

MARKET RATIONALITY AND DIVIDEND ANNOUNCEMENTS*

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We investigate stock market rationality by examining the timeliness and unbiasedness of the market's response to dividend announcements. Our initial findings for market timeliness show a sluggish market reaction to dividend announcements; however, when the ex-dividend effect is controlled for, we find no evidence of a sluggish market reaction. We examine the unbiasedness of the market's response by testing whether the net announcement effect across a sample that is devoid of ex-post selection bias sums to zero. We observe a significant positive net announcement effect and examine several plausible conjectures for this puzzling phenomenon, but none provides a satisfactory explanation.

1. Introduction

Much of the empirical research in finance is concerned with identifying the relation between stock returns and economic events. Meaningful interpretation of these 'event studies' presupposes the efficiency of the stock market. If prices do not react quickly and unbiasedly to new information, little economic insight can be gained from observing stock returns around the announcement of various financial or economic events. Although the efficient market hypothesis is a cornerstone of finance, increasingly researchers have documented apparent instances of market inefficiencies [e.g. Joy, Litzenberger and McEnally (1977), Charest (1978), Copeland and Mayers (1982), and Rendleman, Jones and Latane (1982)]. The market's reaction to dividend announcements is an important example. If the market does not react efficiently to the announcement of regular, well anticipated events, like dividend announcements, it would be

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difficult to interpret the market's reaction to less frequent and less predictable events.

Two recent studies have examined the stock market's reaction to dividend announcements and report evidence of market inefficiency.¹ Charest (1978) finds that the market's response to dividend announcements is sluggish: shares earn abnormally high returns subsequent to announcements of dividend increases and abnormally low returns subsequent to decreases, suggesting a trading profit opportunity. Kalay and Loewenstein (1985) test the market's ability to form unbiased expectations by examining whether the net announcement effect across all dividend announcements sums to zero. In contrast to the implication of market rationality (i.e., efficiency) the authors find evidence of a positive net announcement effect.

We re-examine both the timeliness and unbiasedness of the market's response to dividend announcements and compare our results to those of Charest and Kalay and Loewenstein. Using a larger sample we document a result similar to Charest's for dividend increases, but find no evidence of a sluggish market response to dividend decreases. To explain the result for dividend increases, we note that dividend announcements are followed by ex-dividend days and that Eades, Hess and Kim (1984) document significant positive abnormal returns preceding ex-dividend days. We find that the positive abnormal returns prior to the ex-day, the ex-dividend period effect, account for the sluggish market reaction to the announcement of dividend increases. When the ex-dividend period effect is controlled for, the market appears to react in a timely fashion to the announcement of dividends.

Kalay and Loewenstein note a survivorship bias in their sampling procedure. They attempt to document the extent of this bias by examining several sub-samples; however, it appears that these sub-samples still contain an ex-post selection bias and this may be responsible for the observed positive net announcement effect. To avoid the introduction of any ex-post selection bias, we develop a sampling procedure that only relies upon *ex-ante* information. Even with such a sample, we still find a positive net dividend announcement effect.

In an attempt to explain the positive net dividend announcement effect, we explore several plausible conjectures: the confounding of the ex-dividend period effect with the announcement effect, changes in beta risk during the announcement period, and possible sampling problems. Like the timeliness tests, we find that part of the positive net announcement effect can be traced to the ex-dividend period effect; but even after controlling for the ex-dividend

¹Other studies that have examined the reaction of stock prices to dividend announcements include Pettit (1972, 1976) Watts (1973, 1976a, 1976b), Laub (1976), Aharony and Swary (1980), Eades (1982), Asquith and Mullins (1983), and Brickley (1983). For the most part, these studies have either concluded or assumed that the market's reaction to dividend announcements is efficient.

period, we still observe a significant positive announcement effect. Following Kalay and Loewenstein, we attempt to relate this result to increases in risk during the announcement period. Using a nonlinear seemingly unrelated regression model that allows for a scaling of beta during the announcement period, we find no evidence that betas increase around dividend announcements. We also consider several possible sampling problems; however, none provides a satisfactory explanation.

In the next section we present the basic methodology. Section 3 examines the timeliness of the market's response to dividend announcements and section 4 tests for the unbiasedness of the market's reaction. We examine several possible explanations for the positive net dividend announcement effect in sections 5, 6 and 7. The final section contains concluding remarks.

2. Methodology

To measure the market's reaction to dividend announcements, we form an equally weighted portfolio of all securities that make a regular dividend announcement on each trading day. Because the composition of these announcement day portfolios changes over time, we compute standardized excess returns (*SER*) for the portfolios as

$$SER_{tk} = (RP_{tk} - \bar{RP}_t) / \hat{\sigma}_t, \quad (1)$$

where t is the announcement day (date of portfolio formation), k is the number of trading days relative to t ($k = -10$ to $+10$), RP_{tk} is the portfolio return on relative day k , \bar{RP}_t is the estimated mean return, and $\hat{\sigma}_t$ is the estimated standard deviation of the return on the portfolio formed on day t .

In estimating \bar{RP}_t and $\hat{\sigma}_t$ we note that the nature of dividend announcements is often anticipated (leaked) before the announcement date; therefore, there is a tendency for abnormally high returns to occur prior to the announcement of dividend increases and abnormally low returns prior to the announcement of decreases. If the mean return is estimated with preannouncement returns, the estimate (\bar{RP}_t) will be biased upward for dividend increases and downward for dividend decreases. To avoid this problem, we estimate the mean portfolio return and standard deviation with post-announcement day returns. Rational expectations fully utilize all available information, and hence, expectational errors are independent over time. Thus, the returns following a dividend announcement are independent of the nature of the announcement. However, in using these returns we need to consider the potential impact of the ex-dividend period. Eades, Hess and Kim document that on average common stocks earn an abnormal return that totals about 0.33% during an eleven-day period centered on the ex-dividend day. During the first six days of this period (beginning five days before the ex-day and ending on the ex-day) the total

abnormal return is 0.57%.² To reduce the impact of the ex-dividend period effect on our estimate of the average portfolio return, we estimate the mean portfolio return and standard deviation during the thirty-day period beginning thirty-one days after the announcement and ending sixty days thereafter. In our sample, only 6.5% of the dividend announcements have ex-dividend days more than thirty days after the announcement; thus, the bias contained in our estimate of the average portfolio return should be trivial.³

Assuming that security returns are independently and identically distributed and multivariate normal, each of the standardized excess returns (*SER*) of (1) has a univariate Student *t* distribution with twenty-nine degrees of freedom and a standard deviation of one.⁴ The asymptotic distribution of the average *SER* is normal with a standard deviation equal to the square root of the inverse of the number of observations $T^{-1/2}$. Conditional on the null hypothesis of no announcement effect, the mean of the asymptotic distribution is zero.

3. The timeliness of the market's response to dividend announcements

3.1. *The sample*

In testing the timeliness of the market's response, our basic sample consists of all New York Stock Exchange (NYSE) common stocks that made 'regular' dividend announcements during the period 2 July 1962 to 31 December 1980. We define a regular dividend as any distribution that is coded by the Center for Research in Security Prices (CRSP) monthly master file as an ordinary cash dividend paid quarterly. Each regular dividend announcement is compared to the previous regular dividend and is then classified as an increase, a decrease, or a no-change in dividends. Of the total 73,597 regular dividend announcements during the sample period, there are 13,107 increases, 1,993 decreases, and 58,497 no changes.⁵

3.2. *Results*

Average portfolio returns are calculated for the twenty-one-trading-day period centered on the announcement day. We also calculate the average

²Eades, Hess and Kim use a mean adjusted excess return that is essentially identical to that used here.

