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Dividends, Taxes, and Signaling: Evidence from Germany

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ABSTRACT

The higher taxation of dividends in the United States gave rise to theories that explain why companies pay dividends. Tax-based signaling models propose that the higher tax on dividends is a necessary condition to make them informative about companies' values. In Germany, where dividends are not tax-disadvantaged and in fact are taxed lower for most investor classes, these models predict that dividends are not informative. However, we find that the stock price reaction to dividend news in Germany is similar to that found in the United States. This suggests other reasons, beyond taxation, that make dividends informative.

THE U.S.-CENTRIC VIEW OF dividends reflects the tax regime there which disfavors dividends.[1] Central in this view is the "dividend puzzle" (Black (1976)): if dividends are taxed higher than capital gains, why do companies pay such high cash dividends—about 50 percent of net income in the United States? One explanation suggests that it is the higher tax on dividends that makes them informative about the companies' future values (Bhattacharya (1979), John and Williams (1985), Bernheim (1991), and Bernheim and Wantz (1995)). By these models, dividend news would not be informative if not for the higher tax that they impose on shareholders.

In Germany, the tax system is different from the one in the United States. Until recently, the allocation to dividends of corporate earnings did not impose higher taxes on shareholders. For most investors, taxes on earnings allocated to dividends were *lower* than they would be if earnings were retained, the stock price appreciated accordingly and shareholders realized capital gains when selling the stock. Given that the necessary conditions for a tax-based signaling

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[1] During a short period, following the 1986 Tax Reform Act, the tax rates on both sources of income was equalized, but investors could defer the realization of capital gains, so the effective tax on capital gains was lower.

equilibrium are not satisfied in Germany, there is the question of whether dividend news conveys information about companies' values. If stock prices in Germany react positively to dividend news, it would suggest that higher taxation of dividends is not necessary to make them informative. In addition, if the higher taxation on dividends in the United States is supposed to inhibit dividends, there is a question of whether the lower tax on dividends in Germany induces higher dividend payouts. These questions are answered below.

The rest of the article is organized as follows. We present the tax regime in Germany in Section I. The empirical results are presented in Section II. In Section III, we conclude and discuss possible means that drive the reaction of stock prices to dividend news.

I. The Tax and Dividend Regime in Germany

The following describes the tax system in Germany during the period of our study, 1988 through 1992.[2] A public corporation pays local taxes on taxable earnings before tax, which varies considerably across communities, the average being about 16.5 percent.[3] It then pays additional taxes according to the use of earnings. On income allocated to retained earnings, the company pays a corporate tax of $T_{re} = 0.50$ and has available an after-tax amount of $(1 - T_{re}) = 0.50$. Before 1990, $T_{re} = 0.56$. On income allocated to dividends, the company pays a corporate tax of $T_c = 0.36$ and withholds $T_w = 0.25$ of the remainder.[4] Then, the amount paid out as dividend is $(1 - T_c) \cdot (1 - T_w) = 0.48$, and the taxes paid and withheld amount to 0.52. (Since 1994, the tax rates are $T_{re} = 0.45$ and $T_c = 0.30$.)

The tax treatment of dividends at the level of the investor differs across investor types. We review this tax treatment for the four main types of investors.

A. *Individual Investors*

Denote by T_o the ordinary income tax rate on individuals. Before 1990, $0.22 \leq T_o \leq 0.56$ and since 1990, $0.19 \leq T_o \leq 0.53$.[5]

[2] We are indebted to professors Günter Franke and Johann Heinr. v. Stein for kindly providing this information. Additional information was obtained from the Department of the Treasury report (1992).

[3] Communities can also establish the *Hebesatz*, which determines the local tax and varies between communities. Local taxes affect the after-tax cost of debt and the attractiveness of debt *versus* equity financing.

