THE JOURNAL OF FINANCE • VOL. XXXVIII, NO. 1 • MARCH 1982

Economic Evaluation of Voting Power of Common Stock

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ABSTRACT

This paper presents an economic evaluation of common stock voting rights. An index of relative voting rights inequality for different classes of stock of the same corporation is constructed and the empirical relationship between the market premium on a superior-voting stock and the voting inequality index is examined. In only three out of the 25 cases could investors have arbitraged between the two classes of stock, although in one case the arbitrage opportunity persisted for several months.

OWNERSHIP AND CONTROL OF large corporations are two separate functions. Each shareholder typically holds a relatively small number of shares and hence lacks significant voting power. As a result, shareholders' interest in the management of the firm is typically limited and a majority of them do not participate in the corporation's general meetings.[1] Thus the investment and financial decisions of the firm are made by a small group (the management) which effectively controls the firm. The possible conflict of interest between these two groups, and other various aspects of the separation of control and ownership are the subject of several studies.[2]

Grossman and Hart [5] show that even if the directors of the firm do not act in the best interest of the shareholders,[3] it may be impossible for them to be disciplined and replaced by a takeover bid. This raises the issue of whether the right to control the firm's activities has any economic value. To focus the issue, suppose a firm issues two classes of stock, one with voting rights and the other with no voting rights and assume further that the two classes are entitled to the same pecuniary payoff in every state of the world. According to traditional financial theory, that asserts that two assets promising the same payoff in every state of nature must sell for the same price, the voting rights would be worthless and we should expect the same market price for the two classes of stock. However,

* The Hebrew University, Jerusalem and the Department of Finance and the Center for Econometrics and Decision Sciences, University of Florida. The author acknowledges the helpful comments and suggestions of Zvi Lerman, John J. McConnell, and the Editor of this Journal. The research was supported in part by a grant from the Zaggagi Foundation.

[1] Midgley [11], who surveyed 55 large British corporations, found that the shares held by shareholders attending the annual general meeting represented between 0.05 and 2.60 percent of the total voting rights.

[2] See, for example, Berle and Means [2], Manne [9], [10], Alchian and Demsetz [1], Jensen and Meckling [6], Fama [4], Grossman and Hart [5].

[3] As early as 1932, Berle and Means [2] observed that the separation between ownership and control may cause a shift of resources away from the shareholders to the group which controls the firm.

Lease, McConnell and Mikkelson [7] investigated 30 U.S. corporations which had two classes of common stock outstanding, identical in all respects apart from voting power and found that in 26 out of the 30 firms the stock with extra voting power sold at a premium. This seems to contradict financial theory since the explicit payoff of the two classes of stock is identical in all states of nature. Jensen and Meckling [6] suggest a possible explanation to this seeming paradox. They assume that corporations have two groups of shareholders: the "outsiders," who have no voting rights, and the "management," which controls the firm. Although all shareholders are entitled to the same dividends at the end of each period, management may choose activities which are not in the best interest of the outside shareholders. The group which controls the firm may increase its welfare by receiving nonpecuniary benefits not received by outside shareholders. In such a case, the two classes of stocks actually do not yield the same pecuniary *and* nonpecuniary future payoff.

The purpose of this paper is to analyze and empirically examine the voting rights premia and their behavior over time. Section I provides the theoretical framework and presents a few hypotheses regarding the voting power premium. Section II briefly describes the market and the data employed in the empirical tests. Section III presents the empirical testing of the hypotheses given in Section I. To be more specific, we analyze the relationship between the voting rights premium and the "voting inequality index," and the association between the voting rights premium and the market value of the controlled asset. We also examine whether the group controlling the firm could achieve the same number of votes and at least the same amount of future dividends by selling the more expensive class of stock and buying the less expensive class of stock without increasing their total investment. Such arbitrage opportunities have implications for the efficiency of a stock market. Concluding remarks are given in Section IV. Finally, note that while the model can be applied to any stock market data, the empirical tests of this study are based on data taken from the Israeli stock market.

I. The Model and Hypotheses

A. *Voting Rights Premia*

Consider a firm with two classes of common stock which are identical in all respects except for their voting power, as manifested in different par values: each share has one vote which induces a superiority in the voting rights of the lower par value stock. For example, we may have that each IS1 (where IS stands for Israeli Shekel) of par value of class A stock is entitled to one vote while each IS1 of par value of class B stock is entitled only to one-fifth of a vote. This is the same as saying that each stock is entitled to one vote but class B stock has a par value which is five times larger than the par value of class A stock.

Assuming that investors attach some economic value to the voting privilege, we expect to find that at time t $P_{A_t} > P_{B_t}$, and the market price difference $\psi_t = P_{A_t} - P_{B_t}$ measures the voting rights premium (when no misunderstanding can arise the subscript t will be omitted).

