1986) in an empirical analysis of executive compensation packages in the United States.

Hence, if the firm were levered with secured debt, the labor contract's value would be a negative function of that debt's face value and coupon payments.[8] Intuition suggests that L is in most cases also a negative function of the face value and coupon payments of unsecured debt, regardless of whether it is of less or equal priority as labor's claim. Unsecured debt with the same priority competes directly with the labor contract for the same tail of the distribution of V; in the case of default, the proceeds from liquidation will be shared between workers and bondholders. In addition, unsecured debt with a lower priority than wages, but which matures or pays interest in the current period, is de facto prior to future wages. Therefore, these effects imply that the value of the labor contract decreases with the size of the outstanding debt. Denoting the financial claim of outstanding debt by B, the partial derivative of L with respect to B is negative, $\partial L / \partial B < 0$.

The above arguments can be used to predict the effect of codetermination laws on business policy decisions. The same implications, however, can also be derived (though less concisely) without assuming that labor contracts are tradable.[9] Summarizing our results, we predict the following effects on corporate policies.

1. *Capital structure.*—Employees will favor equity financing for its residual claim nature: debt competes with the financial claims of labor contracts ($\partial L / \partial B < 0$). Therefore, codetermination should lead to a reduction in leverage.

2. *Dividend policy.*—For the same reasons, employees will try to limit dividend payments, unless they are financed with new equity issues. Lower dividends, however, imply higher retention of funds and hence higher investments. Assuming managers have already taken all positive net present value investment opportunities, this amounts to increasing investment outlays by undertaking zero or negative net present value projects.

3. *Wage level and factor intensity.*—Workers will attempt to increase their wages ($\partial L / \partial w > 0$). In addition, since other fixed financial claims

8. Of course, if the firm was close to defaulting, employees would be de facto residual claimants. This would make $\partial L / \partial T$, $\partial L / \partial \sigma^2$, and $\partial L / \partial r$ positive (Smith 1979, p. 98).

9. The tradability assumption is analytically convenient because it implies that individual employees will behave as wealth maximizers and agree on common investment decisions. Dropping the tradability assumption could mean that utility and wealth maximization conditions differ and, in particular, that investment and consumption decisions are nonseparable. Optimal investment decisions could then differ across individual employees because of different time horizons, risk preferences, and tastes for on-the-job consumption. Yet, even then, there are business policy decisions that can make all employees better off. For example, workers' welfare is enhanced by larger expected future income streams and, assuming risk aversion, by any mean-preserving decrease in the variance of those streams.

on the firm's net cash flows have a negative effect on their wealth ($\partial L/\partial L < 0$), workers will try to limit the growth of the firm's labor force by favoring the adoption of capital-intensive production processes.

4. *Investment policy.*—In choosing among investment opportunities (I), employees will not decide on the basis of a net present value criterion ($\partial V/\partial I > 0$) but rather will take all those projects for which

$$(\partial L/\partial V) \cdot (\partial V/\partial I) + (\partial L/\partial \sigma^2) \cdot (\partial \sigma^2/\partial I) > 0.$$

Given that $\partial L/\partial V > 0$ and $\partial L/\partial \sigma^2 < 0$, this implies that employees may favor negative net present value investment projects ($\partial V/\partial I < 0$), as long as these projects decrease the variance of the firm value sufficiently.

Assuming management was maximizing shareholders' wealth before the imposition of codetermination, and abstracting from the productivity gains that could derive from higher worker morale and satisfaction as well as from improved communication within the firm, the above effects also imply a decrease in shareholder wealth and firm value.[10]

IV. Test Procedure

A. Tests of Firm Riskiness

Keeping financial leverage constant, stock-return variance and variance of firm value are positively related. Hence, we analyze the variance in security returns and test whether codetermination leads to less risky projects. Evidence for this proposition is provided by comparing the stock return variance of industries subject to codetermination to similar industries in countries without such legislation. That is, for each country, industries are ranked according to the size of the stock return variance, and the average rank is compared across countries.