[4] If the company decides to pay out as dividend the amount it has retained in an earlier year, on which it already paid a 50 percent tax, it receives a credit of 14 percent to make the corporate tax equal to the 36 percent paid on earnings allocated to dividend. Franke and Hax (1990, p. 448) show that if the company retains earnings in one year, reinvests them, and distributes the earnings in the following year as dividend, the tax-inferiority of retained earnings for individual investors with tax brackets below 50 percent is much reduced.

[5] We ignore the church tax, which increases the maximal marginal tax rate to about 55 percent; see Franke and Hax (1990, p. 450). It applies to those who declare church membership, which is voluntary.

(i) *Capital gains* are not taxed if the stock is held for at least six months. If the stock is held for less than six months, the capital gain is taxed at T_o. Suppose that a company retains one DM and then the stock appreciates by $(1 - T_{re}) = 0.50$. An investor who sells the stock after having held it for more than six months realizes a net gain of 0.50 DM. If the investor held the stock for less than six months, the net gain is $(1 - T_{re}) \cdot (1 - T_o) \leq 0.405$ DM (0.39 before 1990).

(ii) *Dividend income* is taxed at the rate T_o on the grossed-up dividend distribution, and a credit is claimed on the total gross-up. An investor declares as income the entire amount that the company allocates to dividends, pays tax at a rate of T_o, and claims as credit the taxes paid and withheld by the company (0.52 DM). Thus, the effective after-tax income from one DM allocated to dividend is $(1 - T_o)$. An investor in the highest tax bracket adds 0.01 DM (0.04 before 1990), and investors in lower tax brackets are refunded the difference between their tax rate and 0.52.

Summing up, in terms of minimizing the whole tax burden, the analysis is as follows:

(a) Investors in the highest tax bracket who hold the stock for more than 6 months are almost indifferent between the company paying out its earnings as dividend or retaining them. The additional tax burden on dividends is 3 percent after 1990, while before 1990, there was no difference (then, T_{re} and the highest T_o were 0.56).

For all other investors, the taxes on dividends are lower:

(b) Shareholders in tax brackets below 50 percent who hold the stock for at least six months pay *lower* taxes on dividends than the tax the company pays on retained earnings.

(c) Shareholders who plan to sell the stock after holding it for less than six months prefer dividends. Then, net after-tax receipt of one DM allocated to dividend is $(1 - T_o)$, which is higher than $(1 - T_{re}) \cdot (1 - T_o)$, the net after-tax capital gain from one DM retained. Investors in the highest tax bracket (53 percent) who are uncertain about their holding period prefer dividends if there is a small probability[6] of selling the stock within the first six months of holding it.

Bay (1990, p. 153) estimates the implied tax rate of the marginal investor in Germany from the ex-dividend decline in stock prices, assuming that capital gains are not taxed. For the years 1980 through 1988, he finds that the mean implied tax rate was 44 percent; for 1988, which overlaps with our study, the implied tax rate is 48 percent. This suggests that shareholders (who do not pay tax on capital gains) would prefer dividends over retention if their own tax rates are smaller than the implied marginal tax rate, whereas shareholders in higher tax rates would prefer earnings retention. The fact that the tax rate

[6] The break-even probability is $P = 0.113$, obtained by solving for P from $(1 - 0.53) = P \cdot 0.50 \cdot (1 - 0.53) + (1 - P) \cdot 0.50$. This applies to the 1990–1992 period.

critical for this decision is lower than T_{re} can be explained as follows. If an increase in dividends necessitates the issue of equity to finance investments, the company incurs issuing costs that erode the marginal tax benefit of dividends relative to retention, and the critical marginal tax rate is then below 50 percent. This evidence also suggests that shareholders in the highest tax bracket prefer retention even if the probability of selling the stock after having held it for less than 6 months, in which case they pay tax on the capital gain, is higher than in (c) above. Altogether, Bay's (1990) evidence suggests that a substantial group of individual investors in the very high tax brackets would prefer retention to dividends.