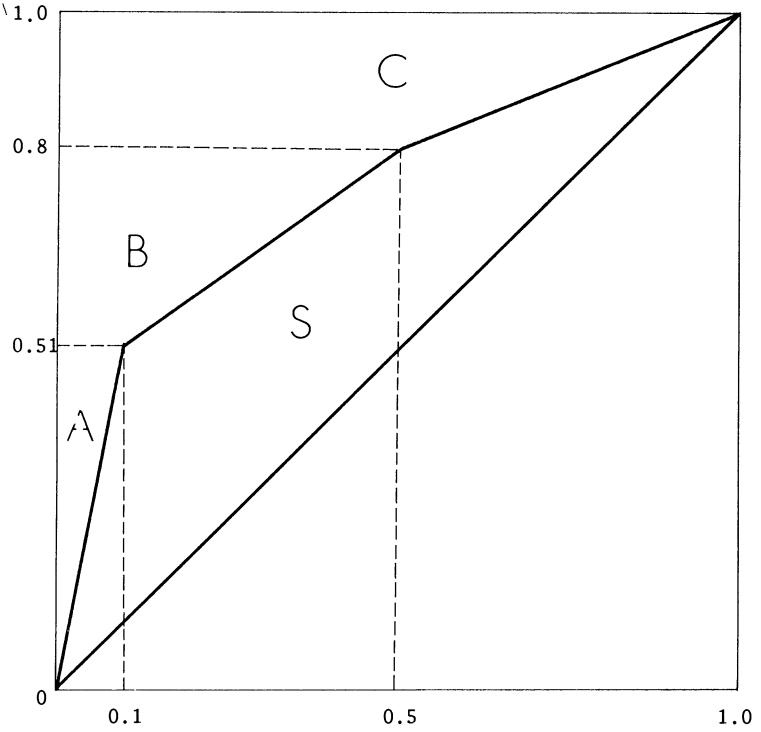

Figure 1. The Lorenz Curve: Inequality of Voting Rights.

If control of the firm has economic value, the voting rights premium will depend on the voting rights differential of the two classes of stock and the proportion of each class of stock in the firm's equity. For example, if the superior voting stock accounts for 25% of the firm's equity, we expect a higher voting rights premium than if it accounts for 99% of the firm's equity, assuming the same voting rights differential. In the latter case, the *total* premium that investors are willing to pay for control of the firm is spread over 99% of the equity and the premium attached to each share is quite small.[4]

In order to take into account both the voting power differential and the proportion of each class of stock in the firm's equity, we constructed an appropriate Lorenz inequality measure. On the horizontal axis (Figure 1) we plot the

[4] To illustrate, consider the voting rights differential of two Israeli insurance firms: Phoenix and Yardenia. In both these firms the inferior voting share has only 1/5 of the votes of the superior share per IS1 of par value. In spite of this seemingly identical degree of voting power discrimination, we find on 29 January 1981, that the relative price difference, $(P_A - P_B)/P_B$, was 11.1% for Phoenix and 51.8% for Yardenia. A possible explanation for the difference in voting premium is that the control of Yardenia is worth much more than the control of Phoenix in spite of both being in the same industry. Yet, a large differential in voting premium may be obtained even if control of the two firms has the same economic value, since both the voting power per unit par value and the proportion of each class of stock in the firm's equity determine the price difference. Indeed, the superior voting stock accounts for about 95% of the Phoenix shares, whereas in Yardenia it accounts for only about 80% of the outstanding shares. Thus, this proportion differential may be an important factor which explains the higher voting premium in Yardenia.

different classes of stock as percentage of the par value of the firm's total equity (starting with the stock which has the highest voting power and ending with the stock with the lowest voting power). On the vertical axis we plot the percentage of total votes in the company acquired by holding the corresponding proportion of its equity. In the example illustrated in Figure 1, the firm has three classes of stock and the Lorenz diagram has three straight-line segments. Stock A, which accounts for only 10% of the equity, entitles the stockholders to 51% of the votes. Stock A plus Stock B, which jointly account for 50% of the equity entitle the stockholders to 80% of the votes.

We measure the voting power inequality by dividing the area S (see Figure 1) by the area of the right triangle (which is always equal to ½). This index which we term the "voting inequality index" and denote by I, is zero in the case of one class of stock and no voting right discrimination and approaches 1 in the case of extreme inequality, i.e., one share which entitles its holder to 100% of the votes. The inequality curve easily shows how much of the equity should be held in order to get 51% of the votes, i.e., to control the firm.

For firms with only two classes of stock, the Lorenz diagram has only two straight segments, so S is a triangle. For this case I_i i.e. the voting inequality index for firm i can be shown to be given by

$$I_i = \alpha_v - \alpha_c = \frac{\text{Area } S}{\text{Area of right triangle}} \tag{1}$$

where α_v and α_c are the vertical and the horizontal coordinates of the break in the inequality line; α_v is the percentage of voting power controlled by acquiring all of the superior voting stock that represents a percentage α_c of the firm's total equity. For example, in Figure 2 (the case of the Israeli company Urdan) the coordinates of point M are $\alpha_v = 0.95$ and $\alpha_c = 0.79$ (i.e., 95% of the votes can be acquired by holding 79% of the equity) and here and area S divided by the total area of the right triangle is $0.95 - 0.79 = 0.16$.