³The ex-dividend period effect averages 0.33% and this occurs for 6.5% of the firms in our sample. This bias ($6.5\% \times 0.33\%$) is spread over the thirty-day estimation period, and thus implies a bias in the estimated mean return of only 0.0007% ($6.5\% \times 0.33\% \times 1/30$).

⁴This ignores a trivial prediction error adjustment of $(1 + 1/30)^{1/2}$ [see Zellner (1971, p. 30)].

⁵If the CRSP files contain no announcement date for a regular dividend, or if no other regular dividend precedes the announcement during the previous quarter, the observation is excluded from this sample. Because initiations of dividends have no preceding regular dividends and zero dividends are not included in the CRSP data, our sampling procedure excludes these observations.

portfolio market adjusted excess returns (returns less an equally-weighted market index of NYSE stocks), the average portfolio mean adjusted excess returns (returns less \overline{RP}_t), and the average portfolio standardized excess returns of (1) for the same twenty-one-trading-day period. Table 1 reports these results along with t -statistics relative to zero for the average $SEER$ and a two-tailed significance level.⁶ The results for the increase sample are shown in panel A, decreases in panel B, and the no changes in panel C. Each of the samples exhibits a significant announcement effect. As might be expected, the increase announcements are good news, and the decreases are bad news. However, the positive announcement effect for the no-change sample is somewhat surprising. The overwhelming frequency of no-change announcements (58,497 out of 73,597 observations) and the tendency for dividends to increase over time would seem to suggest that the market would view a no-change announcement as either no news or bad news.

The post-announcement day returns for the dividend increase sample are significantly positive for six days after the announcement day. The large positive $SEER$ on the day after the announcement can be explained by the fact that some dividend announcements are made after the close of trading. However, the returns on days +2 through +6 are anomalous and are consistent with Charest's finding that the market is slow in reacting to dividend announcements.

In contrast to the dividend increase sample, the post-announcement day returns for the dividend decrease sample are consistent with a timely market reaction. Panel B shows that virtually all of the adjustment in share prices occurs on the announcement day and the day following the announcement. This result is not consistent with Charest's findings. For dividend decreases, Charest reports that the market adjusted excess returns cumulate to -1.01% over the period of days +2 through +6.⁷ Over the same period, we observe a cumulative market adjusted excess return of only -0.129% .

Charest finds the largest abnormal returns for the twenty-one-day period from day +32 through day +52 (the second month following the announcement month). During that twenty-one-day period Charest reports market adjusted excess returns that cumulate to 1.55% for dividend increases and to -3.15% for dividend decreases. In contrast, when we calculate the market adjusted excess returns over the same twenty-one-day period, our increase sample cumulates to -0.19% and our decreases, to -0.25% . These striking differences are apparently due to the small sample used in Charest's study: Charest's sample includes only 177 dividend increases and 49 dividend decreases as opposed to the 13,107 increases and 1,993 decreases of our sample.

⁶To examine the sensitivity of our results to the assumption of normality, we use the Wilcoxon rank sum statistic to verify all of our results. Because the parametric and the non-parametric test results imply identical conclusions, we only report the parametric test results.

⁷Charest's measure of market adjusted excess returns is identical to ours.

Table 1

Test of timeliness of market's reaction to dividend announcements. Average percentage daily raw returns, market adjusted excess returns, mean adjusted excess returns, and standardized excess returns (*SER*) of equally weighted announcement day (AD) portfolios of all NYSE common stocks in the period July 2, 1962 to December 31, 1980.

Days relative to announcement day	Average raw return (%)	Average market adjusted excess return ^d (%)	Average mean adjusted excess return ^e (%)	Average standardized excess return ^f	Average <i>SER</i> standard deviation	<i>t</i> -statistic for average <i>SER</i> relative to zero	Significance level
<i>Panel A: Increases in regular dividends^a</i>							
-10	0.042	-0.024	-0.016	-0.0036	1.132	-0.195	0.8452
- 9	0.107	0.037	0.049	0.0395	1.140	2.130	0.0332
- 8	0.080	0.015	0.022	0.0200	1.112	1.107	0.2684
- 7	0.086	0.020	0.028	0.0217	1.155	1.153	0.2490
- 6	0.101	0.038	0.043	0.0421	1.114	2.321	0.0203
- 5	0.074	0.015	0.016	0.0273	1.135	1.479	0.1393
- 4	0.091	0.027	0.033	0.0472	1.163	2.497	0.0126
- 3	0.152	0.084	0.094	0.0822	1.164	4.337	< 10 ⁻⁴
- 2	0.112	0.056	0.054	0.0482	1.139	2.603	0.0093
- 1	0.180	0.128	0.123	0.0961	1.158	5.098	< 10 ⁻⁴
AD	0.628	0.579	0.571	0.5327	1.398	23.416	< 10 ⁻⁴
+ 1	0.438	0.388	0.380	0.3762	1.341	17.232	< 10 ⁻⁴
+ 2	0.226	0.173	0.168	0.1504	1.200	7.703	< 10 ⁻⁴
+ 3	0.139	0.091	0.081	0.0780	1.331	3.599	0.0003
+ 4	0.114	0.064	0.056	0.0532	1.163	2.810	0.0050
+ 5	0.093	0.036	0.036	0.0457	1.174	2.390	0.0169
+ 6	0.101	0.031	0.043	0.0433	1.095	2.427	0.0153
+ 7	0.095	0.034	0.037	0.0340	1.150	1.818	0.0691
+ 8	0.078	0.026	0.020	0.0141	1.127	0.766	0.4434
+ 9	0.015	-0.048	0.042	-0.0274	1.113	-1.511	0.1310
+10	0.078	0.006	0.020	0.0171	1.118	0.939	0.3477
<i>Panel B: Decreases in regular dividends^b</i>							
-10	0.024	-0.063	-0.031	0.0034	1.130	0.107	0.9146
- 9	0.041	-0.064	-0.015	0.0057	1.237	0.165	0.8686
- 8	0.070	0.015	0.015	0.0249	1.116	0.801	0.4233
- 7	-0.028	-0.088	-0.084	-0.0128	1.111	-0.415	0.6785
- 6	0.000	-0.049	-0.055	-0.0251	1.115	-0.809	0.4188
- 5	-0.015	-0.059	-0.071	0.0016	1.169	0.050	0.9605
- 4	-0.024	-0.090	-0.080	-0.0074	1.194	-0.224	0.8231
- 3	0.031	-0.025	-0.025	0.0076	1.194	0.229	0.8193
- 2	-0.060	-0.095	-0.115	-0.0121	1.210	-0.358	0.7203
- 1	-0.033	-0.076	-0.088	-0.0112	1.146	-0.352	0.7249
AD	-1.138	-1.204	-1.194	-0.6456	2.140	-10.835	< 10 ⁻⁴
+ 1	-0.782	-0.853	-0.837	-0.4378	2.008	-7.830	< 10 ⁻⁴
+ 2	0.050	-0.033	-0.005	0.0409	1.358	1.081	0.2798
+ 3	0.094	0.009	0.039	0.0390	1.258	1.113	0.2661
+ 4	0.044	-0.040	-0.011	0.0303	1.302	0.836	0.4033
+ 5	0.008	-0.053	-0.047	-0.0140	1.192	-0.422	0.6731
+ 6	0.073	-0.013	0.018	0.0300	1.136	0.950	0.3423
+ 7	0.161	0.086	0.105	0.0712	1.123	2.276	0.0230
+ 8	-0.075	-0.145	-0.130	-0.0220	1.178	-0.670	0.5032
+ 9	0.085	-0.001	0.030	0.0586	1.202	1.751	0.0801
+10	0.036	-0.067	-0.019	0.0198	1.131	0.629	0.5298

