THE IMPACT OF THE WAGE-PRICE FREEZE ON RELATIVE SHARES: A TEST OF SHORT-RUN MARKET EXPECTATIONS

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This paper attempts to shed some empirical light on the impact of the Wage-Price Freeze on the distribution of relative shares of business and labor. While the overall impact of the Freeze on relative shares must await extensive data and a comprehensive analysis which are not likely to be forthcoming for several years, the indirect approach which we have taken here has the advantage of yielding more immediate, though suggestive, results. Rather than operate directly on relative shares, we have analyzed the expectations of the market as observed in the major stock exchanges.

I. Introduction

The imposition of the Wage-Price Freeze on August 15, 1971 and the subsequent compulsory controls with built-in penalties, while reportedly enjoying wide public support, have evoked a bitter controversy between the Administration and organized labor concerning their effects.

In analyzing the short-run relative impact of the Freeze on labor and business, there are three possibilities to consider: (1) the Freeze is entirely ineffective and has, therefore, no real impact; (2) the Freeze is equally effective in controlling both wages and prices; (3) the Freeze

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has a differential impact on wages and prices; it is more effective in controlling one than it is in controlling the other.

It is obvious that even in case (2), where the impact of the Freeze is seemingly neutral, if one assumes lagging wages, the unanticipated imposition of a wage-price freeze during an inflationary period would somewhat adversely affect labor's share. This would be a fortiori true in case (3) if wages were more effectively controlled than prices.[1] If, on the other hand, one assumes that wage contracts already incorporate inflationary anticipations with lagging prices, the reverse will be true; it is business share that would be adversely affected.

Clearly, if post-Freeze supply and demand conditions remained unchanged, the Freeze would be effective, but redundantly so in that prices and wages would not have been any different in the absence of the Freeze. However, if the post-Freeze underlying conditions do change, as is likely to be the case, there are some a priori grounds to suspect that a wage freeze would be less costly to police and enforce than a price feeze. Firms have several ways in which they could partially evade the regulation: cancelling discounts, changing the quality, redesigning the product, etc.,[2] promoting key employees, creating new positions, etc.[3] On the other hand, labor contracts, particularly those of unionized workers, are often negotiated under conditions of high public visibility and subsequently stay at the same level, with a possibility of a "wage drift", for a specified period of time. In addition, the existence of unemployment in some sections of the labor market provides firms with little incentive to pay higher than the legal frozen wage.

The evidence used in evaluating the effectiveness of the Freeze

usually involves a comparison of the post-Freeze movement of a wage or a price index with its movement during a pre-Freeze period. On the basis of such evidence Weber [6], for example, concluded that the Wage-Price Freeze was effective. However, in this paper we are less interested in the overall effectiveness of the Freeze and more in its expected short-run impact on corporate profits.

On the level of casual observation, the reaction of the stock market and the reaction of both labor and industry to the imposition of the Freeze indicates that the market did not perceive the new policy as a neutral one, and that a favorable impact on business was widely anticipated.

On August 16, 1971, the first post-Freeze day, the Dow Jones Industrial Average experienced the largest daily price gain in recent history with a record high volume. There is nothing "obvious" in the market's reaction to the imposition of unprecedented governmental economic controls during peace time. If the lesson of President Kennedy's intervention was to be any guide, one could have anticipated a market decline. The fact that the market did actually rise is significant and indicates widespread anticipations of a favorable impact on business.[4]

Another piece of casual observation is the favorable and optimistic reaction to the Freeze in business circles[5] as contrasted with its utter condemnations by organized labor. It is very tempting to dismiss labor's claim that the Freeze is pro-business and anti-labor as sheer political rhetoric, yet we feel that the real issue can be resolved only on empirical grounds.

If labor's claim is valid, we would expect firms with a large labor

component to experience a higher increase in post-Freeze profits than similar firms with a smaller labor component. However, the lack of earnings data for late 1971 and 1972 makes it impossible to test the claim directly at this time. In this paper, therefore, we have attempted to test the claim indirectly by analyzing market expectations of the Freeze's impact. Economic theory suggests that expectations of higher future earnings would be capitalized in stock prices. Thus, we tested the hypothesis that the post-Freeze changes in firms' stock prices were systematically and positively related to their labor intensity. The basic framework for our approach has been suggested in an earlier paper [1] and was considerably extended here to rigorously test not only the effect of the Freeze, but also to analyze the process of market adjustments.

First we discuss the theoretical relationship between expected earnings, stock prices, and the Freeze. We proceed by formulating the empirical model, the operational hypothesis, and describing the variables and the data. Finally, we present the statistical findings and some conclusions.