B. Corporate Investors

Dividends paid by one company to another company do not incur additional tax, and the receiving company merely serves as a conduit. This is different from the U.S. tax regime, where a company pays corporate tax on a fraction (now 30 percent) of the dividend received. A German company does not pay the local tax on the dividend received and claims as credit the entire tax paid and withheld by the company that pays the dividend.

C. Institutional Investors[7]

Charitable institutions do not pay tax, and can claim a refund of the withholding tax T_w. Their effective after-tax income from one DM that a company allocates to dividend is $(1 - T_c) = 0.64$. If the company retains one DM and its value appreciates by the after-tax amount $(1 - T_{re}) = 0.50$, the gain to this institution is smaller.[8]

Investment funds pass through the capital gains and dividend income to their holders, who are taxed according to their tax status.

D. Foreign Investors

Dividends distributed to foreign investors are taxed at the corporate tax rate and are subject to the statutory withholding rate, although these are modified by tax treaties. The taxation of foreign investors depends on the tax laws in their respective tax homes. Denote by T_g the capital gain tax and T_o the ordinary tax rate paid on the gross (after corporate tax) dividend income. If investors can claim as credit the entire tax withheld on dividend, they would prefer the allocation of corporate income to dividend if their tax rates satisfy

[7] These institutions are mentioned in §5 of *Korperschaftsteuergesetz*, the German corporate tax code.

[8] In addition, there are institutions that are quite insignificant among investors: public law corporations or bodies (such as the German Post, the German Railway, and certain central banks) can claim a refund of half the withholding tax, and thus would prefer dividends.

$T_g > 1.28T_o - 0.28$.[9] However, many foreign investors are unable to claim as credit much or all of the tax paid and withheld by the German company.

Next, we illustrate the tax situation of U.S. shareholders of a German company.[10]

U.S. individual portfolio investors in German companies are subject to the tax treaty between the United States and Germany, effective January 1, 1990. The dividend received after German corporate tax (36 percent) is grossed up by 5.88 percent. On the grossed-up amount there is withholding of 15 percent, which the U.S. investor can claim as credit, provided that the limitations on foreign tax credit are satisfied. Thus, one DM allocated to dividend, resulting in after-corporate-tax distribution of 0.64 DM, is grossed up to 0.67763 DM on which 15 percent, or 0.10164 DM is withheld, and the cash dividend distribution is then 0.5760 DM. The U.S. investor declares as income the grossed-up amount of 0.67763 DM, has a tax liability of $0.67763 \cdot T_o$ and claims as credit 0.10164 DM. In summary, from one DM allocated to dividend, a U.S. investor entitled to the full foreign tax credit has a net after-tax income of $(1 - T_c) \cdot (1 + 0.0588) \cdot (1 - T_o)$. For an investor in the highest federal tax bracket (39.6 percent), this implies a net receipt of 0.409 DM. On one DM allocated to retained earnings that results in a value increase of 0.50 DM, a U.S. investor who realizes the gain pays capital gain tax of 28 percent. This results in a net gain of 0.36 DM, lower than the net income from dividend. The tax advantage of dividend increases the lower the investor's tax bracket. For example, for an investor with $T_o = 0.36$ the net after-tax receipts are 0.434 from dividend and 0.36 from retained earnings.

U.S. tax-exempt investors, such as pension funds, also prefer dividends. If one DM is allocated to dividends, the German company pays corporate tax and withholds 10 percent of the remainder. The cash distribution, 0.576, is greater than 0.50, the residual amount remaining of one DM allocated to retained earnings.

In summary, U.S. investors in German companies receive greater after-tax income from corporate income allocated to dividend.

II. Empirical Analysis

The above analysis shows that in Germany, when companies allocate income to dividends instead of retaining it, they do not impose a higher tax burden on many investors. In fact, for most investor classes, the tax burden of dividends is *lower*. We now examine whether dividends are informative in Germany given that the necessary conditions for a tax-based dividend signaling equilibrium do not apply. Since the tax-based signaling models imply that dividends

[9] Again, this assumes that a retention of 0.5 DM after corporate tax increases the company's value by 0.5, and the investor thus incurs a capital gain of 0.5 on which she pays tax of T_g. Clearly, if the realization of the capital gain is delayed, the effective tax is lower.