In addition, stock return variances should decrease after the imposition of codetermination. Therefore, we compare the change in security return variance before and after imposition of codetermination (MBG2) in industries subject to the legislation and industries exempt from MBG2 and investigate whether the number of instances of increased variance is larger for affected industries. Similarly, we compare the portfolio variance of codetermined firms to that of non-codetermined firms and test whether the portfolio return variance increases more in the codetermined portfolio.

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10. Codetermination may also reduce the agency costs of debt because, when the value of the firm is below the present value of its financial obligations, employees may have an incentive to invest in positive net present value projects that shareholders would rather forgo. Whether these gains offset the shareholder wealth decline predicted by the model is an empirical question.

B. Matched Pairs Tests

The main purpose of these tests is to investigate whether codetermination reduces firm leverage, profitability, and dividend payout and whether it increases capital intensity and workers' total pay. Using accounting data, we compare financial ratios of companies subject to codetermination with financial ratios of a control group of companies exempt from this legislation. Every firm subject to codetermination is matched with a non-codetermined firm in the same industry. However, because MBG2 applies only to corporations employing more than 2,000 workers, control firms are significantly smaller than the treatment companies. Therefore, ratios are compared both before and after passage of MBG2 to control for differences that are caused solely by size differences.

Consider, for example, the dividend payout ratio. For every matched pair of firms, we compute the difference in payout ratios before and after the imposition of codetermination and test whether that difference decreases algebraically for a significant number of pairs and whether the average algebraic difference in payout ratios across sample pairs decreases as well.

The same approach is used for other variables discussed in Section III, including changes in leverage, capital intensity, labor costs, and profitability. In addition, we analyze changes in the effect of codetermination on investment risk by comparing changes in the variance of the book return on total assets (unlike stock return variance, this variable does not require any assumption about firm leverage). Rather than comparing arithmetic differences, however, the test is applied to the ratio of variances for every pair of firms, before and after codetermination. We test whether that ratio decreases in a significant number of cases and whether the average (across pairs) ratio decreases as well.

C. Market Value Test

Denote the monthly return on a portfolio of codetermined firms by $R_{p,t}$. Assume that equilibrium monthly returns are generated by the market model:

$$R_{p,t} = \alpha_p + \beta_p R_{m,t} + \epsilon_{p,t}, \tag{1}$$

where $R_{m,t}$ is the monthly return on the market portfolio of assets, and $\epsilon_{p,t}$ represents independent random drawings from a normal distribution with parameters $(0, \sigma^2)$. Market efficiency implies that unexpected imposition of codetermination at time t will be reflected in the error term $\epsilon_{p,t}$. Denote by $I_t = 1$ the imposition of codetermination on the firms in portfolio at time t ($I_t = 0$, if no codetermination is legislated). If codetermination has no effect on shareholder wealth,

$$E_{t-1}(\epsilon_{p,t}|I_t = 1) = 0, \tag{2}$$

where E is the expectation operator, and its subscript indicates the time at which the expectation is formed. However, if codetermination decreases shareholder wealth and the news of its imposition at time t is unexpected, then

$$E_{t-1}(\epsilon_{p,t}|I_t = 1) < 0. \tag{3}$$

The difficulty in testing proposition 3 is that the market may anticipate the imposition of codetermination, as the law has to be discussed and approved by the legislature. If the market incorporates the effect of codetermination over a T-month period preceding the actual date of imposition, returns over that T-month period will on average be lower than predicted by equation (1). Hence, the effect of codetermination can be measured by introducing a dummy variable D_t in equation (1):

$$R_{p,t} = \alpha_p + \beta_{1p} R_{m,t} + \beta_{2p} D_t + \epsilon_{p,t}, \tag{4}$$

$D_t = 1$ over the T-month period, and $D_t = 0$ otherwise. If codetermination reduces stockholder wealth, β_{2p} should be negative.

V. The Data

An extensive database for analyzing the effect of the 1951 legislation of MBG1 is difficult to obtain. For this period, only annual stock returns by industry are readily available for Germany (*Wirtschaft und Statistik*). For comparison purposes, annual stock returns for similar industries in other countries are collected from *International Financial Statistics*.