II. The Theoretical Relationship Between Expected Earnings, Stock Prices, and the Freeze

According to economic theory, in a world of certainty the relationship between assets' prices and their future earnings is given by:

$$P_{it} = \bar{E}_i / \rho_{it} \qquad (1)$$

where P_{it} is the price of stock i at time t, $\bar{E}_i$ is the average long-run earnings per share per unit of time, and ρ_{it} is the firm's cost of capital per unit of time at t. Accordingly, for a short period

of time Δt, during which the cost of capital ρ_{it} is assumed to be given and prices are cum dividend, the major determinant of stock price changes, ΔP_{it}, are changes in long-run earnings, $\Delta \bar{E}_i$. Taking first relative differences in (1) we get:

$$R_{i\Delta t} = \Delta P_{it}/P_{it} = \Delta \bar{E}_i/\bar{E}_i \qquad (2)$$

where $R_{i\Delta t}$ represents the return on stock i during time period Δt as measured by its relative price change during this time period.

In a world of uncertainty, however, the return on a stock i will depend on market expectations, at time t, of the firm's average long-run earning power, $\bar{E}_{it}$, as well as, on its risk characteristics; risky stocks will tend to rise more in a rising market and fall more in a falling one. Thus, empirical returns in (2), under uncertainty, become:

$$R_{i\Delta t} = \alpha_0 + \Delta \bar{E}_{it}/\bar{E}_{it} + \alpha_1 \lambda_{it} R_{mt} + \varepsilon_{it} \qquad (3)$$

where α_0 and α_1 are constants, R_{mt} is the overall market return ($R_{mt} > 0$ for a rising market, $R_{mt} < 0$ for a falling one), λ_{it} is a risk measure of the firm's stock, and ε_{it} is a random error.

The formulation in (3) is similar to the well known "market model"[6] in the theory of finance, according to which the return on an individual stock is a linear function of the "market-return" R_{mt}, where the coefficient $\alpha_1 \lambda_{it}$ is analagous to, and more general than, the traditional Beta risk measure. Thus, the second term in (3) can be viewed as an additional component which explains a portion of the original residual in the "market model", a residual which has been linearly decomposed into a systematic component $(\Delta \bar{E}_i/\bar{E}_i)$ and a random error (ε_{it}).

The discussion in Section I suggests that the change in expected post-Freeze earnings is a function of the firm's employment intensity ℓ_i , which can be approximated by:

$$\Delta\bar{E}_{it}/\bar{E}_{it} = \delta_0 + \delta_1\ell_i + w_{it} \tag{4}$$

where w_{it} is a random error with expectation $E(w, \varepsilon) = 0$.

Combining (3) and (4), and recognizing that in a cross-sectional analysis of firm data R_{mt} is constant for all i's , the testable equation becomes:

$$R_{i\Delta t} = \beta_0 + \beta_1\ell_i + \beta_2\lambda_{it} + u_{it} \tag{5}$$

In plain economic terms, equation (5) presents a post-Freeze relationship between changes in the firm's stock price ("returns", $R_{i\Delta t}$) and its employment intensity (ℓ_i) , holding risk (λ_{it}) constant. Thus, (5) is a direct implication of (2) in the real world of uncertainty. Therefore, a positive sign of the employment intensity coefficient, $\beta_1 > 0$, will be consistent with the hypothesis that the Freeze, as judged by market expectations, tends to increase profits at the expense of wages. The sign of the risk coefficient is expected to be positive, ($\beta_2 > 0$) for a rising market and negative, ($\beta_2 < 0$), for a falling one.

III. The Empirical Model and the Data

In order to make equation (5) more operationally suitable for empirical testing, we have added the size of the firm as an additional control variable. In general, one would expect large firms to bear the brunt of the controls more heavily than small ones due to the regulator's lower cost of policing

the former. More specifically, since firms with annual sales in excess of $100 million were singled out by the regulator for special controls, it was deemed interesting to analyze the independent influence of the firm's absolute size.[7] Thus, equation (5) becomes:

$$R_{i\Delta t} = \gamma_0 + \gamma_1 L_{it} + \gamma_2 Z_{it} + \gamma_3 Q_{it} + v_{it} \qquad (6)$$

where $R_{i\Delta t}$ is the return of stock i during time period Δt, L_{it}, the firm's employment intensity, Z_{it} the firm's risk, Q_{it} the firm's absolute size, and v_{it} a stochastic error term.

The empirical estimation of equation (6) was based on a sample of the 1,000 largest United States industrial corporations in Fortune's Double 500 Directory which was also the source for some of the data. The dependent variable R_i ("return"), the short-run rate of change in stock prices, was approximated by the logarithm of the ratios of stock prices during various time intervals for post-Freeze (RF) and pre-Freeze (RB) periods. These time intervals have been quite arbitrarily chosen with no particular purpose whatsoever in mind.