If indeed the two classes of stock yield the same payoff in every state of nature, we expect to find in the market a zero premium for extra voting privilege. However, since a large percentage of firms listed in the Israeli stock exchange issued two classes of stocks with differential voting rights, it is reasonable to assume that the class with the superior voting right yields some additional direct benefit (though not in the form of cash dividends) or some indirect benefits. If no benefits are attached to the superior voting class, one would wonder why firms issue two classes with differential voting rights in the first place. This study tests the following hypotheses regarding the voting premium differential:

(i) The voting premium is non-negative. Superior voting power at worst has no economic value, but cannot carry a negative premium; and

(ii) The voting premium is positively associated with the degree of discrimination in the voting power per share, as well as with the "voting inequality index" which takes into account the per-share discrimination and the proportion of each class of stock in the firm's equity.

B. Market Efficiency

The market is considered to be efficient if all relevant information is instantaneously reflected in stock prices so that no one can achieve a net excess return

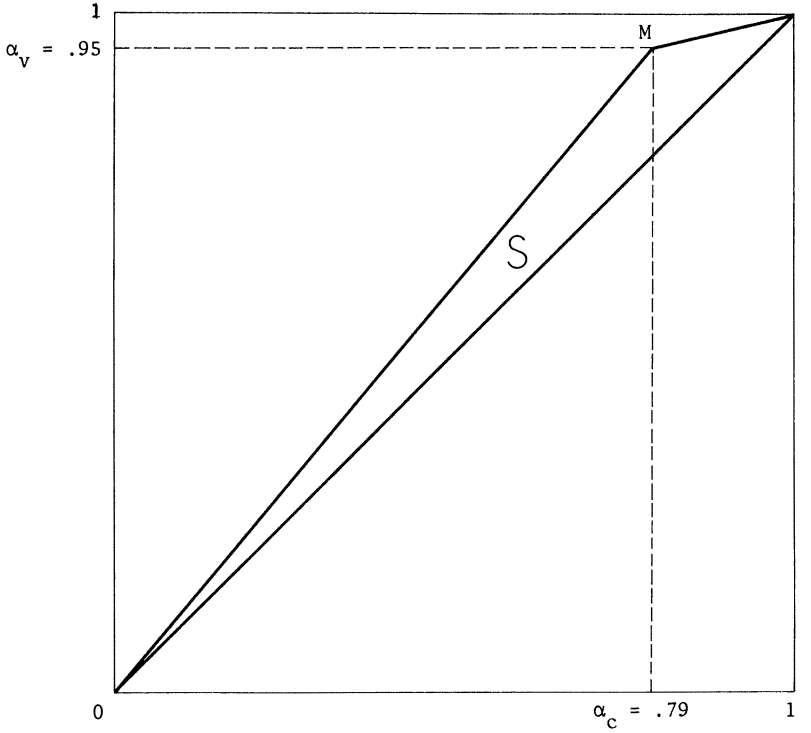

Figure 2. The Inequality Index for Urdan.

(adjusted for risk) in the stock market. It is very difficult to assess whether a particular stock is overpriced or underpriced at a given date. However, in our case, since all stocks have the same rights for dividends and the same rights in liquidation, one can construct a voting premium index, VP, such that whenever it falls *outside* the range [0, 1] the market is clearly inefficient, since investors can then switch to a better stock, increasing their future dividend cashflow without any change in the voting power that they possess. Note that in the analysis below we assume that voting rights have definite economic value, but ignore its magnitude.

To be more specific, let P_A and P_B be the market price of shares of the two classes of stock; each share of stock A is entitled to n_A votes while each share of stock B is entitled to n_B votes, where $n_A > n_B$.[5] Since the two stocks are identical in all respects except for the voting power and since stock B is inferior in this respect, we expect to have a non-negative voting premium, namely $P_A - P_B \geq 0$. We shall now show that this premium cannot exceed $P_B\left(\frac{n_A}{n_B} - 1\right)$. To see this,

[5] Share prices on the Israeli Stock Exchange are quoted in percent of par value with IS1 = 100%. Thus a quotation of 500% implies a price of IS5 per IS1 par value, and so a share of IS2 par value, say, trades for IS5 × 2 = IS10. Thus in what follows all references to shares invariably imply a "standard" share of IS1 par value, and "price of share" is actually "price of IS1 par value." Similarly, dividends are declared as percent of par value so that each IS1 of par value is entitled to the same cash dividend. Therefore the phrase "dividend per share" is actually "dividend per IS1 par value."