Table 1 (continued)

Test of timeliness of market's reaction to dividend announcements. Average percentage daily raw returns, market adjusted excess returns, mean adjusted excess returns, and standardized excess returns (*SER*) of equally weighted announcement day (AD) portfolios of all NYSE common stocks in the period July 2, 1962 to December 31, 1980.

Days relative to announcement day	Average raw return (%)	Average market adjusted excess return ^d (%)	Average mean adjusted excess return ^e (%)	Average standardized excess return ^f	Average <i>SER</i> standard deviation	<i>t</i> -statistic for average <i>SER</i> relative to zero	Significance level
<i>Panel C: No change in regular dividends^c</i>							
-10	0.056	-0.003	0.007	0.0023	1.190	0.129	0.8975
-9	0.051	-0.007	0.002	0.0078	1.153	0.455	0.6491
-8	0.043	-0.017	-0.006	-0.0063	1.157	-0.364	0.7159
-7	0.052	-0.007	0.003	0.0012	1.161	0.067	0.9462
-6	0.071	0.012	0.023	0.0045	1.186	0.253	0.8002
-5	0.047	-0.012	-0.002	-0.0095	1.165	-0.550	0.5823
-4	0.039	-0.020	-0.010	-0.0114	1.151	-0.665	0.5062
-3	0.053	-0.005	0.005	-0.0127	1.166	-0.731	0.4645
-2	0.062	0.005	0.014	-0.0033	1.180	-0.186	0.8522
-1	0.069	0.013	0.020	0.0135	1.173	0.771	0.4410
AD	0.104	0.047	0.055	0.0609	1.221	3.351	0.0008
+1	0.116	0.058	0.067	0.0746	1.214	4.127	< 10 ⁻⁴
+2	0.092	0.035	0.043	0.0448	1.189	2.529	0.0115
+3	0.109	0.054	0.060	0.0644	1.181	3.660	0.0003
+4	0.078	0.026	0.029	0.0353	1.147	2.064	0.0391
+5	0.072	0.018	0.023	0.0237	1.150	1.385	0.1662
+6	0.060	0.004	0.012	0.0041	1.142	0.241	0.8093
+7	0.051	-0.006	0.003	-0.0040	1.140	-0.238	0.8121
+8	0.031	-0.025	-0.017	-0.0181	1.153	-1.056	0.2910
+9	0.049	-0.007	0.000	0.0136	1.154	0.789	0.4300
+10	0.041	-0.017	-0.007	0.0039	1.150	0.226	0.8209

^aThe number of announcement day portfolios is 3,774 with an average of 3.47 stocks per portfolio for a total of 13,107 announcements. The average portfolio estimated mean (\bar{R}_{P_i}) is 0.058 percent and the average portfolio estimated standard deviation ($\hat{\sigma}_i$) is 1.293 percent.

^bThe number of announcement day portfolios is 1,290 with an average of 1.55 stocks per portfolio for a total of 1,993 announcements. The average portfolio estimated mean (\bar{R}_{P_i}) is 0.055 percent and the average portfolio estimated standard deviation ($\hat{\sigma}_i$) is 1.895 percent.

^cThe number of announcement day portfolios is 4,511 with an average of 13.0 stocks per portfolio for a total of 58,497 announcements. The average portfolio estimated mean (\bar{R}_{P_i}) is 0.049 percent and the average portfolio estimated standard deviation ($\hat{\sigma}_i$) is 0.886 percent.

^dMarket adjusted excess returns equal the difference between the announcement day portfolio returns and the returns on an equally-weighted market index of NYSE stocks.

^eMean adjusted excess returns equal the difference between the announcement day portfolio returns and \bar{R}_{P_i} .

^fStandardized excess returns equal the mean adjusted excess returns for the announcement day portfolio divided by the standard deviation where \bar{R}_{P_i} and $\hat{\sigma}_i$ are estimated during the thirty-day period of +31 to +60.

3.3. *Controlling for the ex-dividend period*

Although the small sample size in Charest's study explains much of his anomalous results, our results still show a sluggish market reaction to the announcements of dividend increases and no-changes: the *SER*'s in panel A are significantly positive on days +2 through +6, and in panel C on days +2 through +4. To explain these results we note that in constructing our sample no attempt was made to control for the occurrence of ex-dividend days. As previously noted, returns on stocks exhibit particularly large positive excess returns prior to and on their ex-dividend days. Thus, when ex-dividend days are in close proximity to announcement days, the returns between the announcement day and the ex-dividend day will be abnormally high. When firms make favorable dividend announcements, these abnormally high post-announcement day returns could give the appearance of a sluggish positive market reaction.

To avoid confounding announcement and ex-dividend effects, we add the sampling constraint that no ex-days (for the announced dividend or any other distribution) occur during the twenty-one-day period beginning five days before the announcement and ending fifteen days thereafter. Table 2 reports the results for dividend increases, decreases, and no-change announcements when this requirement is imposed on our sample. The sampling constraint reduces the sample to 18,984 regular dividend announcements, 3,392 increases, 419 decreases, and 15,173 no changes. In contrast to table 1, the *SER*'s in table 2 indicate a timely response to dividend announcements. For increases, the only significant *SER* after day +1 occurs on day +2. The no-change sample in panel C shows a marked decrease in *SER*'s: the *SER*'s on the announcement day and the following days are no longer significant. Apparently, the market interprets the announcement of a no-change in dividends as no news. These results suggest that the market reacts rapidly to dividend announcements, and that the observed sluggish reaction can be traced to the confounding of announcement and ex-dividend effects.

4. **Test for unbiasedness in the market's response**

Our investigation of market rationality focuses on two implications of the hypothesis: the timeliness of the market's response to dividend announcement and its unbiasedness. After controlling for the ex-dividend effect, we have documented a timely market response;⁸ however, we have yet to show whether this timely response is also unbiased.

⁸Using the ex-dividend effect to explain the sluggish market response does not by itself imply that the market is efficient. Such a conclusion would require that the ex-dividend effect is not the result of a market inefficiency.

Table 2

Test of timeliness of market's reaction to dividend announcements: controlling for ex-dividend period. Average percentage daily raw returns, market adjusted excess returns, mean adjusted excess returns, and standardized excess returns (*SER*) of equally weighted announcement day (*AD*) portfolios of all NYSE common stocks in the period July 2, 1962 to December 31, 1980.