As a measure of employment intensity, L_i, one would have liked to use the firm's labor to capital ratio, wage bill to total cost, etc. Unfortunately, such data are not readily available. Consequently, we used as alternative proxy variables the following ratios: employees/sales 1970, employees/sales 1971, average employees/sales 1970-1971, employees/assets 1970 and employees/assets 1971. Since all these ratios have given consistent, substantially identical, empirical results, and in order to conserve space, only the results for employment/sales 1970 (N/S) have been reported below.[8]

The risk variable, Z_{it} , was approximated by three alternative measures. The first was the commonly used Standard and Poor's Earnings and Dividend Ranking (EDRISK) truncated to numerical values ranging from one to nine, and based on Standard and Poor's Stock Guides. The second measure was the Beta risk measure, the regression coefficient of the individual stock's return over the market's return. This risk measure has been widely used in recent theoretical and empirical work in finance.[9] For a subsample of firms for which data were available, we used a least square estimate of Beta based on monthly data for a ten-year period which ended in 1968.[10]

The third measure of risk was based on the observation that risky stocks rise more in a rising stock market, and fall more in a falling one. This would seem to justify the use of observed stock returns during previous periods as proxies for their risk in subsequent ones.[11] This approach seems to be both intuitively appealing and pragmatically sound. Contrary to other measures, this particular risk measure does not necessarily assume constancy over time. If one assumes a dynamically changing world with the risk of individual stocks changing in a random walk process, a relatively small number of <u>recent</u> observations over a short period of time may contain more relevant information, and would seem to constitute a better measure of risk, than a measure based on many <u>past</u> observations which extend over a long period of time.[12]

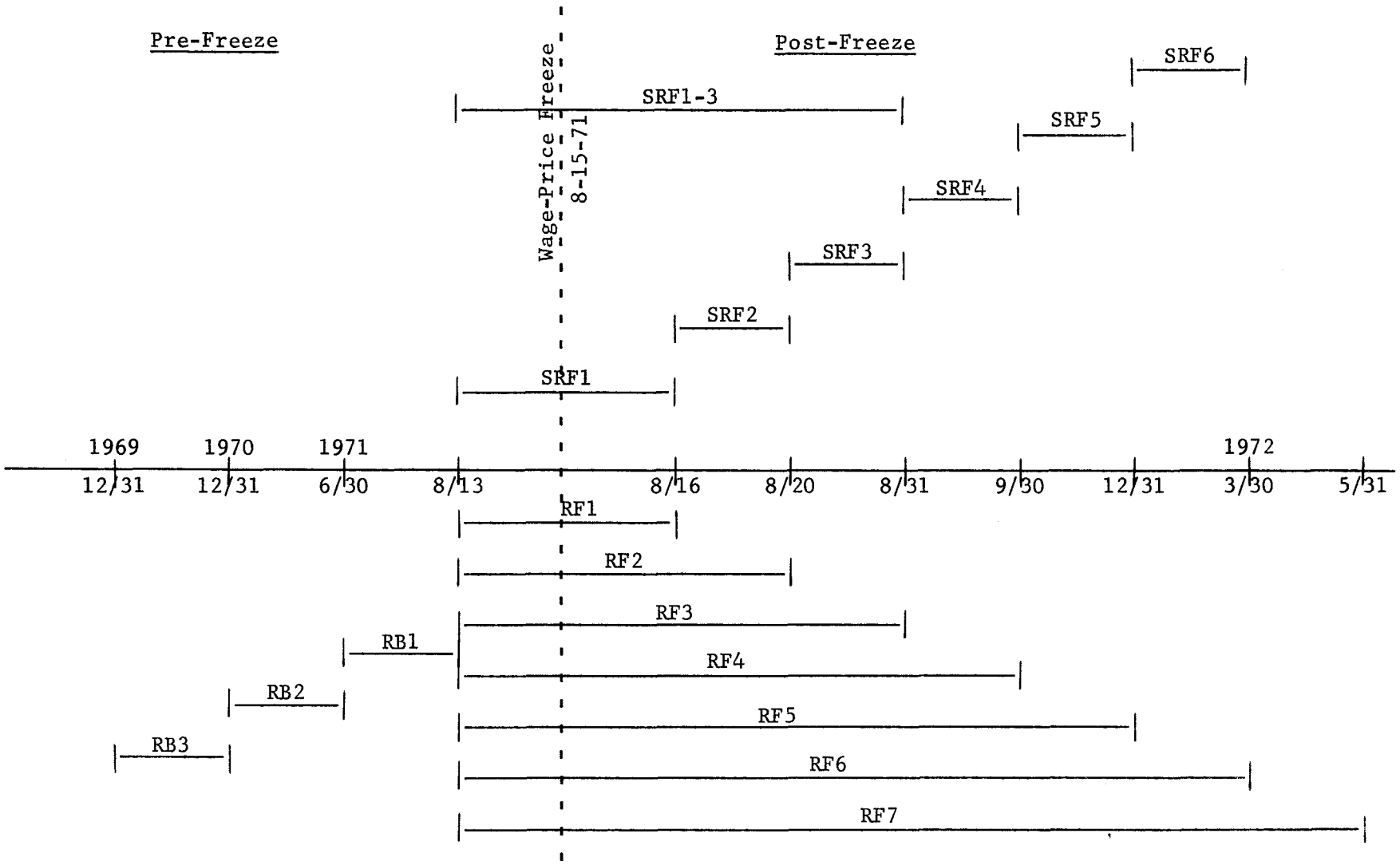
Two alternative measures were used to approximate absolute size, Q_{it} , the firm's annual sales, (S) and the firm's total assets (A) based on the 1970 and 1971 <u>Fortune</u> Directory data. Since all alternative