To analyze the effects of MBG2 on shareholder wealth, monthly stock returns and cash dividends are collected, and two portfolios are formed: a test portfolio of codetermined firms and a control portfolio of corporations not subject to MBG2. First, all publicly traded firms subject to MBG2 were identified. For each publicly traded codetermined firm, a publicly traded non-codetermined firm in the same industry was selected. If no control firm was found, we discarded the codetermined firm. If more than one non-codetermined firm was available, the first firm in alphabetical order was chosen. This selection procedure yielded a test and a control portfolio of 64 firms each. Unfortunately, monthly returns and dividends over the period January 1973–June 1983 were available for only the most frequently traded stocks.[11] This reduced the test sample to 40 firms and the control sample to 18 firms; corporations that are exempt from MBG2 tend to be smaller and less frequently traded. The stock market index used is published by *Wirtschaft und Statistik*.

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11. The database of stock prices was kindly provided by Union Bank of Switzerland. Dividends were gathered separately from stock exchange reports.

In addition to security prices, financial accounting data were collected for the above two portfolios of 64 firms. H. Albach of the University of Bonn (Bonner Stichprobe) provided us with detailed accounting information on 42 matched pairs of codetermined and non-codetermined firms in industries other than banking and insurance. No data were available for seven pairs. Six of the other 15 matched pairs were commercial banks, and nine were insurance companies. Data on these additional 15 pairs were hand collected from different issues of *Saling Aktienfuehrer*. However, because only limited data were available, and because financial ratios differ considerably between industrial firms and financial institutions, these 15 additional pairs are excluded from the test results reported below.

VI. Empirical Results

A. Variance Test Results

The effect of MBG1 on the riskiness of corporate investments is analyzed first. For this purpose, annual stock return variances for the period 1954–76 are ranked for Germany and other European countries as a control group. In Germany, industries subject to parity codetermination (coal mining and iron and steel production) rank lowest (table 1). The return variances of those two industries (indicated in table 1 with an asterisk) are lower than the return variance on the whole stock market portfolio (although with confidence smaller than 0.90, on the basis of an *F*-test). In contrast, this pattern is not observed in other European countries where codetermination, as defined here, was either nonexistent during the same 1954–76 period (Belgium, France, and Spain) or legislated only after 1972 (Austria). In those countries, the two industries in question do not generally rank lowest, and their return variances are almost always larger than the market return variance. These results are consistent with the implication that codetermination leads to less risky investments.[12]

Table 2 reports the effect of MBG2 on security returns. Monthly stock return variances for a portfolio of firms subject to MBG2 is

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12. However, the risk decline documented in table 1 may reflect a decline in security returns only, independent of total firm risk. For example, it could be the result of employees' willingness to share more of a given firm risk by accepting wage contracts more sensitive to actual cash flows. There is no indication that we are aware of, however, that German wage contracts were more flexible than those in other countries. Alternatively, as suggested by the referee, increased government subsidies and regulation could also have led to a decline in stock return variance. However, we do not know whether government intervention in the mining and iron and steel producing industries was more significant in Germany than in the other European countries. Finally, these results could also be the consequence of lower debt-to-equity ratios (independent of the effects of codetermination) in Germany than in the other European countries.

TABLE 1   **Annual Stock Return Variance Estimates by Industry: Selected European Countries**

Country	Variance	Country	Variance
Germany, 1954–76:		France, 1954–75	
Economywide	.0831	Economywide	.0429
Coal mining*	.0499	Coal mining*	.0179
Iron and steel*	.0619	Food	.0245
Electronics	.0781	Housing and	
Dyestuffs	.0807	construction	.0316
Textiles & clothes	.0897	Chemicals	.0465
Chemicals	.0900	Mechanical	
Machines and tools	.1016	construction	.0475
Automobiles	.2463	Iron and steel*	.0484
		Textiles	.0568
Austria, 1954–75		Automobiles	.0810
Economywide	.0449	Oil refining	.1251
Beer	.0381		
Construction	.0516	Spain, 1953–74	
Metals*	.0815	Economywide	.0165
Paper	.0893	Electrical utilities	.0185
		Banking	.0223
Belgium, 1954–75		State monopolies	.0286
Economywide	.0233	Mining and metals*	.0348
Gas and Electricity	.0140	Insurance	.0357
Food	.0199	Transportation	.0447
Housing	.0296	Other	.0479
Iron metals	.0321	Chemicals	.0618
Textiles	.0495	Maritime	
Steel*	.0576	transportation	.0652
Chemicals	.0582		
Others	.0609		
Nonferrous metals	.0655		
Coal mining*	.0768		