[10] The following information on U.S. taxes is obtained from the Department of the Treasury report (1992). We thank Deborah Goldstein of the law firm Coudert Brothers for valuable assistance.

in Germany cannot serve as a credible signal, if dividend changes induce a reaction in stock prices, there must be reasons other than higher taxes (as is the case in the United States) that make dividends informative.

We conduct an event study, examining the reaction of stock prices to announcements of dividend changes. In Germany, the *Vorstand*, an executive committee appointed by the board of directors, announces a proposal for the dividend. The stockholder's meeting subsequently normally approves it. Thus, the effective announcement day is the day of the *Vorstand*'s recommendation, as appears in *Handelsblatt*, a leading business newspaper in Germany. Dividends are usually declared once a year.

A. *Data and Methodology*

We examine dividend announcements made during 1988 through 1992 by the 200 companies whose stocks were most actively traded on the *Frankfurter Börse* (in 1991 DM volume). Stock return data were provided by the *Institut fur Entscheidungstheorie und Unternehmensforschung* of the University of Karlsruhe, which compiles a research database on the German stock market. We obtain daily return series (adjusted for dividends and rights) for each stock in our sample and the return on the stock index DAFOX, the *Deutscher Aktien-Forschungsindex*, which is value weighted and adjusted for cash dividends and capital changes, constructed by the Research Center of the University of Karlsruhe.

Dividend announcements by the sample companies are gathered from the online database *Genios*, constructed by the *Handelsblatt* organization from articles and news published on the German business newspaper *Handelsblatt*.[11] The final sample consists of 255 events of dividend increase and 51 events of dividend reduction. For each event i in year y, data are obtained on the announced cash dividends per share in DM,[12] DIV_{iy}, and the stock price 10 days before the announcement day, P_{iy}. We calculate the dividend yield $\mathrm{DIV}_{iy}/\mathrm{P}_{iy}$ and the change in dividend relative to price, $\Delta\mathrm{DIV}/\mathrm{P}_{iy} = (\mathrm{DIV}_{iy} - \mathrm{DIV}_{i,y-1})/\mathrm{P}_{iy}$. For the dividend increase sample, the average dividend yield $\mathrm{DIV}_{iy}/\mathrm{P}_{iy}$ is 2.63 percent, and the increase in dividend $\Delta\mathrm{DIV}/\mathrm{P}_{iy}$ averages 0.53 percent. For the dividend reduction sample, the respective numbers are 2.12 percent and −1.39 percent. The detailed results are presented in Table I. The data are subdivided into years (or groups of years for dividend reductions, because of the small sample). The numbers are fairly similar throughout.

To study the stock price reaction to dividend announcements, we examine the cumulative excess returns on days −1 and 0, day 0 being the announcement day. The market model is estimated over 120 days centered on the event

[11] For the period 1988 to 1989, the headlines of the dividend announcements were supplied by the *Institut fuer Betriebswirtschaftslehre der Christian-Albrechts Universitaet Kiel*, which constructed a similar database from *Genios*. For the period 1990 to 1992, dividend announcements are obtained directly from the *Informationsdienst* of the *Handelsblatt* Group.

[12] Source: the database of the University of Karlsruhe, and *Börsenführer*, various issues. We used the dividend figure referred to as "cash dividends," excluding tax credit.