Days relative to announcement day	Average raw return (%)	Average market adjusted excess return ^d (%)	Average mean adjusted excess return ^e (%)	Average standardized excess return ^f	Average <i>SER</i> standard deviation	<i>t</i> -statistic for average <i>SER</i> relative to zero	Significance level
<i>Panel A: Increases in regular dividends^a</i>							
-10	0.043	-0.047	-0.025	-0.0048	1.122	-0.191	0.8485
-9	0.058	-0.024	-0.009	0.0089	1.142	0.350	0.7264
-8	0.069	-0.014	0.002	-0.0034	1.123	-0.135	0.8924
-7	0.114	0.031	0.046	0.0308	1.250	1.104	0.2697
-6	0.151	0.084	0.083	0.0577	1.173	2.201	0.0278
-5	0.024	-0.038	-0.043	-0.0026	1.200	-0.098	0.9220
-4	0.131	0.059	0.064	0.0641	1.147	2.501	0.0124
-3	0.108	0.042	0.041	0.0488	1.194	1.829	0.0675
-2	0.086	0.040	0.018	0.0185	1.199	0.689	0.4906
-1	0.160	0.125	0.092	0.0862	1.143	3.375	0.0008
<i>AD</i>	0.656	0.619	0.588	0.4484	1.477	13.579	< 10 ⁻⁴
+1	0.417	0.356	0.349	0.3061	1.549	8.840	< 10 ⁻⁴
+2	0.158	0.117	0.091	0.0959	1.197	3.584	0.0003
+3	0.077	0.045	0.010	0.0382	1.458	1.173	0.2408
+4	0.053	0.031	-0.014	0.0046	1.148	0.180	0.8570
+5	0.080	0.045	0.013	0.0375	1.077	1.557	0.1196
+6	0.074	0.002	0.006	0.0058	1.087	0.238	0.8116
+7	0.125	0.091	0.058	0.0477	1.173	1.819	0.0691
+8	0.021	-0.010	-0.047	-0.0311	1.141	-1.221	0.2222
+9	-0.009	-0.061	-0.076	-0.0290	1.118	-1.161	0.2456
+10	0.065	-0.012	-0.003	0.0037	1.078	0.155	0.8768
<i>Panel B: Decreases in regular dividends^b</i>							
-10	0.000	-0.064	-0.081	-0.0157	1.222	-0.235	0.8145
-9	0.206	0.075	0.125	0.1027	1.153	1.628	0.1044
-8	0.000	-0.100	-0.081	-0.0339	1.132	-0.547	0.5850
-7	0.033	-0.062	-0.048	0.0230	1.117	0.376	0.7070
-6	-0.012	-0.111	-0.094	-0.0408	1.242	-0.600	0.5488
-5	0.027	-0.058	-0.054	-0.0042	1.304	-0.059	0.9532
-4	0.097	-0.074	0.015	0.0856	1.217	1.285	0.1995
-3	0.125	-0.022	0.044	0.0537	1.340	0.732	0.4647
-2	-0.067	-0.177	-0.149	-0.0324	1.313	-0.451	0.6522
-1	0.011	-0.124	-0.071	-0.0722	1.062	-1.243	0.2149
<i>AD</i>	-0.950	-1.065	-1.032	-0.4903	2.122	-4.224	< 10 ⁻⁴
+1	-0.684	-0.786	-0.765	-0.3995	2.153	-3.391	0.0008
+2	0.123	-0.004	0.041	0.0746	1.198	1.137	0.2562
+3	0.436	0.325	0.354	0.1548	1.309	2.161	0.0314
+4	-0.100	-0.169	-0.182	-0.0474	1.234	-0.702	0.4834
+5	0.096	0.053	0.015	-0.0226	1.143	-0.362	0.7177
+6	0.085	-0.042	0.003	0.0089	1.190	0.137	0.8913
+7	0.334	0.224	0.252	0.1199	1.122	1.953	0.0516
+8	0.165	0.087	0.084	0.0550	1.239	0.812	0.4176
+9	0.250	0.190	0.168	0.1234	1.208	1.867	0.0628
+10	0.087	-0.069	0.005	0.0367	1.173	0.572	0.5677

Table 2 (continued)

Test of timeliness of market's reaction to dividend announcements: controlling for ex-dividend period. Average percentage daily raw returns, market adjusted excess returns, mean adjusted excess returns, and standardized excess returns (*SER*) of equally weighted announcement day (*AD*) portfolios of all NYSE common stocks in the period July 2, 1962 to December 31, 1980.

Days relative to announcement day	Average raw return (%)	Average market adjusted excess return ^d (%)	Average mean adjusted excess return ^e (%)	Average standardized excess return ^f	Average <i>SER</i> standard deviation	<i>t</i> -statistic for average <i>SER</i> relative to zero	Significance level
<i>Panel C: No change in regular dividends^c</i>							
-10	0.051	-0.011	-0.001	0.0005	1.186	0.025	0.9798
-9	0.036	-0.028	-0.016	0.0051	1.130	0.281	0.7787
-8	0.010	-0.051	-0.042	-0.0136	1.122	-0.758	0.4483
-7	0.075	0.013	0.022	0.0151	1.117	0.850	0.3953
-6	0.104	0.045	0.052	0.0374	1.185	1.983	0.0474
-5	0.074	0.019	0.022	0.0248	1.146	1.358	0.1744
-4	0.031	-0.028	-0.021	-0.0045	1.135	-0.250	0.8028
-3	-0.000	-0.057	-0.053	-0.0380	1.128	-2.117	0.0343
-2	0.030	-0.018	-0.022	-0.0184	1.172	-0.983	0.3256
-1	0.042	-0.000	-0.010	-0.0062	1.123	-0.345	0.7301
<i>AD</i>	0.072	0.025	0.020	0.0188	1.189	0.995	0.3199
+1	0.063	0.007	0.010	0.0282	1.200	1.476	0.1400
+2	0.068	0.018	0.016	0.0106	1.182	0.561	0.5751
+3	0.075	0.034	0.023	0.0179	1.149	0.980	0.3272
+4	0.056	0.016	0.004	0.0078	1.122	0.437	0.6619
+5	0.026	-0.021	-0.026	-0.0166	1.105	-0.942	0.3464
+6	0.013	-0.036	-0.039	-0.0258	1.112	-1.459	0.1447
+7	0.027	-0.017	-0.026	-0.0091	1.128	-0.508	0.6115
+8	0.016	-0.029	-0.037	-0.0219	1.140	-1.206	0.2279
+9	0.053	0.005	0.000	0.0135	1.121	0.755	0.4500
+10	0.056	-0.008	0.004	0.0200	1.166	1.079	0.2807

^aThe number of announcement day portfolios is 2,002 with an average of 1.69 stocks per portfolio for a total of 3,392 announcements. The average portfolio estimated mean (\bar{R}_t) is 0.067 percent and the average portfolio estimated standard deviation ($\hat{\sigma}_t$) is 1.694 percent.

^bThe number of announcement day portfolios is 334 with an average of 1.25 stocks per portfolio for a total of 419 announcements. The average portfolio estimate mean (\bar{R}_t) is 0.082 percent and the average portfolio estimated standard deviation ($\hat{\sigma}_t$) is 1.924 percent.

^cThe number of announcement day portfolios is 3,938 with an average of 3.85 stocks per portfolio for a total of 15,173 announcements. The average portfolio estimated mean (\bar{R}_t) is 0.051 percent and the average portfolio estimated standard deviation ($\hat{\sigma}_t$) is 1.302 percent.