size measures have given consistent and substantially the same empirical results, only the results of the firm's 1970 sales have been reported below as a measure of size (SIZE).

As was previously mentioned, the main thrust of our empirical work was directed towards analyzing the independent effect of employment intensity, L_{1t} , on stock returns during seven post-Freeze periods (RF1, ..., RF7) . However, it was also interesting to check whether employment intensity had any significant effect on stock returns before the Wage-Price Freeze. For comparison, therefore, we have also estimated the model's parameters for two pre-Freeze periods: one was the six-week period immediately preceding the Freeze (RB1) and during which the stock market as a whole fell, while the other was the six-month period (December-June, 1971) during which the market as a whole rose (RB2). We have also computed "returns" during the entire pre-Freeze year of 1970 (RB3) in order to serve as a proxy for risk in subsequent periods.

Finally, the unexpected imposition of wage and price controls offers a rare opportunity to study some dynamic aspects of stock market behavior. In particular, it was deemed interesting to analyze the speed and efficiency in which the market is able to digest and act upon new information, and the length of time it takes to complete adjustments towards a new equilibrium. With this in mind, additional post-Freeze "returns" were calculated for intermediate short periods (SRF1, ..., SRF6) . Figure 1 illustrates the various time intervals covered by all "returns": pre-Freeze, post-Freeze, "short" and "long". Detailed definitions of all the variables can be found in the Appendix.

TIME INTERVALS FOR PRE-FREEZE AND POST-FREEZE RETURNS *



* Time intervals not drawn to scale

Figure 1

IV. Empirical Results

Equation (6) has been estimated by a set of OLS regressions and the statistical results, in logarithmic form,[13] are summarized below in Table 1 and Table 2 for the post-Freeze and the pre-Freeze periods respectively.

The most remarkable feature of Table 1 is the positive and highly significant effect of employment-intensity (N/S) on post-Freeze stock returns, holding constant risk and firm's size and independent of the risk measure used. The second most important feature is the persistence of this effect throughout the entire period under review, which extends from the first post-Freeze date (August 16, 1971) almost ten months later (May 31, 1972).

A third interesting feature is that the signs and significance of the regression coefficients are similar with the different risk measures used, whether risk was measured by the conventional Earnings Dividend Ranking (EDRISK), the traditional Beta, or our newly introduced RB1.[14] In general, the coefficients of the different risk measures used have the theoretically expected sign which is the same sign as the overall market change during the appropriate period. The overall market changes during the relevant time periods under study are given in the right-hand column in the Appendix, which reports the levels of the Standard and Poor's Industrial Index. Whenever previous "returns" were used as proxies for risk in subsequent "returns", the appropriate variable was multiplied by the sign of the overall market change during the relevant time period. (Thus, the previous returns, when used as risk proxies, were labeled $\overline{RB1}$, $\overline{RB2}$, $\overline{RB3}$ respectively, where $\overline{RB1}$ = (-) RB1, $\overline{RB2}$ = RB2 and $\overline{RB3}$ = (-) RB3.)

Table 1a

POST-FREEZE "LONG" RETURNS
(T-VALUES IN PARENTHESES)

	LOG(RF1)	LOG(RF2)	LOG(RF3)	LOG(RF4)	LOG(RF5)	LOG(RF6)	LOG(RF7)
Constant	.0358 (1.365)	.1025 (3.394)	.0976 (2.431)	.1232 (2.176)	.2653 (3.677)	.4644 (4.466)	.3573 (3.183)
LOG (N/S)	.0253 (4.934)	.0374 (6.343)	.0384 (4.969)	.02459 (2.220)	.0444 (3.149)	.0672 (3.306)	.0680 (3.083)
LOG (EDRISK)	.0346 (5.023)	.0242 (3.064)	.0297 (2.820)	-.0018 (.1123)	-.0400 (2.117)	-.0112 (.4124)	.01238 (.4223)
LOG (SIZE)	.0097 (3.752)	.0063 (2.123)	.0086 (2.176)	-.0024 (.4386)	-.0070 (.9956)	-.0224 (2.199)	-.0118 (1.078)
F	17.4	17.2	11.3	1.83	4.655	6.23	4.52
D.F.	760	755	762	762	761	760	749
R^2	.065	.064	.043	.007	.018	.0241	.0179