NOTE.—Return variances are calculated as

$$S^2 = \frac{1}{N-1} \sum_{t=1}^{N} (\bar{R}_{p,t} - \bar{R}_p)^2,$$

where N is the number of years in the estimation period, $\bar{R}_{p,t}$ is the raw return based on an index of stock prices in industry P, and $\bar{R}_p$ is the average $\bar{R}_{p,t}$.
  * Industries subject to the 1951 codetermination law in Germany.

compared to a portfolio of firms exempt from this legislation, both before and after the imposition of that law.

The legislation became law in July 1976, but a 2-year implementation period was granted. Since some corporations probably instituted codetermination before the July 1978 deadline, we chose a pre-determination period ranging from January 1973 to December 1977 and a postcodetermination period ranging from January 1978 to April 1983. Using equally weighted portfolios and continuously compounded returns, three variance measures were calculated: the return variance (panel 1); the variance of the residual from a market model regression (Fama

TABLE 2   Comparison of Monthly Portfolio Return Variances before and after the Implementation of the 1976 Codetermination Act

	Variance Estimate s_1^2, January 1973– December 1977	Variance Estimate s_2^2, January 1978– April 1983	F-Statistic (s_1^2/s_2^2)
Panel 1:[a]			
Codetermined firms (40)	.0020	.0010	2.0*
Noncodetermined firms (18)	.0020	.0010	2.0*
Panel 2:[b]			
Codetermined firms (40)	.0008	.0005	1.708*
Noncodetermined firms (18)	.0009	.0004	2.0*
Panel 3:[c]			
Codetermined firms (40)	.0005	.0003	1.731*
Noncodetermined firms (18)	.0007	.0003	2.059*

[a] Return variances are calculated as

$$s^2 = \frac{1}{N-1} \sum_{t=1}^{N} (\hat{R}_{p,t} - \bar{R}_p)^2,$$

where N is the number of months in the estimation period, $\hat{R}_{p,t}$ is the natural logarithm of one plus the monthly return on portfolio p in period t, and $\bar{R}_p$ is the average $\hat{R}_{p,t}$. Monthly returns include dividend payments.

[b] Return variances are calculated as the estimated variance of the error term $\bar{\epsilon}_{p,t}$ in the regression

$$\hat{R}_{p,t} = \alpha_p + \beta_p \hat{R}_{m,t} + \bar{\epsilon}_{p,t},$$

where $\hat{R}_{m,t}$ is the natural logarithm of one plus the return on the stock market index. The error term is assumed to be normally distributed.

[c] Return variances are estimated variances of the error term $\bar{\eta}_{p,t}$ in the regression

$$\hat{R}_{p,t} = \alpha_p + \beta_{1p}R_{m,t-2} + \beta_{2p}R_{m,t-1} + \beta_{3p}R_{m,t} + \beta_{4p}R_{m,t+1} + \beta_{5p}R_{m,t+2} + \bar{\eta}_{p,t}.$$

The error term is assumed to be normally distributed.

* Indicates statistical significance with confidence 0.95.

1976) (panel 2); the residual variance from a market model regression using the contemporaneous rate of growth of the market index, two lagged values (1-month and 2-month lags), and two lead values (1-month and 2-month leads) of the rate of growth in this market index as additional independent variables (panel 3). This additional residual variance measure was used to correct for potential dependencies between current portfolio returns and the noncontemporaneous returns on the market index caused by infrequent trading (Dimson 1979).

As the natural logarithms of monthly stock returns is approximately normally distributed, variance changes can be tested using F-tests. The return variance of the portfolio of codetermined firms declines significantly (confidence 0.95) following the imposition of codetermination; both the total and the diversifiable risk decrease. However, the same phenomenon occurs in firms not subject to MBG2. If anything, the variance decrease is stronger for non-codetermined firms. Hence, we cannot conclude that codetermination causes a lower stock return variance in the case of MBG2.