^dMarket adjusted excess returns equal the difference between the announcement day portfolio returns and the returns on an equally-weighted market index of NYSE stocks.

^eMean adjusted excess returns equal the difference between the announcement day portfolio returns and \bar{R}_t .

^fStandardized excess returns equal the mean adjusted excess returns for the announcement day portfolio divided by the standard deviation where \bar{R}_t and $\hat{\sigma}_t$ are estimated during the thirty-day period of +31 to +60.

Table 3

Possible sequences of regular dividends announcements over two consecutive quarters.

Previous quarter	Current quarter	
	Positive dividends	Zero dividends
Positive dividends	Continuances	Initial omissions
Zero dividends	Initial payments	Non-resumptions
	Announcement days available on CRSP master file	Announcement days not available on CRSP master file

4.1. *The sample*

Our tests for an unbiased market response to dividend announcements require a sample that is devoid of any ex-post selection bias. In constructing such a sample it is useful to consider the possible sequences of regular dividend payments that could occur over two consecutive quarters. A firm can either pay or not pay a dividend in a quarter. If the firm paid a regular dividend last quarter, in the current quarter it can either declare a continuance of positive dividends or an omission of dividends. Similarly, if the firm paid no dividend last quarter, in the current quarter it can either declare an 'initial' dividend or it can declare a non-resumption of dividends. These four possible sequences of regular dividends are depicted in table 3.

One way of avoiding any ex-post selection bias is to construct a sample that includes all types of dividend announcements shown in table 3. To construct such a sample would require that an announcement date be identified for every dividend decision. As table 3 shows, the announcement dates for continuances and initial payments are available on the CRSP master file, but the dates for initial omissions and non-resumptions are not. Hence, the dates for initial omissions and non-resumptions must be collected from other sources. However, it is rare for firms that are not paying dividends to make public announcement concerning their decision not to reinstitute dividends; consequently, the announcement dates of non-resumptions are often nonexistent.

The unavailability of the announcement dates for non-resumption of dividends precludes conducting our tests for unbiasedness with all the types of distributions in table 3. Fortunately, a test of market rationality or efficiency does not require such a sample. Unlike non-resumptions, initial omissions are virtually always reported in the *Wall Street Journal Index* or *Standard and Poor's Annual Dividend Record*. Thus, we can test for unbiased expectations by conditioning on the fact that firms paid positive dividends in the previous quarter. Rationality implies that expectations are unbiased conditional upon all prior information. If we condition on the payment of dividends in the

previous quarter, the sample only includes continuances and initial omissions in the current quarter (see table 3) and the net announcement effect for this sample should be zero.

It might seem that tests for unbiasedness of the market's response to dividend announcements requires a sample devoid of other simultaneous announcements, notably earnings announcements, so that the sample includes only 'clean' dividend announcements. However, a rational or efficient market forms unbiased expectations for all types of announcements, and hence, the inclusion of simultaneous announcements introduces no bias. Indeed, selecting a sample of clean dividend announcements requires an ex-post selection rule and there is no reason to believe that such a sample is unbiased.

From the CRSP files, we identify 73,783 cases of continuances of regular dividends.⁹ We define an initial omission of dividends to have occurred any time a firm announces its intention to 'omit', 'defer', or 'take no action' on a regular dividend. During our sample period of 1962 through 1980, we document 367 announcement dates of dividend omissions, of which 317 are collected from *Standard and Poor's Annual Dividend Record* and the remaining 50 are collected from the *Wall Street Journal Index*. Whenever available, the announcement date from *Standard and Poor's* is used; otherwise, we use the trading day immediately preceding the *Wall Street Journal's* publication date.

4.2. Results

Table 4 reports our basic results. Given the nature of our sample we have only two types of announcements: initial omissions and continuances of dividends. The average returns for each of these announcement types are reported in the first two columns of table 4. Not surprisingly, initial omissions result in a large price decline: on the day of announcement and the day following share prices fall by about 7.6%. The announcement of dividend continuances produces less dramatic results: stock prices increase by a total of about 0.3% over the announcement day and the day following the announcement. The third column of table 4 shows the average returns across both types of announcements, and these returns are virtually identical to the returns for the announcements of continuances. Even though announcements of initial omissions are bad news, the infrequency of these announcements causes them to be swamped by the mildly good news of dividend continuances.

⁹The sample of continuances includes 73,783 announcements whereas the sample of increases, decreases and no changes used to test for timeliness includes only 73,597 dividend announcements. The additional 186 announcements in the continuances sample are cases when regular dividends are followed by non-regular dividends instead of regular dividends. In these instances, we use the non-regular dividend announcement dates in our test. These non-regular dividends include extra and special dividends, stock dividends and stock splits, share repurchases, as well as other types of distributions. None of the results for the unbiasedness tests are significantly affected when these distributions are excluded from the sample.

Table 4

Test of unbiased expectations of the market with respect to dividend announcements. Average percentage daily raw returns, mean adjusted excess returns, and standard excess returns (SER) of equally weighted announcement day (AD) portfolios of NYSE common stocks for the 4,640-trading-day period July 2, 1962 to December 31, 1980.^a

Days relative to announcement day	Initial omissions		Continuances		Aggregated sample: initial omissions plus continuances				Significance level
	Average raw return (%)	Average raw return (%)	Average raw return (%)	Average adjusted return ^b (%)	Average standardized excess return ^c	Average SER standard deviation	t-statistic		
-10	-0.237	0.056	0.050	-0.001	-0.0025	1.201	-0.138	0.8900	
-9	-0.138	0.059	0.058	0.008	0.0124	1.169	0.712	0.4762	
-8	0.057	0.051	0.052	0.001	-0.0018	1.158	-0.104	0.9173	
-7	-0.276	0.058	0.052	0.002	0.0030	1.174	0.171	0.8645	
-6	-0.102	0.071	0.073	0.023	0.0086	1.190	0.485	0.6273	
-5	-0.373	0.053	0.049	-0.002	-0.0039	1.172	-0.225	0.8223	
-4	-0.237	0.044	0.044	-0.007	-0.0052	1.167	-0.300	0.7639	
-3	-0.229	0.068	0.068	0.017	0.0065	1.175	0.373	0.7093	
-2	-0.256	0.075	0.071	0.021	0.0077	1.194	0.437	0.6624	
-1	-0.396	0.090	0.086	0.036	0.0331	1.187	1.878	0.0604	
AD	-4.140	0.171	0.154	0.103	0.1367	1.271	7.235	< 10 ⁻⁴	
+1	-3.485	0.160	0.137	0.087	0.1088	1.274	5.750	< 10 ⁻⁴	
+2	-0.134	0.110	0.106	0.055	0.0658	1.205	3.673	0.0002	
+3	0.239	0.112	0.116	0.065	0.0738	1.200	4.140	< 10 ⁻⁴	
+4	0.085	0.083	0.088	0.037	0.0396	1.165	2.289	0.0222	
+5	0.324	0.076	0.077	0.026	0.0293	1.165	1.693	0.0904	
+6	0.398	0.068	0.071	0.020	0.0157	1.158	0.911	0.3625	
+7	0.233	0.062	0.062	0.012	0.0096	1.163	0.557	0.5773	
+8	0.109	0.035	0.034	-0.017	-0.0164	1.161	-0.950	0.3423	
+9	0.115	0.045	0.046	-0.004	0.0074	1.165	0.430	0.6675	
+10	-0.056	0.045	0.045	-0.005	0.0015	1.162	0.085	0.9320	

^aInitial omissions have 347 announcement day portfolios with 1.06 stocks per portfolio; continuances have 4,527 portfolios with 16.3 stocks per portfolio; and the aggregated sample of initial omissions and continuances has 4,528 portfolios with 16.4 stocks per portfolio.