Table I

Arbitrage Transaction between the Two Classes of Stock

	Changes due to transaction		
Transaction	Cash	Votes	Dividends
Sell one share of class A	$+P_A$	$-n_A$	$-d$
Buy n_A/n_B shares of class B	$-(n_A/n_B)P_B$	$+n_B(n_A/n_B)$	$+(n_A/n_B)d$
Net change due to the transaction	$(P_A - \frac{n_A}{n_B} P_B)$	0	$(n_A/n_B - 1)d > 0$
No arbitrage condition implies $P_A - \frac{n_A}{n_B} P_B < 0$			

Note: $n_A > n_B$.

suppose that an investor holds one share of stock B which entitles him to n_B votes. He can acquire more votes by two alternative strategies: the first is to sell one share of stock B and buy one share of stock A, thus increasing the number of votes to which he is entitled by $n_A - n_B$ at the price $P_A - P_B$. Alternatively, he can increase his investment in stock B to n_A/n_B shares and end up with $\frac{n_A}{n_B} n_B = n_A$ votes (as in the previous alternative). The required investment in B is $P_B\left(\frac{n_A}{n_B}, - 1\right)$ and since he initially held one share of stock B, he has to pay $P_B\left(\frac{n_A}{n_B} - 1\right)$ in order to control the same number of votes as by holding one share of stock A. Thus both alternatives add $n_A - n_B$ votes and, of course, the investor will choose the least costly way to acquire this increase in voting power.

Table I illustrates that if the premium exceeds $P_B\left(\frac{n_A}{n_B} - 1\right)$ an arbitrage transaction is available which guarantees a sure profit. We assume that $n_A > n_B$. Since each stock is entitled to the same dividends we have $d_A = d_B = d$ where d_A and d_B are the dividends distributed to stocks A and B, respectively. An investor who holds stock A can sell it for P_A and buy n_A/n_B shares of class B. This transaction induces no change in the number of votes for the stockholder. However, his total dividend increases by $(n_A/n_B - 1)\,d > 0$. Since there is no change in the stockholder's voting power and his dividends increase, we expect to find that the first period cash flow involved with such a transaction would be negative. So that

$$P_A - \frac{n_A}{n_B} P_B < 0 \tag{2}$$

Subtracting P_B from both sides of (2) yields

$$P_A - P_B < P_B\left(\frac{n_A}{n_B} - 1\right) \tag{3}$$

Recalling that $P_A - P_B > 0$, inequality (3) can be rewritten as follows,

$$0 \leq \frac{P_A - P_B}{P_B\left(\frac{n_A}{n_B} - 1\right)} \leq 1 \tag{4}$$

Denoting the voting premium index by VP when

$$VP = (P_A - P_B)/P_B\left(\frac{n_A}{n_B} - 1\right) \tag{5}$$

we claim that if the market is indeed efficient *VP* must lie in the range [0, 1]. The factors which determine the exact value of this index are the relative weights investors attach to voting privilege and future dividends. If no economic value at all is attached to controlling the firm, this ratio is expected to be zero. At the other extreme, if future dividends are not considered important and they are given zero weight and a very high positive weight is attached to the controlling power, *VP* will equal 1. In any event, because of the arbitrage possibility described above, the index *VP* can never exceed 1. Should stocks with voting premium index greater than 1 or smaller than zero exist in the market for a long period of time, we shall conclude that the market is inefficient since a sure profit can be taken by arbitraging as described above.[6]

II. Background and Data

An important laboratory for evaluating voting rights exists in the Israeli stock market. Out of 104 corporations listed in early 1981 on the Israeli stock exchange, 25 had two classes of listed stock identical in all respects (i.e. dividends, liquidation rights, etc.), except for voting rights. Thus the difference between the prices of the two classes of stock measures the market value of the voting rights premium. This sample differs from the one used by Lease, McConnell, and Mikkelson [7], (LMM) in two important respects. First, it constitutes about 25% of all firms listed on the Israeli stock exchange, whereas LMM's sample represents only a negligible fraction of all firms listed in the U.S. market. Second, the observed voting premium in the Israeli stock market is much larger than the observed premium in the U.S. stock market.

In Israel, differential voting rights are introduced by issuing two classes of stock with different par values. While a difference in par value per se has no economic significance, each share of an Israeli corporation is entitled to one vote regardless of its par value, so that by issuing two classes of stock with different par values, differential voting power is created.[7] If voting privileges are valued by the market, we may expect a difference between the market prices of the two classes of stock.

[6] This sure profit exists if the investor holds the stock forever. Holding the stock for a short horizon (e.g., a year) guarantees this sure profit only if the market is efficient in the future. Otherwise, sure profit is not guaranteed since due to inefficiency of the market the price of one stock may go up and the other may go down, even though the stocks are identical.

[7] Normally when the firm offers to the public two classes of stock, the initial market price is determined as a percentage of the par value, e.g., at 120% of par, 110% of par, etc.

Apart from differential voting rights, holders of the two classes of stock are entitled to the same explicit payoffs per unit of investment, since dividends are declared as a percentage of the par value and residual assets in case of liquidation are distributed in proportion to the par value of the holdings. This means that by holding 1 share of stock with IS5 par value, the investor receives the same explicit future payoff (dividends, liquidation rights) in every state of nature as he would by holding 5 shares of stock with IS1 par value, and yet in the latter case he is entitled to 5 votes versus 1 vote in the former case.