Table 1b

POST-FREEZE "LONG" RETURNS
(T-VALUES IN PARENTHESES)

	LOG(RF1)	LOG(RF2)	LOG(RF3)	LOG(RF4)	LOG(RF5)	LOG(RF6)	LOG(RF7)
Constant	.0895 (5.512)	.1284 (6.445)	.1486 (5.644)	.1190 (2.543)	.1386 (2.712)	.3887 (5.372)	.3609 (4.466)
LOG (N/S)	.2011 (5.068)	.0292 (5.996)	.0343 (5.327)	.0342 (2.996)	.0391 (3.121)	.0561 (3.165)	.0620 (3.128)
LOG ($\overline{RB1}$)	.1906 (12.22)	.1440 (7.531)	.1280 (5.063)	.0971 (2.159)	.020 (.4075)	.0895 (1.289)	.0620 (.8113)
LOG (SIZE)	-.0031 (1.658)	.0009 (.3800)	.0021 (.7067)	.0021 (.3889)	.0030 (.5262)	-.0186 (2.275)	-.0134 (1.475)
F	60.45	32.3	18.8	4.75	3.36	6.46	4.72
D.F.	903	897	905	905	902	900	885
R^2	.167	.0978	.059	.0156	.011	.021	.0158

Table 1c

POST-FREEZE "LONG" RETURNS
(T-VALUES IN PARENTHESES)

	LOG(RF1)	LOG(RF2)	LOG(RF3)	LOG(RF4)	LOG(RF5)	LOG(RF6)	LOG(RF7)
Constant	.0991 (4.266)	.1576 (5.033)	.1632 (2.786)	.1048 (1.213)	.2439 (2.386)	.4948 (3.139)	.1421 (.9458)
LOG (N/S)	.0269 (5.510)	.0477 (7.254)	.0479 (3.891)	.0181 (.999)	.0683 (3.186)	.0957 (2.895)	.0462 (1.465)
BETA	.0285 (4.046)	.0239 (2.524)	.0238 (1.342)	.0160 (.6122)	-.0269 (.8700)	-.0225 (.4706)	.0780 (1.713)
LOG (SIZE)	.0025 (1.349)	.0039 (1.543)	.0048 (1.009)	-.0057 (.8244)	.0071 (.8621)	-.0112 (.8810)	.0006 (.0550)
F	21.6	25.06	7.17	1.13	3.50	3.403	2.56
D.F.	348	348	348	348	348	348	348
R^2	.158	.179	.059	.0097	.0295	.029	.021

Table 2

PRE-FREEZE RETURNS

(T-VALUES IN PARENTHESES)

	LOG (RB2)			LOG (RB1)		
Constant	.1377 (1.447)	.0958 (.8183)	.1854 (2.559)	.00128 (.0324)	-.0547 (1.574)	-.082 (2.530)
LOG (N/S)	-.0025 (.1209)	-.0180 (.6176)	-.0063 (.3602)	-.0109 (1.411)	.0010 (.1203)	-.0078 (.9816)
LOG (EDRISK)	.0429 (1.721)			-.0412 (3.972)		
LOG (SIZE)	-.0152 (1.627)	-.0091 (.8223)	-.0183 (2.265)	-.00737 (1.898)	.00162 (.4225)	.0017 (.4562)
BETA		.0912 (2.179)				
LOG ($\overline{RB3}$)			.1124 (4.037)		-.0777 (5.848)	
LOG ($\overline{RB2}$)						-.1245 (7.893)
F	3.78	2.34	8.17	6.13	12.16	21.68
D.F.	755	358	892	764	829	871
R^2	.015	.019	.027	.024	.043	.07

The empirical results in Table 1 are consistent with the hypothesis that the market expected the profitability of firms with high employment-intensity to rise significantly more, due to the Wage-Price Freeze, than the profitability of low employment-intensity firms of similar size and risk. This conclusion is reinforced by Table 2 which reports the estimated parameters of equation (6) for two pre-Freeze periods and in which no significant relationship could be found between returns and employment intensity.

We would like to point out that although the percentage of "explained" variation (R^2) is rather low, it was quite expected since changes in stock prices are subject to other random effects. Low levels of R^2 are quite common in studies which use changes in individual stock prices as the dependent variable. However, this is not bothersome in our case since rather than explain stock market returns, our objective here is to test an hypothesis. On the basis of the evidence reported here, one can reject the hypothesis that the market expected the Freeze to have no effect in increasing the relative share of profits at the expense of wages.