^bMean adjusted excess returns equal the difference between the announcement day portfolio returns and RP_t .

^cStandardized excess returns equal the mean adjusted excess returns for the announcement day portfolio divided by the standard deviation where RP_t and $\hat{\sigma}_t$ are estimated during the thirty-day period of $+31$ to $+60$. The average RP_t is 0.051% and the average $\hat{\sigma}_t$ is 0.838%.

The remaining columns of table 4 report the results for average excess returns across both types of announcements. As one might infer from the average raw returns reported in the first three columns, the aggregated average announcement effect is positive. The excess returns on the day of the announcement and the day after are significant in excess of the 0.0001 level. Taken at face value, these results suggest that the market is either overly pessimistic in forecasting dividends or overly optimistic in assessing the information content of dividend announcements.

Kalay and Loewenstein document a two-day standardized daily mean excess return of 0.167 as opposed to our two-day *SER* of 0.245. Although Kalay and Loewenstein's sample only include 20,451 dividend announcements and ours includes 74,150, such a difference in announcement effects would appear to be significant. However, Kalay and Loewenstein's standardized daily mean excess returns are computed differently from our *SER*'s. Kalay and Loewenstein calculate standardized excess returns for *each* security in their sample and then average these in event time to arrive at their standardized daily mean excess returns. In contrast, we calculate standardized excess returns for portfolios that include all stocks that announce a dividend on a particular trading day. Because of the diversification effect, the portfolio standard deviations are less than the average standard deviations of the securities included in the portfolio, and hence, our average *SER*'s are larger than their standardized daily mean excess returns. More important, Kalay and Loewenstein's procedure does not account for the cross-sectional dependencies in security returns and hence it is difficult to draw statistical inference from their results. In contrast, our procedure explicitly accounts for the cross-sectional dependencies.

4.2.1. *Controlling for the ex-dividend period*

Our test for timeliness of the market's response to dividend announcements revealed that the ex-dividend period was confounding the measurement of announcement effects. After controlling for the ex-dividend period, we found no evidence of a lagged marked response to dividend announcements. The ex-dividend period may also be confounding the results reported in table 4. If ex-dividend days and announcement days are in close proximity, announcement day returns could reflect these positive abnormal returns during the ex-dividend period.

To avoid confounding the ex-dividend period effect with the announcement effect, we again require that no ex-days (for the announced dividend or any other distributions) occur during the twenty-one-day period beginning five days before the announcement day and ending fifteen days after the announcement. This sample selection procedure reduces our total sample of dividend continuances from 73,783 to 19,016.

Because omissions have no ex-days associated with them, the sampling procedure would not reduce the initial omission sample; as a result, con-

Table 5

Test of unbiased expectations of the market with respect to dividend announcements: controlling for the ex-dividend period. Average daily percentage raw returns, mean adjusted excess returns (SER) of equally weighted announcement day (AD) portfolios of NYSE common stocks for the 4,640-trading-day period of July 2, 1962 to December 31, 1980.^a

Days relative to announcement day	Initial omissions		Continuances		Aggregated sample: initial omissions plus continuances					Significance level
	Average raw return (%)	Average raw return (%)	Average raw return (%)	Average raw return (%)	Average mean adjusted excess return ^b (%)	Average standardized excess return ^c	Average SER standard deviation	t-statistic		
-10	-0.194	0.043	0.042	-0.012	-0.004	1.168	-0.024	0.9811		
-9	-0.472	0.039	0.032	-0.021	-0.0014	1.118	-0.078	0.9378		
-8	-0.035	0.023	0.025	-0.029	-0.0098	1.111	-0.564	0.5725		
-7	-0.393	0.068	0.065	0.011	0.0170	1.150	0.950	0.3422		
-6	-0.682	0.095	0.089	0.035	0.0321	1.187	1.733	0.0832		
-5	-0.032	0.053	0.055	0.001	0.0143	1.143	0.804	0.4214		
-4	-0.570	0.048	0.046	-0.008	0.0054	1.132	0.306	0.7597		
-3	-0.148	0.025	0.026	-0.028	-0.0215	1.133	0.306	0.2233		
-2	-0.550	0.055	0.044	-0.006	-0.0154	1.194	-1.218	0.4075		
-1	-0.335	0.066	0.066	0.012	0.0075	1.138	0.421	0.6739		
AD	-4.110	0.159	0.130	0.076	0.0823	1.269	4.162	< 10 ⁻⁴		
+1	-3.452	0.110	0.070	0.016	0.0484	1.370	2.270	0.0233		
+2	0.150	0.081	0.081	0.027	0.0248	1.195	1.333	0.1825		
+3	0.647	0.093	0.096	0.042	0.0288	1.162	1.590	0.1118		
+4	-0.005	0.056	0.055	0.001	0.0027	1.126	0.154	0.8773		
+5	0.282	0.041	0.040	-0.014	-0.0077	1.092	-0.454	0.6502		
+6	0.046	0.025	0.027	-0.027	-0.0217	1.116	-1.250	0.2115		
+7	0.515	0.052	0.058	0.004	0.0080	1.140	0.449	0.6537		
+8	0.651	0.021	0.025	-0.029	-0.0212	1.154	-1.177	0.2392		
+9	0.062	0.047	0.051	-0.003	0.0015	1.130	0.085	0.9326		
+10	-0.150	0.047	0.047	-0.006	0.0073	1.143	0.408	0.6837		

^aInitial omissions have 108 announcement day portfolios with 1.03 stocks per portfolio; continuances have 4,111 portfolios with 4.63 stocks per portfolio; and the aggregated sample of initial omissions and continuances has 4,119 portfolios with 4.64 stocks per portfolio.

^bMean adjusted excess returns equal the difference between the announcement day portfolio returns and RP_t .

^cStandardized excess returns equal the mean adjusted excess returns for the announcement day portfolio divided by the standard deviation where RP_t and $\hat{\sigma}_t$ are estimated during the thirty-day period of +31 to +60. The average RP_t is 0.054% and the average $\hat{\sigma}_t$ is 1.230%.

Table 6

Test of unbiased expectations of the market with respect to dividend announcements for the aggregated sample of initial omissions and continuances: controlling for the ex-dividend period. Average daily percentage raw returns, mean adjusted returns, and standardized excess returns (*SER*) of equally weighted announcement day (AD) portfolios of NYSE common stocks for the period of July 2, 1962 to December 31, 1980 and several sub-periods.