However, a controlling group of shareholders may enjoy implicit nonpecuniary benefits, and in some cases even receive direct cash payments, which are not available to noncontrolling shareholders. Rights to these benefits are not attached to the shares but belong to the firm's executives who are nominated by the controlling group, which in turn holds most of the shares with the superior voting power.

Since each share is entitled to one vote irrespective of its par value, the lower par value characterizes the superior voting stock, and the voting power differential depends on the ratio of the par values. The differential for the shares of the two classes ranged from 2:1 to 10:1, with 5:1 as the most common ratio. All differential voting stocks were issued by industrial corporations, with the exception of a single small bank.[8]

Monthly prices of the two classes of stock as quoted on the 15th of each month on the Tel Aviv Stock Exchange[9] were used to compute the monthly voting rights premium of the superior-voting stock. The equity structure of the companies in the sample are described in Table II. In the table, α_c shows the proportion of equity having superior votes and α_v shows the proportion of voting power. For example, 79 percent of Urdon's stock had 95 percent of its voting power.

Table II reveals that in many firms, holding a relatively small proportion of the equity (α_c) guarantees a full control of the firm. Extreme cases are Kerur and Wolfson where less than 20% of the equity control more than 50% of the votes.

The two classes of stock phenomenon originated in Israel with growing family businesses, whose founders welcomed the growth but wanted to maintain control.[10] The founding family still always controls the Board of Directors and hence

[8] Many firms including banks (see Levy, Smith and Sarnat [8]) have only one class of stock listed on the stock exchange. However, they also have unlisted stock (often only a single share) which guarantees full control of the firm to its holders. These firms listed their stock on the Israeli exchange prior to the late 1960s. Since then, the Israeli stock exchange has imposed constraints on the capital structure of firms which go public. In particular there is a constraint now in effect on the magnitude of the voting rights discrimination between the different classes of stock. These constraints are a result of public pressure. In 1982 there was an appeal to the Supreme Court to eliminate all existing discrimination in the voting rights.

[9] The trading on the Israeli stock exchange follows the so-called "call system." Each stock is "called from the floor once a day, everyday, and a unique quoted price is established by matching all the accumulated sell and buy orders for that stock." The daily quoted price is thus the price at which the market for a given security clears on a given day. Note that all market prices included in this study reflect actual daily trading. None is based on nontrading days.

[10] For more details, see Levy, Smith, and Sarnat [8].

Table II

The Voting Inequality Index I_i and the Average Relative Voting Premium $\bar{\psi}_i^*$ for Firms Listed on the Tel Aviv Stock Exchange

	Fraction of votes held by superior voting stock α_v	Fraction of Equity accounted for by superior voting stock α_c	Voting inequality index $I_i = \alpha_v - \alpha_c$	Average relative premium over sample period $\bar{\psi}_i^{*a}$
Urdan	0.95	0.79	0.16	−3.39%
Elbit	.92	.72	.20	0.54
Elco	.56	.34	.22	118.12
Electra	.60	.22	.38	42.54
Elron	.56	.39	.17	23.70
Ata	.98	.79	.19	24.31
Lodzia	.67	.34	.33	119.53
Polgat	.67	.34	.33	18.63
Rim	.82	.53	.29	74.37
Wolfson	.69	.18	.51	96.87
Ararat	.85	.54	.31	62.19
Phoenix	.97	.87	.10	8.07
Yardenia	.82	.47	.35	21.66
Kerur	.62	.15	.47	110.03
Sapanut	.89	.58	.31	137.23
Rapak	.94	.77	.17	20.06
Africa	.79	.27	.52	62.84
Gevyam	.95	.79	.16	0.64
Maritime Bank	.99	.93	.06	−5.07
Danot	.83	.50	.33	38.65
Clal Leasing	.93	.73	.20	−2.30
HLB	.54	.40	.14	30.83
Israel-Underwriting	.64	.26	.38	—
Zion Cables	.68	.30	.38	—
Man	.93	.72	.21	—

[a] $\bar{\psi}_i^* = \frac{1}{T_i}\sum_{t=1}^{T_i}\frac{P_{A_t}-P_{B_t}}{P_{B_t}}$, where T_i is the number of months with available price observations for firm i, $i = 1, 2, \ldots, 22$. The last three firms are not included because of insufficient number of observations.

the nomination of the chief executive and the determination of executive compensation levels. These controls must have significant economic value.[11]

Thus, taking account of these indirect benefits, the two classes of stock actually do not promise the same payoff in every state of nature, at least not for all

[11] To bring two examples, Argaman and Polgate are two firms which were originally family-owned and went public later. The founders still hold enough votes to control the Board of Directors. The Board of Directors of Argaman adopted a resolution that 4% of the profits before taxes should be paid as administration fee to the Kleer family, the founders of Argaman. In Polgat, 6-9% of the pre-tax profit is paid to three key managers, who are the founder's relatives. Only the Board of Directors can change the preferential compensation to the founders, which implies that the controlling stockholders can increase their return in the future.

stockholders. Though the two classes of common stock are entitled to the same explicit benefits (cash dividend and liquidation rights), the payoff to the controlling group is on the whole higher.