B. Matched Pairs Tests

For MBG2, firm-specific accounting data can be used to test the model's predictions with the matched pairs methodology described in Sectin IVB. The findings obtained with the database of the University of Bonn (42 matched pairs of firms) are shown in table 3. The pre-codetermination period spans the years 1970–77 and the post-codetermination period the years 1978–82. Generally, there is no evidence that employees use codetermination to affect firm policies. None of the mean comparison tests performed produce statistically significant results.

The effect of the MBG2 on accounting profitability is investigated first. The average difference in the book return on assets between codetermined and non-codetermined firms in the 1970–76 comparison period was 0.7%. This difference fell to 0.6% in the test period. However, the difference is not statistically significant. In fact, average differences in the book return on equity between treatment and control firms rose from 2.0% to 4.8%, but the 2.8% increase is not significant.[13]

Similarly, the data do not support the notion that codetermined firms pay lower dividends: if anything, the average difference in payout ratios increased (although not significantly) from −0.024 in 1970–76 to 0.041 in 1977–82. Furthermore, and in contrast to our predictions, there is also no noticeable change in debt/total assets ratios. For instance, the difference in long-term indebtedness as a fraction of total assets between companies subject to MBG3 and control firms did not become larger; rather it went from −0.3% to −0.2%. Furthermore, although there is an increase in the composition of assets toward more liquidity, and hence toward potentially safer financial claims for employees, the increase in the average difference of the ratio of current to total assets from 1.6% to 6.6% is not significant. Similar results are obtained for the ratio of current assets (minus inventories) to short-term debt.

We also tested for a change in investment policy but found that investments in fixed assets did not experience a significant shift: the difference in the ratio of net investments to total assets went from −0.1% to −0.4%. There is also little evidence to suggest a perceptible development in codetermined firms toward more capital-intensive production processes: although the difference in the rato of total labor costs of total sales decreased from −5.9% to −6.9%, the change is not statistically significant. Finally, the results do not indicate that codetermination increases employees' total pay or that it reduces the variabil-

13. To offset any possible costs from codetermination, we tested whether tax authorities are more lenient toward codetermined firms. We found no evidence indicating that codetermined firms pay less taxes.

ity of salaries.[14] For instance, the differential in total pay per employee between codetermined and non-codetermined firms did not change significantly: it was 10.7% before the imposition of codetermination and 8.4% thereafter.

Table 3 also reports the results of a matched pairs test of the notion that codetermination leads firms to follow a less risky investment policy. The findings provide weak support for the conclusions of Section VIA. There is no evidence that the variance of the book return on assets changed. However, the data indicate that the variance of the book return on equity decreased after the imposition of the 1976 Codetermination Act.

Finally, since the adjustments in firm policy induced by codetermination could be too small to be detected with a parametric test, we also used nonparametric test procedures. Table 3, therefore, also presents the results of a binomial test of the frequency with which the difference (between codetermined and non-codetermined firms) in the analyzed financial ratios changed after codetermination became law.[15] The results are uniformly consistent in direction with the model's predictions: dividend payout ratios, profitability measures, debt ratios, the variability of profitability ratios and of total pay changes, and labor intensity all decrease; in addition, there is an increase in firm liquidity and workers' total pay. Yet none of these changes is statistically significant with confidence 0.95.

As an alternative test of whether codetermination reduces cash dividends, we used stock market data for the period around the enactment of MBG2. Two equally weighted portfolios of 40 codetermined and 18 non-codetermined firms, respectively, are formed. Average dividends per share were computed for each portfolio during 1973–82; German corporations typically pay dividends on an annual basis only. Average differences in dividends by the two portfolios were then calculated for the pre-codetermination period 1973–77 and the post-codetermination period 1978–82. During 1973–77, the difference in deutsche marks (DM) is -0.238; that is, firms in the codetermined portfolio paid an average DM 0.238 per year less dividends than firms in the non-codetermined portfolio. The differential increased to DM -0.441 after MBG2 became effective. While this is consistent with our analysis, a mean comparison test does not indicate that DM -0.238 is statistically larger than DM -0.441 with confidence 0.90.

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14. Using the textile industry as the base, Svejnar (1981) argues that the MBG1 increased relative hourly earnings in the iron-steel industry by 6.5%.