Time period	Number of trading days	Number of announcement day portfolios ^a	Average number of stocks in each announcement day portfolio	Days relative to announcement day	Average			Average standardized excess return ^c	Average standard deviation	<i>t</i> -statistic	Significance level
					raw return (%)	adjusted excess return ^b (%)	mean				
July 2, 1962 through June 20, 1966	1000	870	3.7	-1	0.125	0.058	0.0307	1.183	0.766	0.4440	
				AD	0.111	0.044	0.0684	1.353	1.491	0.1364	
				+1	0.068	0.001	0.0497	1.533	0.957	0.3387	
				+2	0.091	0.024	0.0392	1.277	0.907	0.3648	
June 21, 1966 through July 20, 1970	1000	871	4.3	-1	-0.013	-0.052	-0.0331	1.137	-0.859	0.3903	
				AD	-0.037	-0.077	-0.0330	1.199	-0.812	0.4168	
				+1	0.059	0.019	0.0277	1.286	0.636	0.5248	
				+2	0.018	-0.022	0.0049	1.180	0.122	0.9030	

July 21, 1970 through July 5, 1974	1000	901	4.4	-1 AD +1 +2	-0.006 0.163 -0.073 0.028	0.020 0.189 -0.047 0.054	-0.0095 0.1426 -0.0167 0.0116	1.090 1.241 1.224 1.170	-0.261 3.449 -0.409 0.298	0.7945 0.0006 0.6827 0.7661
July 8, 1974 through June 20, 1978	1000	921	5.3	-1 AD +1 +2	0.107 0.166 0.132 0.159	-0.013 0.046 0.012 0.038	0.0141 0.1079 0.0793 0.0370	1.122 1.275 1.507 1.153	0.382 2.568 1.597 0.972	0.7024 0.0104 0.1106 0.3312
June 21, 1978 through December 31, 1980	640	556	5.9	-1 AD +1 +2	0.147 0.306 0.221 0.117	0.073 0.232 0.147 0.042	0.0510 0.1446 0.1333 0.0348	1.175 1.267 1.202 1.194	1.024 2.691 2.615 0.688	0.3060 0.0073 0.0092 0.4920
July 2, 1962 through December 31, 1980	4640	4119	4.6	-1 AD +1 +2	0.066 0.130 0.070 0.081	0.012 0.076 0.016 0.027	0.0075 0.0823 0.0484 0.0248	1.138 1.269 1.370 1.195	0.421 4.162 2.270 1.333	0.6739 < 10 ⁻⁴ 0.0233 0.1825

^a The number of announcement day portfolios equals the number of observations in the sample.

^b Mean adjusted excess returns equal the difference between the announcement day portfolio returns and \bar{R}_P .

^c Standardized excess returns equal the mean adjusted excess returns for the announcement day portfolio divided by the standard deviation where \bar{R}_P and $\hat{\sigma}_P$ are estimated during the thirty-day period of +31 to +60.

tinuances would be systematically underrepresented relative to omits. To avoid over-representing omit announcements, the current quarter's sample excludes all omit announcements for securities that had ex-days falling within the twenty-one-day period in the previous quarter. If there is a constant lag between dividend announcement days and ex-days, applying this rule to the previous quarter is equivalent to applying it to the current quarter. Our omit sample was reduced from 367 to 111.

The results of controlling for the ex-dividend period are reported in table 5. The aggregate sample shows that controlling for the ex-dividend period reduces the returns after day +1; none of the excess returns from day +2 through +10 are significant at conventional levels. However, the two-day announcement period (days 0 and +1) excess returns are still significantly positive: the announcement day excess return is significant in excess of the 0.0001 level and the day after at about the 0.02 level. These results suggest that the market's expectations of dividends are biased and conflict with market rationality.

To determine if the results in table 5 are specific to a particular sample period, we report the results for five sub-periods in table 6. Four of the five sub-periods exhibit positive announcement day *SER*'s and three of these are significant at the 0.01 level and beyond. The second sub-period of June 21, 1966 through July 20, 1970 exhibits a negative announcement effect but it is not significant. These results suggest that the positive announcement effect for the total period is not driven by an isolated abnormal period.

5. Changes in risk

Kalay and Loewenstein argue that because dividend announcements convey important information about firms' values, the risk of firms' shares increases around dividend announcement dates; in turn, the increase in risk implies an increase in expected returns. If true, Kalay and Loewenstein's reasoning may explain our results; indeed, Kalay and Loewenstein find that betas increase by an average of nine percent around dividend announcement dates for their sample. Such an effect seems to be present in our tables 4 and 5 in that the average standard deviation of the standardized excess returns are higher on the announcement day and the day after. However, table 5 also shows an *average daily raw* return of 0.10% during the two-day announcement period; about twice the estimation period average daily return of 0.054%. To explain differences in average returns of this magnitude with changes in risk in the context of the Capital Asset Pricing Model (CAPM) requires that betas increase by more than *one hundred percent* during the announcement period.¹⁰

¹⁰According to the CAPM, if announcement period expected rates of return are twice as large as the estimation period expected rates of return, the announcement period betas, β_a , must be related to the estimation period betas, β_e , as follows: $\beta_a = R_f / (\bar{R}_m - R_f) + 2\beta_e$, where R_f is the riskfree rate of interest and \bar{R}_m is the expected rate of return on the market portfolio.

Table 7

Test of shift in beta risk^a: the Dow Jones 30 for the period of July 2, 1962 to December 31, 1980.

Sample period	Average unrestricted risk scaling coefficient	Restricted risk scaling coefficient ^b ($\gamma^* = \gamma_1 = \dots = \gamma_{30}$)	Test of hypothesis that $\gamma_1 = \gamma_2 = \dots = \gamma_{30}$	
	$\bar{\gamma} = \sum_{i=1}^{30} \frac{\gamma_i}{30}$	γ^*	χ^2 statistic ^c	<i>p</i> -value
July 2, 1962 through February 7, 1967	-0.037	-0.033 (0.047)	21.48	0.8411
February 8, 1967 through October 21, 1971	0.089	0.069 (0.045)	25.65	0.6441
October 25, 1971 through May 27, 1976	0.028	0.007 (0.035)	31.54	0.3404
May 27, 1976 through December 31, 1980	0.071	0.050 (0.037)	47.96	0.0148

^a The model is

$$\tilde{R}_{it} = \alpha_i + \beta_i \tilde{R}_{mt} + \beta_i \gamma_i (\delta_{it} \tilde{R}_{mt}) + \alpha'_i \delta_{it} + \tilde{\epsilon}_{it}, \quad i = 1, 2, \dots, N, \quad t = 1, 2, \dots, T,$$

where R_{it} = return on day t for security i , R_{mt} = CRSP value-weighted index for day t , $\delta_{it} = 1$ in the period $[t - 1, t + 1]$ when security i announces a regular dividend on day t , and 0 otherwise, and γ_i = risk scaling factor for security i in the announcement period.

^bStandard errors are reported in parentheses.

^cThe chi-squared statistic has 29 degrees of freedom.

To formally investigate the effect of risk changes on our results, we propose the following model:

$$\tilde{R}_{it} = \alpha_i + \beta_i \tilde{R}_{mt} + \beta_i \gamma_i (\delta_{it} \tilde{R}_{mt}) + \alpha'_i \delta_{it} + \tilde{\epsilon}_{it}, \quad \begin{matrix} i = 1, 2, \dots, N, \\ t = 1, 2, \dots, T, \end{matrix} \quad (2)$$

where \tilde{R}_{it} is the return of security i on day t , \tilde{R}_{mt} is the return of the CRSP value-weighted index on day t , δ_{it} takes on a value of one if security i announces a dividend during the three-day period of $t - 1$ through $t + 1$ and zero otherwise, and $\tilde{\epsilon}_{it}$ is a random disturbance. The coefficient γ_i allows for changes in risk via a scaling of beta (β_i) and the α'_i controls for announcement effects or beta-related shifts in the intercept (α_i) of (2). If betas increase around dividend announcement dates, we would expect the scaling coefficients (γ_i) to be positive.