An individual investor who does not benefit from the extra financial compensation that the management gets would have a motive to hold the stock with the superior voting rights, which normally sells at premium, if he or she actually wanted to gain control of the firm, or expected that a future struggle for control will yield significant capital gains. Thus, the possibility of a takeover bid in the future is a sufficient condition for creating a price gap between two classes of stock with differential voting power.

III. The Empirical Results

As a first step, we measured the average relative voting right premium for each company: $\bar{\psi}_i^* = (P_A - P_B)/P_B$ where i stands for the ith company. The results, which appear in Table II, reveal that except for 3 cases the average relative premium is positive as expected, and a t-test indicates that even the three negative figures are not significantly different from zero at 5% significant level. Thus, we can not reject the null hypothesis that the voting premium is non-negative. Moreover, it is positive and relatively high for most firms. The average voting premium across all firms for which data are available is 45.5%. This is very high in comparison to what has been found in the U.S. stock market.

Lease, McConnell, and Mikkelson [7] found that when a premium existed, in most cases it was not very large and the average premium for the 26 firms which revealed such a premium was 5.44 percent. In Israel, on the other hand, the voting rights premium ran well above 100% for many firms, which implies that the controlling group in Israeli firms derives a significant direct (or indirect) benefit, which does not exist in the United States.

We next proceed to test hypothesis (ii) (Section I), by analyzing the relationship between the voting power differential and the voting premium across firms.

Using the simple voting power differential (without consideration of the proportion of each stock in the firm's equity), we could not reject the null hypothesis that there is no relationship between the simple voting-power differential and the relative voting premium. All 18 corporations were divided into groups according to their voting-power ratio (from 2:1 to 10:1).[12] The mean relative voting premium $\bar{\psi}_i^*$ was calculated for each corporation as $\bar{\psi}_i^* = \frac{1}{T_i}\sum_{i=1}^{T_i} \psi_i^*$, where T_i is the number of observations for corporation i. The group's mean $\bar{\psi}^*$ was then computed across all the corporations in the group. This procedure yield the following results:

Voting power differential	2:1	4:1	5:1	10:1	Total
Number of firms	2	3	9	4	18
Mean relative voting premium (in percent), $\bar{\psi}$	70.91	70.84	32.17	73.51	52.11

[12] A firm with 2.5:1 ratio was grouped together with another firm with 2:1 ratio in the same category. Note that since we require, for some of the statistical tests, at least 12 months observations, the number of firms is reduced from 25 to 18.

Table III

Spearman Rank Correlation Coefficient r_s between the Voting Inequality Index I_i and the Average Relative Voting Premium $\bar{\psi}_i^*$ for Different Years

Year	r_s	Significance level α	Number of cases
1980	0.62	.005	22
1979	0.63	.003	18
1978	0.72	.002	14
1977	0.57	.091	7
1976	0.60	.075	7
1975	0.77	.037	6
1974	0.70	.095	5

Although there is an apparent tendency for low premium firms to cluster in the group 5 : 1, the result is apparently due to the small total number of firms and the fact that half of them (9 out of 18) were assigned to the 5 : 1 group. Analysis of variance of these data actually gives an F ratio of 1.11, so that the observed differences between the group means are insignificant at $\alpha = 0.10$ level. A similar result was obtained with the nonparametric Kruskal-Wallis test, run in order to overcome the small-sample difficulty. Thus the voting power ratio as such is indeed not the main factor responsible for the relative voting-rights premium.

In order to take into account both the voting power differential and the proportion of each class of stock in the firm's equity, we first calculated the Lorenz type "voting inequality index" for each firm defined by Equation (1). We then tested the hypothesis that the higher the inequality index, the higher is the relative market premium $\bar{\psi}^* = (P_A - P_B)/P_B$ on the superior voting stock.

The Spearman rank correlation between the average relative voting premium $\bar{\psi}_i^*$ of the 22 firms in Table II and the ranked voting inequality index I_i is +0.62 which is significantly different from zero at 5% significance level. Table III lists the Spearman rank correlation coefficient between I_i and the average relative voting premium for each year in the sample period 1974–80. The correlation coefficient varies between 0.6 and 0.8 in different years, and is significant at no more than 10% level in all cases.

Thus, we find significant positive association between the voting inequality index and the observed market premium on the stock with the superior voting rights. We do not expect to find a perfect correlation between these two variables, since there are many other economic factors which may contribute to the voting power premium, i.e. the industry, the degree of diversification of the stock between investors, the potential financial compensation to the controlling group, etc. However, the voting inequality index, combining the voting-power differential with the structure of the firm's equity, explains a major part of the variance of the voting premium across firms, while the simple voting-power differential alone failed to discriminate between different levels of voting premium.