15. Under the null hypothesis of no codetermination effects, the frequency in question (π) is binomially distributed with probability of success 0.5. We report the normal approximation: $z = (\pi - 0.5) \cdot (0.25/n)^{-1/2}$, where n is the number of pairs in the sample.

TABLE 3   Mean Comparison Tests of the Difference in Various Financial Ratios in Codetermined versus Non-codetermined Firms

	Mean	SD	t-Value of Mean Comparison*	Proportion of Cases in Which the Ratio Decreased (%)	z-Statistic for Proportion†
Difference in ratios:					
Earnings before interest and taxes/total assets (ROA):					
1970–76	.007	.053			
1977–82	.006	.064	.06	47.6	−0.311
Net income/total equity (ROE):					
1970–76	.020	.099			
1977–82	.048	.133	−1.11	50.0	0
Dividends/net income‡:					
1970–76	−.024	.801			
1977–82	.041	.431	−.46	55.0	.633
Total debt/total assets:					
1970–76	.032	.217			
1977–82	.046	.241	−.28	54.8	.623
Long-term debt/total assets:					
1970–76	−.003	.107			
1977–82	−.002	.104	−.02	59.5	1.234
Current assets/total assets:					
1970–76	.016	.344			
1977–82	.066	.329	−.68	45.2	−.623
Current assets − inventories/short-term debt:					
1970–76	−.179	1.374			
1977–82	−.166	2.183	−.03	35.7	−1.850
Net investment in fixed assets/total assets:					
1970–76	−.001	.039			
1977–82	−.004	.027	.38	54.8	.623

Labor costs/total sales:					
1970–76	−.059	.173			
1977–82	−.069	.266	.21	61.9	1.545
Ratio of total pay pro capite in the codetermined firm: (W_C)/total pay pro capite in the non-codetermined firm (W_N):					
1970–76	1.107	.380			
1977–82	1.804	.388	.23	48.4	−.178
Ratio of variance in the rate of growth of W_C/variance in the rate of growth of W_N:					
1970–76	68.908	370.496			
1977–82	13.390	37.488	.83	51.6	.178
Ratio of ROA variance in the codetermined firm§/ROA variance in the non-codetermined firm:					
1970–76	1.344	1.934			
1977–82	1.646	3.491	−.49	52.4	.311
Ratio of ROE variance in the codetermined firm§/ROE variance in the non-codetermined firm:					
1970–76	21.513	77.834			
1977–82	2.449	5.352	1.58	57.1	.922

NOTE.—Firms are matched in pairs of codetermined and non-codetermined on the basis of industry. There are 42 matched pairs of firms in 1970–82. Differences are arithmetic differences of a particular ratio for a codetermined firm minus the same ratio for the matching non-codetermined firm.
* The *t*-value is a comparison test of the pre-codetermination and the post-codetermination averages (variances are estimated separately for the two samples).
† Under the null hypothesis of no codetermination effects, the proportion in question is binomially distributed with probability of success 0.5. We report the normal approximation

$$ z = (\pi - 0.5)\left(\frac{0.25}{n}\right)^{-\frac{1}{2}}, $$

where *n* is the number of observations.
‡ The number of observations here is 40 (rather than 42) because two differences in payout ratios had values of 45 and 12, respectively. While that did not affect the conclusions, it made the average difference in payout ratios larger than one.
§ Missing values restrict the sample to 31 matched pairs.

C. The Effect on Shareholder's Wealth

As pointed out by Jensen and Meckling (1979), it is difficult to believe that codetermination makes shareholders better off since it has not emerged voluntarily. In addition, nine companies and 29 employers' associations challenged MBG2 on constitutional grounds, maintaining that it infringes on their right to run the company, limits their freedom of industrial action and their right to associate freely without the participation of those having different interests, and blurs the line between companies and unions in collective bargaining, all of which indicates that this law was not in their best interests. However, the nation's constitutional court rejected the challenge in March 1979, arguing that the law does not infringe on shareholder's rights because the supervisory board chairman has the tiebreaking vote, which gives shareholders a "small preponderance." In addition, the court ruled that, while property rights are basic rights anchored in the constitution, they must be used to enhance public welfare, and the Parliament's belief that the law would promote industrial peace and positively influence the economy could not be ignored ("German act placing workers on board survives court test"; "West German firms lose their test of codetermination").