Turning to the size variable, it is not clear what its expected a priori sign ought to be. On the one hand, large firms may possess the advantages of legal and professional staff to effectively fend off legal and administrative interferences, but on the other hand, large corporations also constitute easier targets due to the regulator's low cost of control. Indeed, the post-Freeze results may suggest that as information began to accumulate, the market revised its expectations to be consistent with the special controls imposed on large firms. This interpretation gains

some support from a more direct approach in which we ran the regressions of Table 1 for a split sample with separate regressions for firms with annual sales above and below $100 million sales. The results (not reported here) show that while the larger corporations continued to display reduced significance and reversal of signs, the smaller companies exhibited a consistent pattern of a negative sign and low statistical significance throughout the entire post-Freeze period under examination. However, the independent effect of size is by no means clear and more work is called for.

V. A Note on Stock Market Efficiency

In order to get the full benefit which the Wage-Price Freeze offers in analyzing the dynamics of the stock market, a daily, perhaps even hourly, analysis of stock market returns would have been warranted, at least for the immediate post-Freeze period. Nevertheless, Table 3, which only covers arbitrary and varying intervals of one day to three months, provides some insight into market adjustments to new information.

The most obvious element in Tables 3a and 3b is that the stock market does not take the attitude of "wait and see"; it reacts immediately, without delay and in the theoretically expected direction: the biggest adjustment toward a new equilibrium took place on the very first day after the Freeze (SRF1) when high employment-intensity stocks gained their biggest price boost. However, the results also indicate that it takes more than just one day, but less than a week, for the market to complete the adjustment: employment-intensity had still a significantly positive effect on stock returns during SR2 (August 17 - August 20, 1971), although

a weaker effect when compared with the one which occurred on the first day (August 16, 1971). In practical terms this means that following the end of the first post-Freeze trading day, there was at least one day, but no more than a few days, during which a possible opportunity still existed to make money by buying high employment-intensity stocks despite an overall stable market.[15] Finally, after the first trading week, no further opportunities existed to profitably act upon this information: there is no longer a significant relationship between employment-intensity and stock returns in the period August 20 to August 31, 1971 (SRF3).[16]

In judging the extent to which our findings are consistent with the concept of an "efficient market", it is important to bear in mind that the performance of the market, as reported here, constitutes an underestimate of its actual efficiency in several respects:

First, the time period covered under SRF2 (August 16 - August 20, 1971) records the cumulative effect of four trading days during which the market continued its adjustment toward equilibrium. This represents only the upper limit for the adjustment's duration. A further breakdown to daily "short" returns could, in principle, show that the market has already completed the adjustments on the second post-Freeze trading day (August 17, 1971), and that no further gains could have been made after that day.

Secondly, a duration of a few days, as the time necessary for market adjustments, can be considered as somewhat unflattering to market efficiency only if one assumes that all the relevant information about the Freeze was known at the end of August 15, and that subsequent adjustments have been solely a reaction to that information. It is, however, more likely that

Table 3a

POST-FREEZE "SHORT" RETURNS
(T-VALUES IN PARENTHESES)

	LOG(SRF1)	LOG(SRF2)	LOG(SRF3)	LOG(SRF1-3)	LOG(SRF4)	LOG(SRF5)	LOG(SRF6)
Constant	.0358 (1.365)	.0668 (4.004)	-.0069 (.2380)	.0622 (1.950)	.023 (.4655)	.1549 (2.410)	.2030 (2.525)
LOG (N/S)	.0253 (4.934)	.0119 (3.658)	.0012 (.2191)	.0134 (2.154)	-.015 (1.565)	.0221 (1.768)	.0231 (1.482)
LOG (EDRISK)	.0346 (5.023)	-.0105 (2.403)	.0054 (.7028)	-.0053 (.6324)	-.0301 (2.307)	-.0413 (2.429)	.0306 (1.440)
LOG (SIZE)	.0097 (3.752)	-.0035 (2.140)	.0024 (.8380)	-.0013 (.4166)	-.0110 (2.272)	-.0048 (.7617)	-.0161 (2.040)
F	17.4	7.004	.2807	1.703	3.08	2.92	5.39
D.F.	760	763	764	772	781	779	778
R^2	.065	.0269	.0011	.0066	.0118	.0111	.0204

Table 3b

POST-FREEZE "SHORT" RETURNS
(T-Values in Parentheses)