Table I

Cumulative Excess Return for Dividend Changes in Germany

The table lists mean cumulative excess returns, *AER*, for the dividend announcement day and the previous day. The excess returns are the errors from a market model whose parameters are estimated by the Scholes-Williams (1977) method over 120 days centered on the announcement day (with a 5-day window). The market index is *DAFOX* (the *Deutscher Aktien-Forschungsindex*). *WAER* is the weighted average *AER*; the weights are the standard errors from the market model. *DIV/P* is the dividend yield, where *DIV* is the announced dividend per share and *P* is the stock price 10 days before the announcement day. $\Delta DIV/P$ is the change in dividend from the previous year, divided by *P*. *Probability* is the binomial probability of having at most the indicated number of negative or positive *AER*s for dividend increases and decreases (respectively) under the null hypothesis that the binomial probability is ½. Panel A presents the results for 255 announcements of dividend increases. Panel B presents the results for 51 announcements of dividend reductions.

Year (1)	No. cases (2)	*DIV/P* (%) (3)	$\Delta DIV/P$ (%) (4)	*AER* (%) (5)	*WAER* (%) (6)	Pos:Neg (7)	*Probability* (8)
			Panel A: Dividend Increases				
All	255	2.63	0.53	0.965	0.667	165:90	0.000
				(6.97)	(5.79)		
1988	37	3.14	0.61	0.386	0.256	19:18	0.500
				(1.10)$^{+}$	(0.81)$^{+}$		
1989	58	2.83	0.59	1.372	0.841	44:14	0.000
				(4.14)	(3.57)		
1990	55	2.10	0.36	1.048	0.813	35:20	0.029
				(3.72)	(3.32)		
1991	54	2.83	0.73	0.910	1.122	34:20	0.038
				(2.70)	(3.26)		
1992	51	2.43	0.36	0.890	0.328	33:18	0.024
				(3.96)	(2.02)*		
			Panel B: Dividend Reductions				
All	51	2.12	−1.39	−1.73	−1.10	16:35	0.006
				(4.46)	(3.44)		
1988–1990	17	2.23	−1.54	−1.57	−0.88	4:13	0.025
				(2.97)	(2.12)*		
1991–1992	34	2.07	−1.31	−1.81	−1.21	12:22	0.061
				(3.46)	(2.78)		

t-statistics are in parentheses. All test statistics indicate significance at better than 0.01, except: * better than 0.05, + insignificant at standard levels.

day, excluding a window of 5 days. For event i, the excess return on day t, ER_{it}, is calculated as

$$ER_{it} = R_{it} - (\alpha_i - \beta_i \cdot RM_t), \tag{1}$$

where R_{it} is the return on event i on day t, α_i and β_i are the market model parameters estimated by the Scholes-Williams (1977) method, and RM_t is the rate of return on the DAFOX market index on day t. We then calculate the two-day cumulative excess return for each stock, $ER2_i = ER_{i,-1} + ER_{i,0}$ for each event i, and the average two-day excess return across events, AER =

Σ ER2$_i$/N, where N is the number of events. We also calculate WAER, the weighted average of the two-day excess return, the weights being the standard deviation of the residual returns over the estimation period for each event.

B. Results

The results in Table I show a significant reaction of stock prices to dividend news, similar to the findings in the United States. For the dividend increase sample (Panel A), AER = 0.965 percent with t = 6.97, highly significant, and similar in magnitude to that reported for the United States (Pettit (1972) and Aharony and Swary (1980)).[13] The weighted average excess return is lower, WAER = 0.667 percent with t = 5.79. The binomial test also strongly rejects the null hypothesis of equal likelihood of ER2$_i$ being negative or positive when dividends increase. The AER is also positive and significant in each of the four years 1989–1992; in 1988, the AER is positive but insignificant, and ER2$_i$ is almost equally positive as negative.[14]

For the dividend reduction sample (Panel B), AER = −1.73 percent with t = 4.46, and WAER = −1.10 with t = 3.44, both highly significant. The magnitude of AER is about half that found in the United States (Pettit (1972) and Aharony and Swary (1980)). The binomial test also strongly rejects the null hypothesis of equal likelihood of ER2$_i$ being negative or positive when dividend reductions are announced. The data are divided into two subperiods because of the small sample; in both, AER is negative and significant.