Employers, however, seem to have repeatedly tried to evade codetermination. These activities include the following.

1. The number of employees was reduced below the threshold level to which MBG1 and MBG2 apply. This claim is difficult to substantiate for MBG1 because coal mining and iron and steel production were declining industries for reasons unrelated to codetermination. In the case of the MBG2, however, the evidence (at least according to the unions) is less disputable.[16] Following that law, employers in different industries reduced the size of their firms by selling off entire divisions or by breaking them up into legally separate firms.

2. Firms were reorganized into legal forms not covered by MBG2.

3. Corporate charters were changed to reduce the number and im-

16. In the case of MBG1, works councils and labor unions challenged the legality of various attempts by corporations to avoid codetermination. Moreover, they negotiated agreements with firm owners to reestablish parity codetermination in firms to which MBG1 had ceased to apply (see also Spieker 1973). To prevent firms from escaping codetermination by merging with firms in other industries, legislators first amended MBG1 in 1956 (Amendment on Holding Companies), extending MBG1 to holding companies with an aggregate sales value originating mainly (50%) from industries subject to MBG1. However, holding companies that had a share of total revenues from industries covered by the MBG1 that fell below 50% for 2 straight years were exempt from MBG1. This exemption was made more restrictive with a new amendment (1967) requiring that shares fall below 50% for 5 consecutive years. The new amendment was legislated to prevent the Rheinstahl AG from claiming exemption after it acquired the Henschel AG. When this provision became ineffective in keeping the Rheinstahl AG under MBG1, the act was amended again in 1971.

portance of decisions requiring supervisory board approval. Authority was shifted from the supervisory board to newly created boards under shareholder control. Unions also charged that companies adopted new bylaws that gave company officials the right to make decisions without board approval, thereby circumventing codetermination (Ulmer 1977; Koestler and Raebiger 1978).

At the time the 1976 codetermination law was passed, it applied to about 650 firms; 3 years later, only 480 firms qualified. Roughly 50 companies had changed their corporate charters, and 120 had reduced their labor force below the 2,000 limit.

To test the effect of codetermination on the wealth of firm owners formally, we used the methodology described in Section IVC. Data availability restricts the investigation to MBG2. The dummy variable was set equal to one in the 18-month period immediately preceding the imposition of the 1976 Codetermination Act (January 1975–June 1976). The regression was estimated using continuously compounded monthly stock returns for two equally weighted portfolios of 40 codetermined and 18 non-codetermined firms, respectively. A possible infrequent trading problem (Dimson 1979) was addressed by including two lagged values (1-month and 2-month lags) and two lead values (1-month and 2-month leads) of the return on the market portfolio.

If codetermination, as claimed by its supporters, raises general satisfaction and morale, improves communication and group cohesion, and increases productivity, the coefficient associated with the dummy variable should be positive for the portfolio of codetermined firms and negative for the portfolio of non-codetermined firms, as the legislation will put them at a competitive disadvantage. On the other hand, if codetermination reduces firm owners' wealth, the dummy variable will have a negative sign for the portfolio of codetermined firms. In that case, codetermination may also adversely affect rapidly growing non-codetermined corporations since it reduces the cash flow expected after the time they will have reached the 2,000-employee threshold.

The results suggest that, in the case of firms directly affected by codetermination, the period immediately preceding its imposition is characterized by 0.008% lower average montly stock returns (table 4). Although this figure is not statistically significant with confidence 0.90 (one-tailed test), it implies that stock prices of codetermined firms declined, in relative terms, by 14.4% (0.008 × 18) between January 1975 and June 1976,. In the case of non-codetermined firms, the dummy proxying for the codetermination effect is significant with confidence 0.95, and it implies a relative stock price decline of 23.4% (0.013 × 18) during the same 18-month period. Although the monthly 0.008% loss per share of codetermined firms is smaller than the 0.013% loss per share of non-codetermined firms, the absolute monetary loss is

TABLE 4 Test of the Effect of the 1976 Codetermination Act on the Stock Value of Firms (January 1973–June 1983)