	LOG(SRF1)	LOG(SRF2)	LOG(SRF3)	LOG(SRF1-3)	LOG(SRF4)	LOG(SRF5)	LOG(SRF6)
Constant	.0895 (5.512)	.0389 (3.251)	.0194 (.9961)	.0600 (2.807)	-.0314 (.728)	.0302 (.5986)	.2568 (4.565)
LOG (N/S)	.2011 (5.068)	.0090 (3.078)	.0052 (1.093)	.0144 (2.747)	-.0007 (.066)	.0093 (.7487)	.0174 (1.263)
LOG ($\overline{RB1}$)	.1906 (12.22)	-.0466 (4.055)	-.0169 (.9031)	-.0631 (3.071)	-.0302 (.726)	-.0815 (1.682)	.0694 (1.285)
LOG (SIZE)	-.0031 (1.658)	-.0022 (1.635)	.0014 (.6510)	-.0010 (.3976)	-.00001 (.019)	.0018 (.3127)	-.0224 (3.518)
F	60.45	9.516	.743	5.562	.179	1.115	5.76
D.F.	903	895	896	902	904	902	899
R^2	.167	.0310	.0025	.0182	.0006	.0037	.019

the dissemination of news was not an instantaneous process, that new information continued to reach the market during the week following the President's announcement, and that the market's adjustments have been in response to this new information.

Thirdly, the technical and administrative stock exchange facilities are of a given and finite capacity, not a frictionless theoretical construct. The first post-Freeze trading day witnessed a record high volume resulting in substantial delays in the tape, suspension of trading in certain stocks, etc. It may very well be that the observed performance was not so much a manifestation of a slow market reaction as it was of its slowness to register this reaction under conditions of a substantial peak-load stress. If this is true, the observed performance during the immediate post-Freeze period is an underestimate of market efficiency under normal circumstances.

VI. Summary and Conclusions

Our empirical results show that, judged by its observed behavior in the major stock exchanges, the market expected the Wage-Price Freeze to improve the relative share of corporate profits at the expense of wages. Our results also show that, to the latest date, these market expectations have not reversed themselves, but rather continued to persist throughout the ten-month post-Freeze period under study. Post-Freeze stock market returns of firms were found to be significantly and positively related to the extent of their employment-intensity, holding size and risk constant. In contrast, no such relationship has been detected during the pre-Freeze period.

The stock market took its biggest stride towards a new equilibrium on the very first post-Freeze day and in the theoretically expected direction, while taking between a minimum of two, and a maximum of four, trading days for the adjustment to complete.

Finally, as Houthakker [5] has already pointed out, economists are likely to debate the Freeze's impact for years to come. Our procedure, admittedly, does not constitute a direct test of the relative shares hypothesis, as it was merely based on market expectations. However, according to economic theory these expectations do not form in a vacuum, but rather do summarize the relevant information available, and in a rational market these expectations constitute an unbiased prediction of the future. In this respect, our indirect test may not be irrelevant to the eventual analysis of the Wage-Price Freeze policy and its impact on relative shares.

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APPENDIX

With reference to the basic equation (6), the following is a list of symbols and definitions for the variables used in estimating the equations' parameters. The right-hand column gives the respective index levels of the Standard & Poor's 425 Industrials.

DEFINITION OF VARIABLES AND THEIR SOURCES

Variable	Dependent/ Independent	Symbol	Definition*	S & P Industrial Average Index
Post-Freeze "returns" $RF_{i\Delta t}$	Dep	RF1	P(8-16-71)/P(8-13-71)	108.92/105.46
	Dep	RF2	P(8-20-71)/P(8-13-71)	108.49/105.46
	Dep	RF3	P(8-31-71)/P(8-13-71)	109.40/105.46
	Dep	RF4	P(9-30-71)/P(8-13-71)	108.77/105.46
	Dep	RF5	P(12-31-71)/P(8-13-71)	112.72/105.46
	Dep	RF6	P(3-30-72)/P(8-13-71)	119.26/105.46
	Dep	RF7	P(5-31-72)/P(8-13-71)	122.49/105.46
Post-Freeze Intermediate Short "returns" $SR_{i\Delta t}$	Dep	SRF1	P(8-16-71)/P(8-13-71)	108.92/105.46
	Dep	SRF2	P(8-20-71)/P(8-16-71)	108.49/108.92
	Dep	SRF3	P(8-31-71)/P(8-20-71)	109.40/108.49
	Dep	SRF4	P(9-30-71)/P(8-31-71)	108.77/109.40
	Dep	SRF5	P(12-31-71)/P(9-30-71)	112.72/108.77
	Dep	SRF6	P(3-30-72)/P(12-31-71)	119.26/112.72
	Dep	SRF1-3	P(8-31-71)/P(8-16-71)	109.40/108.92

* P represents stock prices on the designated dates, see Figure 1.