Finally, we estimate the stock price reaction to dividend changes and to earnings changes for the same year. Companies in Germany usually do not announce their annual earnings and dividends on the same day, and earnings announcements precede dividend announcements. Thus, the information in dividends could corroborate the information in earnings (Kane, Lee, and Marcus (1984)). Earnings data for our sample are available for 262 cases: 222 cases of dividend increases and 40 cases of dividend reductions.[15] We calculate $(\Delta EPS/P)_i$, the annual change in earnings per share relative to price. As usual, dividends are positively related to earnings changes: Corr[$(\Delta DIV/P)_i$, $(\Delta EPS/P)_i$] = 0.51, implying that about 25 percent of the variation in dividend changes is related to EPS changes. Thus, dividends may contain information beyond that contained in earnings.

[13] The U.S. studies use quarterly dividend announcements, whereas here the dividend announcements are annual. On the one hand, there may be less new information in a quarterly announcement than in an annual one. On the other hand, in Germany dividend announcements usually follow earnings announcements.

[14] The results are biased in favor of not rejecting the null because dividend increases are all classified as unexpected increases. In our sample, the likelihood of a dividend increase in each of the five years was much greater than the likelihood of dividend reduction, so investors must have expected dividends to increase on average. Then, some of the cases in the dividend increase sample are, in fact, events of dividend increases *below* expectations.

[15] Source: Deutsche Bank Research GmbH, and *Börsenführer*, various issues. The per-share figures are adjusted for possible effects of rights issues and regrouping of capital.

We estimate a model where $ER2_i$ is a function of both dividend changes and earnings changes relative to price (using robust estimation of standard errors, White (1980)):

$$\begin{array}{lccc} ER2_i = & .003 + & .614\ \Delta DIV/P_i + & .214\ \Delta EPS/P_i, \\ (t =) & (2.20) & (4.23) & (3.21) \end{array} \tag{2}$$

$R^2 = 0.23$, is quite high. There are no significant differences between the response coefficients of dividend increases and reductions. As in Kane *et al.* (1984), both dividend and earnings news have significant information effects. Next, the estimations for the two subperiods are:

1988–1990: (146 events)

$$\begin{array}{lccc} ER2_i = & .004 + & .824\ \Delta DIV/P_i + & .124\ \Delta EPS/P_i, \quad R^2 = 0.10. \\ (t =) & (2.00) & (2.62) & (1.42) \end{array} \tag{3}$$

1991–1992: (116 events)

$$\begin{array}{lccc} ER2_i = & .002 + & .544\ \Delta DIV/P_i + & .253\ \Delta EPS/P_i, \quad R^2 = 0.31. \\ (t =) & (0.97) & (3.56) & (2.70) \end{array} \tag{4}$$

The results show that dividend changes induce a significant positive reaction in stock prices, beyond the effect of the information contained in earnings changes. It should be noted that the weaker effect of earnings does not imply that earnings are less informative, since this test pertains to the dividend announcement days, while earnings announcements are usually made a little earlier.

III. Conclusion and Discussion

This article examines dividend informativeness in Germany where, unlike in the United States, the tax regime does not disfavor dividends: corporate earnings allocated to dividends instead of to retention do not subject investors to higher taxes, and for many investors the tax burden due to dividends is even lower. This enables us to examine the hypothesis based on the U.S. tax system that dividends are informative because they are subject to higher taxes (Bhattacharya (1979), John and Williams (1985), and Bernheim (1991)).[16] We also examine whether the dividend puzzle in the United States, where high dividend payouts seem inconsistent with the tax regime that disfavors dividends, is absent under the German tax regime.

A. Dividend Informativeness

Tax-based dividend signaling models predict that in Germany, absent the necessary conditions of higher dividend taxation, dividends should not be

[16] In the United States, the information content of dividends is shown by Ofer and Siegel (1987), who find that dividend changes lead to revision of analysts' earnings expectations.

informative. We find, however, that dividend changes in Germany generate stock-price reaction in the same way that they do in the United States. This suggests that dividend changes have information content that can be explained by other factors.