Finally, we test whether the index VP falls in the range [0, 1]. (see Eq. (4)). If

the index VP falls outside this range for a relatively long period of time, this indicates market inefficiency since a sure profit is available and has not been exploited by investors. This sure profit is available by carrying out the arbitrage described in Table I.

For almost all the stocks included in the study and for almost all the years covered, we find as expected that $0 \leq VP \leq 1$. However, there are three exceptions. The first exception is Urdan Corporation for the period 1979–80.

Stock A is superior in its voting power, and hence we expect to have $P_{A_t} > P_{B_t}$. This is not the case and in many months we have $P_{A_t} < P_{B_t}$ which yields a negative index VP, contrary to what one would expect if voting power had economic value. For example, in January 1980 $P_{A_t} - P_{B_t}$ = IS 3.50 − IS 3.75 = IS −0.25. Thus, an investor who held stock B could sell it, buy stock A, and by doing so increase his voting power without impairing his future dividend stream (since the two stocks carry the same rights for dividends). In expectation of rational price behavior in the future, the investor could earn a sure profit of IS0.25 per share by this arbitrage (a profit could be made even net of transaction costs, assuming about 1.5% to 2% for a round trip). Indeed, it seems that such arbitraging actually took place in the market: in February 1980, the negative difference disappeared and a small positive premium was observed for the extra voting privilege (IS + 0.04). In all other months of 1980 we have either a small negative or a positive voting premium. The figures for 1979, on the other hand, indicate that the market was far from efficient. Negative differences observed in the second half of the year persisted until mid-1980. In October 1979, the price of the inferior voting stock was IS4.10 while the superior voting stock traded for IS3.35. A holder of a share of stock B could sell it and buy a share of stock A, acquiring more votes, while receiving the same future dividends and a profit of IS0.75 (before transaction costs). For example, suppose an investor held 100 shares of stock B in October 1979. He could sell his holding and obtain, net of 1% transaction costs, 0.99×410 = IS405.9. Then he could buy 100 shares of stock A paying (including 1% transaction costs) 101×3.35 = IS338.35. Thus, by arbitraging, the investor could net a profit of IS67.55 after transaction costs, while maintaining the same future dividends and controlling more votes, which at worst have zero economic value. This arbitrage opportunity persisted for about six months.

This phenomenon is only possible if investors believe that in the future stock B will appreciate faster than stock A, and consequently they will get the same dividend per share plus higher capital gains on shares of stock B. But if two identical stocks yield the same future dividends, there is no reason to expect that one stock would appreciate more than the other. Putting aside the voting power differential, observing $P_B > P_A$ is similar to observing two identical shares (of IBM, say) which trade the same exchange at the same time at different prices! A possible explanation of such seemingly irrational behavior may be provided by the volume of trade of the two classes of stock. In Israel, the volume of trade of the stock with extra voting rights is much smaller than that of the other class of stock, which may cause much sharper price movements in the short term. This property makes class A less attractive.

Obviously, it is also possible that investors do not realize that the only difference between the two classes of stock is the voting power. The information which

appears in the firm's prospectus is not taken properly into account in price determination which again indicates an inefficiency of the Israeli stock market.

A second price anomaly occurs for Elbit Corporation during 1979 and 1980. The price of stock A of Elbit was lower than the price of stock B during several months while the two stocks were identical in all respects except for voting power, and stock B was inferior in this respect. However, unlike the Urdan case, it seems that the market for the Elbit stock is much more efficient. For example in February 1980, a large negative price difference was observed (IS − 0.60), and this disappeared almost completely one month later.[13] Nevertheless, there was room for an arbitrage in some periods. In November 1980, a difference of IS − 3.40 was observed which was big enough to provide a profit by arbitrating. This large negative price difference diminished a month later, which indicates that investors actually realized that stock A was worth more than stock B (or at least not less). Whenever $P_{A_t} < P_{B_t}$ for Elbit, this gap disappeared in subsequent periods. For example, in October 1979, $P_{A_t} - P_{B_t} = \text{IS} - 0.54$, but this negative difference disappeared in the following month. Negative differences which persisted for a long time were usually small and could not yield an arbitrage profit net of transaction costs. In the period June–October 1979, five consecutive negative differences were observed, but until September 1979 these differences were so small that given 2% round trip transaction costs the arbitrage would end up with a loss. However, in October 1979, the negative difference was big enough (IS − 0.54) to provide an economic incentive for arbitraging, which indeed took place and the negative difference was wiped out.

Note that finding that $VP < 0$ is an exception rather than the rule. In all other companies a positive difference was observed in almost all the periods examined. Thus, in general we found that $P_{A_t} > P_{B_t}$, which implies that the market places a positive premium on the extra voting privilege.[14]

In all cases except one, the voting premium index VP was less than unity, as predicted (see Section I, Eq. (4)). However, for one firm (Elco) we found that the premium index was greater than 1 for a long period of time, which implies that a sure profit could be made by selling the stock with the superior voting rights and buying the stock with the inferior voting rights.