Variable	Dependent/ Independent	Symbol	Definition	S & P Industrial Average Index
Pre-Freeze "returns" $RB_{i\Delta t}$	Dep	RB1	P(8-13-71)/P(6-30-71)	105.46/109.95
	Dep	RB2	P(6-30-71)/P(12-31-70)	109.95/100.9
	Dep	RB3	P(12-31-70)/P(12-31-69)	100.9/101.49
Employment-Intensity L_i	Ind	N/S	Employees 1970/Sales 1970	
RISK Z_{it}	Ind	EDRISK	Earnings Dividend Ranking 1970	
	Ind	BETA	Beta risk measure	
	Ind	$\overline{RB1}$	P(8-13-71)/P(6-30-71)	105.46/109.95
	Ind	$\overline{RB2}$	P(6-30-71)/P(12-31-70)	109.95/100.9
	Ind	$\overline{RB3}$	P(12-31-70)/P(12-31-69)	100.9/101.49
SIZE Q_{it}	Ind	SIZE	Sales 1970	

Sources

Stock price data for calculating "returns" were derived from Standard and Poor's Stock Guides for the appropriate dates.

Earnings and Dividend Ranking data were derived from the August 1971 issue of Standard and Poor's Stock Guide.

Employment and sales figures were derived from "Fortune Double 500 Directory of 1,000 Largest U. S. Industrial Corporations", 1971 issue. New York: Time, Inc., 1971.

Beta risk measure was derived from the University of Chicago (CRSP) Price Relative Tape.

FOOTNOTES

1. It is presumably against this background that some have proposed the extension of controls to include corporate profits. Implicit in these proposals is a tacit admission that either price controls are not entirely effective, or even if they are, that the Freeze might, nevertheless, increase profits at the expense of wages.

2. For the American experience with wage-price controls during World War II consult Campbell [2].

3. For the current experience see "Firms Find New Benefits for Key Men", Wall Street Journal, August 3, 1972, page one, column six.

4. This anticipated favorable impact could have possibly originated in higher expected corporate earnings, or lower expected capitalization rates, or both. The overall rise of the stock market cannot, in itself, provide evidence to differentiate between the effects. Moreover, the overall rise in the stock market could also be interpreted as a reaction to other parts in the President's message, and not necessarily to the Wage-Price Freeze. Our empirical analysis, however, as we shall see below, avoids these difficulties by operating on cross-sectional changes in individual stock prices, and not on determinants of the overall market rise.

5. See the New York Times and the Wall Street Journal, week of August 16 - August 22, 1971.

6. See Fama and Miller [3].

7. About one-quarter of our basic sample consists of firms below $100 million annual sales.

8. Taking the ratio of employees/sales as a proxy for wage bill/sales is tantamount to assuming that the wage rate is constant across firms and industries. If w_i is the average wage rate for firm i, N_i is the number of employees, $w_i N_i$ is its wage bill, S_i is its sales and $w_i N_i / S_i$ is the "true" measure of its employment-intensity, then our proxy N_i / S_i assumes $w_i = \bar{w}$, the average market wage rate. We have used the above proxy in the absence of detailed wage data by firms.

9. See Fama and Miller [3] for more details and references.

10. The source of these data is the University of Chicago Center for Research in Security Prices (CRSP) Price Relative Tape. Description of the data can be found in Fisher and Lorie [4].

11. More specifically, the variable consists of previous returns multiplied by the sign of a rising (+) or a falling (-) market.

12. This approach should not be misinterpreted as an attempt to "predict" the market. It is only suggested here that stocks which undergo larger changes in one period would, on the average, experience larger changes in a subsequent period. No attempt is made to predict the direction of subsequent changes.

13. Substantially the same results have been obtained when the regressions were run in linear form. Due to theoretical considerations relating to its definition and use, Beta entered the regressions in linear form.

14. It is worthwhile noting that in explaining subsequent returns, previous returns as a measure of risk perform somewhat better than alternative, commonly used, risk measures.

15. During SRF2 the Standard and Poor's Industrial Index fell slightly from 108.92 to 108.49, see the right-hand column in the Appendix.

16. The regression results for SRF4, SRF5 and SRF6 have been given for the reader's information only, and to correspond to the "long" returns reported in Table 1. Their interpretation can be speculative at best. The further away we get from SRF1, the less can the results be attributed to the Freeze and the more to bits of new information which continued to flow and affect the market. Thus, the negative affect during SRF4 could possibly be interpreted as a correction to an "overshooting" during SRF1-3, or alternatively, as a reaction to new information not necessarily connected with the Freeze. In contrast, no such problems exist in the interpretation of the "long" returns (RF1, .., RF7) if the cumulative effect is strong; the decrease in the significance level of the employment-intensity coefficient from RF1 to RF7 can be attributed to a presumably increasing variance of the error term during the ten-month period over which these returns extend.