Black (1976) proposes that dividends convey information because managers are reluctant to cut dividends and thus raise dividends only when they believe that they can be sustained.[17] Bhattacharya (1979) suggests that dividends are informative because, unless they are supported by better prospects, they impose costs on the firm, which has to resort to costly outside financing of its planned investment. In Miller and Rock's (1985) model, a dividend signaling equilibrium is driven by the cost of underinvestment. Kalay (1982) suggests that dividends reveal information about the company's ability to satisfy constraints imposed by debt contracts. Finally, Franke (1987) shows that there may be conditions that accommodate costless signaling in securities issues; this may apply to dividends that could signal information even when they do not involve higher tax costs.

Dividends in Germany are important in providing information on companies' *current* earnings because the accounting rules there are considered less informative than in the United States, and managers have greater discretion in reporting earnings. This is why the German Financial Analysts' Association (DVFA) and the *Schmalenbach-Gesellschaft* (SG) publish estimated net earnings (*Geschatztes Nettoergebnis*) that "differ(s) from the disclosed profit figure of the company and enables a more relevant appraisal of the real income situation and provides a better basis for the valuation of the stock than the reported net earnings for the year" (*Börsenführer*, 1995, p.xi). The estimated net earnings figure is published before the official earnings announcement, which is usually made before the dividend announcement.[18] Our results show that in spite of the earlier announcements of estimated and actual earnings, dividend news still contains significant information.

Higher dividends can directly benefit shareholders because they reduce the free resources which managers can use suboptimally (Black (1976)), and force on them scrutiny by the capital market when they need to raise outside capital (Easterbrook (1982)). Finally, the positive price reaction to dividend changes may simply support Black's (1986, p. 535) suggestion: "I think we must assume that investors care about dividends directly."

B. Dividend Payout

The average dividend payout in Germany is lower than in the United States, although the tax situation alone might suggest the opposite. The average payout was 20 percent to 40 percent in Germany during the years 1988

[17] Implicit in this is an assumption that there is a cost to managers in cutting dividends afterwards. Fischer Black also suggested that given the availability of low cost signaling, it is unreasonable that companies should choose to employ higher cost means to signal.

[18] We thank Ms. Elke Pawellek of the *Deutsche Börse* for this information.

through 1992, compared with 45 percent to 55 percent in the United States.[19] Although Rule 58 of the *Aktiengesetz* (the Stock Company Act) instructs companies to pay out at least 50 percent of earnings, the board can decide to retain more than 50 percent,[20] and after the board's decision the stockholders' meeting can decide to retain even more.

The low dividend payout in Germany could be explained by agency costs unique to that country. Banks often control the majority of voting rights in shareholder's meetings[21] of many companies to which they lend, and the banks might therefore favor low dividend payouts in order to provide greater security for debt. In addition, the cost of issuing equity to replace the money paid out in dividends may lower the propensity of companies to pay dividends.

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[19] Source: *Datastream*, presented in *The Economist*, January 29, 1994, p. Survey 17, and June 4, 1994, p. 15. (The definition: "Dividend pay-out as % of post-tax profits.") Allen and Michaely (1994) document payout ratios of 57 percent to 63 percent in the United States during that period.

[20] There are rules that enable greater retention of earnings. Stock companies have to hold *legal reserve* (retained earnings and paid-in capital) of at least 10 percent of capital stock. In a case of a shortfall, the deficit is reduced gradually by allocating for this purpose 5 percent of net income each year (reduced by the amount that is necessary to cover a potential loss carried forward from earlier periods). In addition, stock companies may have corporate articles that require a retention rate higher than 50 percent. Corporate articles can provide for a statutory reserve that exceeds 10 percent of capital stock. In addition, corporate articles can authorize the Board of Directors and the *Vorstand*, its appointed executive committee, to retain more than 50 percent of earnings.

[21] In addition to their own substantial holdings, a large proportion of stock owned by individuals are held and voting rights exercised by banks; see Prowse (1995).

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