In the year 1979–1980, we found several months with $VP > 1$ for Elco's stocks and hence arbitrage opportunities were available. In September 1977, $VP = 1.0361$, and indeed the investors probably sold stock A and bought stock B so that in the following month market forces drove the index down to $VP < 1$. In November 1979 again $VP = 1.2347$, but in December 1979 the index drops below 1, as expected. A high degree of price anomaly is observed in November–December 1980, and especially during the period February–May 1979. During this

[13] One may ask why such a negative difference appeared in the first place. This may happen in the Israeli stock market which is small so that relatively small excess demand (or supply) of some stock on a particular day may cause a large fluctuation in the stock price.

[14] Lease, McConnell, and Mikkelson [7] discovered that in four cases (out of 30) the class of stock with the superior voting rights traded at a discount. These were the cases where the ownership structure of the firm also included a class of voting preferred stock. This is not the case in Israel since the firms in our sample have only two classes of common stock.

period, the index was consistently greater than 1, but investors did not exploit the arbitrage opportunity and the index remained greater than 1 for a long time.[15]

In order to illustrate arbitrage, recall that stock A and stock B are identical in all respects except that stock A carries 2.5 times as many votes as stock B per unit par value. Suppose that an investor holds 100 shares of stock A, which entitles him to 250 votes. Since the stock price on April 1979 was IS7.62 his investment in April 1979 is

$$100 \times 7.62 = \text{IS}762$$

and his dividend income is 100 d_t where d_t is the dividend per share in period t. The investor can carry out the following arbitrage (see also Table I): sell the 100 shares of stock A netting after 1% transaction costs $0.99 \times 762 = \text{IS}754.38$. Then buy 250 shares of stock B and pay, after 1% transaction costs,

$$250 \times 1.01 \times 2.33 = \text{IS}588.33$$

where IS2.33 is the share price of stock B in April 1979. Thus, the final position is as follows: the investor controls 250 votes as before, but he has made net of transaction costs a profit of $754.38 - 588.33 = \text{IS}166.05$.

Cash dividend considerations actually increase the incentive for this arbitrage. While before the arbitrage the investor received annual cash dividends of 100 d_t, after the arbitrage he should received 250 d_t, since he or she now holds 250 shares and the dividend per share is the same. However, despite this arbitrage opportunity, the index VP remained greater than 1 for four consecutive months which indicates one of the following: (a) the market was inefficient, at least for this particular stock; or (b) the stock with the superior voting power is held mainly by a small group of investors. They do not trade the stock daily, and a random excess demand for this stock drives its price upward. It took this group a few months to realize that they could make money without losing control of the firm. So this small group (normally 2–3 families) lost a profit opportunity, but this does not necessarily imply inefficiency of the security market as a whole.

To sum up, for 22 out of 25 firms, the market was efficient in the sense that the index VP of the two classes of stock fell in the expected range. For the other three stocks, VP fell in the appropriate range in most months, and in most cases arbitrage eliminated the abnormal price gap in a short period. Only a few cases did the price gap remain outside the expected range for a long time, which may indicate inefficiency of the market or inefficiency of the controlling group. However, even in these three cases the *average* price gap (over the whole year) was not significantly different from zero in the first two cases (where $VP < 0$), and the index VP was not significantly greater than 1 in the third case.

Finally, there may be some other factors which determine the voting premium which we failed to discover in this study.

[15] Note that our analysis is based on stock prices on the 15th of each month. Thus, it might be that while the index VP was greater than 1 on 15 Feb. it dropped below 1 the following day. Analyzing the daily price series, we found that the index VP remained greater than 1 persistently for a long time, in some cases for as long as a few months.

V. Concluding Remarks

Most firms whose shares are listed on major American exchanges have only one class of common stock, so that all shares of a given firm have equal voting rights. In firms with more than one class of stock, the various classes generally differ not only in voting power but also in other economic rights, e.g., dividend rights, liquidation preferences, etc. Thus, it is very difficult to evaluate the economic value of voting rights with American market data.

However, out of the 104 firms listed on the Israeli Stock Exchange in early 1981, 25 firms had two classes of common stock identical in all respects except for voting power. Thus the price difference of the two classes of stock measures the economic value of the extra voting power of the superior stock, which we call the voting rights premium.

The main results of this paper are as follows:

(1) We constructed a "voting inequality index" for the voting rights discrimination. A significant positive relationship is found between the voting inequality index and the voting rights premium.

(2) Since the two classes of stock are identical in all respects except for voting rights, it is possible to establish upper and lower bounds on the price difference. Whenever the price difference falls outside this range, there is an arbitrage opportunity. Thus, the behavior of the price difference over time sheds some light on the efficiency of the stock market. For most firms, the price difference falls inside the appropriate range for all years covered in this study. However, for three firms we found opportunities to obtain a significant arbitrage profit even net of transaction costs. Investors seem to have taken advantage of these opportunities and the abnormal price gap eventually disappeared. In a few cases, the price gap disappeared very quickly; in some cases it persisted for a few months. This may imply inefficient investment behavior of the small group controlling the firm.

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