Parameter Estimates	Stock Values			
	Codetermined Firms		Non-Codetermined Firms	
	January 1973	June 1983	January 1973	June 1983
$\hat{\alpha}_p$	5.153E − 03** (2.729)	5.466E − 03** (2.192)	4.963E − 03** (2.196)	5.497E − 03** (2.224)
$\hat{\beta}_{1p}$	.166E + 00** (2.492)	...	5.522E − 02 (.692)	...
$\hat{\beta}_{2p}$	−.422E + 00** (−6.308)	...	−.182E + 00** (−2.274)	...
$\hat{\beta}_{3p}$	.994E + 00** (14.993)	1.012E + 00** (12.425)	8.473E + 00** (10.676)	.896E + 00** (11.093)
$\hat{\beta}_{4p}$	.405E + 00** (6.182)	...	.273E + 00** (3.485)	...
β_{5p}	−3.571E − 02 (−.549)	...	.158E + 00** (2.034)	...
$\hat{\beta}_{6p}$	−8.426E − 03 (−1.619)	−8.479E − 03 (−1.295)	−1.298E − 02** (−2.083)	−1.215E − 02* (−1.873)
$\bar{R}^2$	.754	.563	.593	.504
F	61.946	77.691	29.936	61.537

NOTE.—Regression equation:

$$\bar{R}_{p,t} = \alpha_p + \beta_{1p}\bar{R}_{m,t-2} + \beta_{2p}\bar{R}_{m,t-1} + \beta_{3p}\bar{R}_{m,t} + \beta_{4p}\bar{R}_{m,t+1} + \beta_{5p}\bar{R}_{m,t+2} + \beta_{6p}D_t + \bar{\epsilon}_{p,t};$$

$$D_t \begin{cases} = 1 & \text{for } t \in \text{(January 1975–June 1976)} \\ = 0 & \text{otherwise.} \end{cases}$$

Numbers in parentheses are t-statistics.
* indicates statistical significance with confidence .90 (two-sided test).
** indicates statistical significance with confidence .95 (two-sided test).

larger for codetermined firms since they are much bigger than non-codetermined firms.[17]

Finally, we focused on the constitutional court's ruling in favor of codetermination. However, an event study failed to detect any abnormal stock price changes associated with that event. Thus, taken together, the evidence that codetermination reduces stockholders' wealth is only marginal at best. In summary, our results fail to support the contention that codetermination makes stockholders better off. However, there is also little evidence for the opposite notion. One possible reason is that the test lacks power since we do not know exactly when the market incorporated the effects of codetermination.

VII. Conclusions

This paper investigates whether employees use the right to sit on the governing boards of their firms to increase the value of their financial claims on the firms' cash flows. We predicted a reduction in dividend payments, firm leverage, and firm profitability and an increase in capital intensity and total pay. Furthermore, we predicted a change in investment policy toward less risky projects. Although we observe some tendency by codetermined firms to behave according to these predictions, the evidence is very weak and rarely statistically significant.

One potential reason for these weak results could lie in the fact that the 1976 Codetermination Act was imposed on industries already subject to (minority) codetermination for 24 years, under the 1952 Works Constitution Act and its 1972 Amendment. Thus, corporate business policy decisions may have already reflected the influence of codetermination before 1976. Moreover, firms had various opportunities, through changes in firm size of corporate charter, to circumvent the 1976 act. Those that did not use these loopholes were probably firms less affected by codetermination. Still, parity codetermination should have given more influence to employee board representatives. Consistent with this notion, employers fought the new law in court. The evidence of little or no effect is therefore surprising.

An alternative reason for this result is the absence of a common objective among firm employees. Unlike shareholders, employees cannot agree on wealth maximization because their financial claim on the firm is not tradable. Given different endowments, time horizons, and tastes for on-the-job consumption, utility maximization by employees will result in different and probably contradictory maximization condi-

17. To check whether our results depend on the composition of the portfolios chosen, we repeated the test using portfolios of 18 firms each, all from the same industries, and found that the dummy variable for the codetermined portfolio became negative with confidence 0.90 (one-sided test).

tions. Even layoffs, which are commonly thought to be opposed by all firm employees, may face a divided constituency because those who expect to keep their jobs may, in fact, end up better off.

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