We use the securities included in the Dow Jones 30 to estimate the parameters of (2). Although this is a limited sample, it should provide some insight into the reasonableness of the hypothesis.¹¹ For purposes of presenta-

¹¹Although not reported here, our test for unbiasedness on the Dow Jones 30 yielded no significant difference from the results reported in table 4.

tion, we also estimate a version that restricts the scaling coefficients to be equal across the securities included in the Dow. We use a Gauss–Newton procedure to estimate (2) and assume that the vector of disturbances (e) is normally, independently and identically distributed with a mean vector of zeroes and an unrestricted covariance matrix. With these assumptions the Gauss–Newton procedure is approximately maximum likelihood.¹²

Table 6 reports the results of estimating (2) for four sample periods each of 1,160 trading days. For each of these periods we report the average unrestricted estimate of the scaling coefficient ($\bar{\gamma}$), the restricted estimates of the scaling coefficients (γ^*) along with their standard errors, the chi-squared statistic associated with the restriction that the scaling coefficients are the same across the securities included in the Dow (the likelihood ratio test), and the p -value for the hypothesis of equality of the scaling coefficients (the probability of observing the sample conditional upon the hypothesis of equality). If betas do not change during the announcement period, the true scaling coefficient is zero; in this case, we should accept the hypothesis of a common scaling coefficient (γ^*) and the estimated coefficient should be small relative to its standard error. In all but the last period, we accept the hypothesis of a common scaling of beta, and the estimates of the common coefficients are small relative to their standard errors. In sum, our results are consistent with unchanging betas.¹³

6. Sampling problems

6.1. *Missing omission announcement dates*

During the period July 2, 1962 to December 31, 1980 there are 398 regular dividend payments by NYSE common stocks that are not followed by a distribution in the subsequent quarter. Of this total, we document 367 announcement dates for initial omissions; leaving thirty-one possible announcements of initial omissions with no announcement dates. Four of the thirty-one result from a change in the frequency of payment (e.g. quarterly to semi-annual); seven are isolated payments not preceded by regular payments; however, twenty appear to be bona fide omit candidates. We gauge the potential effect of these missing dates by calibrating the number of missing omit announcements required to exactly offset the observed announcement

¹² See Judge, Griffith, Hill and Lee (1980, pp. 735–736).

¹³ This result conflicts with the conclusion reached by Kalay and Loewenstein. For each firm in their sample, Kalay and Loewenstein estimate an announcement period beta and a non-announcement period beta. The average of these betas is 0.86 for the announcement period and 0.79 for the non-announcement period. Although it is unclear how the authors test for differences in these average betas, they report a 't-statistic' of 2.33. Interestingly, the nine percent increase in their betas during the announcement period is not dramatically different from the average estimate of our risk scaling coefficient ($\bar{\gamma}$) in table 7.

effect. To make this calculation, we assume that the two-day excess announcement returns in table 5 represent the appropriate announcement effect.

The average excess returns during the two-day announcement period (days 0 and +1) for the aggregated sample in table 5 sum to 0.09% (0.076% + 0.016%), and the average two-day announcement return for the initial omissions is about -7.6% (-4.11% - 3.45%). Assuming that the average return of -7.6% is entirely excess return, and using the total number of announcements in our complete sample (table 4), the number of missing omissions that is required to yield a zero announcement effect is $(73,783 + 367) \times 0.09\% / 7.6\% = 878$; far more than twenty.

6.2. *A survivorship bias*

In calculating the standardized excess returns we estimate portfolio mean returns and standard deviations with returns thirty-one to sixty days after the dividend announcement date. Because of this estimation procedure, securities are only included in our sample if they are listed for at least sixty days after the dividend announcement. This listing requirement imparts a survivorship bias to our sample. If firms that experience financial distress are likely to delist and if these firms are also likely to make disappointing dividend announcements, the sixty-day listing requirement will impart a positive bias to our results.

A total of 367 dividend announcements are excluded from our sample because the securities delisted prior to sixty days after the announcement. The vast majority of the delistings (326) preceded mergers: 322 of these are regular dividends and four are initial omits. The remaining forty-one announcements are delisted for reasons other than a merger: thirty-five of these are regular dividends and six are initial omits. Given that most of the delistings are due to mergers, it seems unlikely that the excluded securities experienced negative announcement effects and that their exclusion imparts a positive bias to our results. Indeed, the average two-day announcement period returns of the excluded announcements is 0.554% as opposed to 0.292% for the two-day announcement period returns in table 4. If the sixty-day listing requirement has imparted any bias to our announcement day returns, it has caused us to understate, not overstate, the two-day announcement effect.

6.3. *Non-trading and multiple-day returns around dividend announcements*

If dividend announcements convey new information and the arrival of new information results in higher trading volume, securities will be traded more frequently around dividend announcements. For securities that are not traded frequently, this means that there will be a higher frequency of multiple-day returns around dividend announcements, imparting a positive bias to the average returns during the announcement period. An obvious way of investigating the influence of multiple-day returns is to examine the behavior of a

sample of heavily traded securities. Because larger firms tend to be traded more frequently than smaller firms, we repeat the test for both the Dow Jones 30 and the firms that have market values in the top decile of NYSE common stocks. Although these results are not reported here, they are virtually identical to those reported in table 4.

7. The timing of dividend announcements

Dividend announcement dates are under the control of firms' management and are not known with certainty to investors. The discretionary nature of dividend announcement dates raises the possibility that the timing of announcements conveys information to the market. Such an argument could be used to explain our results if favorable dividend announcements are generally announced early. If such a pattern existed, a rational market would interpret the failure to announce early as a signal that the impending dividend announcement is not 'good news'. As a consequence, the common stocks of firms not announcing early would experience price reductions. In other words, the unfavorable announcements are anticipated and hence are not fully reflected during the announcement period (days 0 and +1) imparting a positive bias to the measured effect for the total sample. This explanation implies that there is a tendency for negative excess returns to precede the non-early announcements, which, in turn, implies that the average pre-announcement excess returns across all announcements will be negative.

To test the predictions of this conjecture we need to develop a test for the significance of the cumulated pre-announcement day average *SER*'s. Such a test is complicated by the dependency structure implicit in the average *SER*'s: the averages for different days in event time include returns from the same calendar days. With positive contemporaneous correlation of security returns, averaging *SER*'s in event time induces a positive correlation among the averages. However, we can devise an approximate test by assuming that the average *SER*'s are jointly independent. The true correlation among the averages is positive and hence the significance level of the approximate test will be overstated.

In table 5 we have 4,119 portfolios implying an approximate standard deviation of 0.0156 ($1/\sqrt{4119}$) for each of the average *SER*'s. Assuming independence of the average *SER*'s, the approximate standard error of a ten-day sum is 0.0493 ($0.0156 \times \sqrt{10}$). In table 5 for the ten-day period prior to the announcement, the average *SER*'s cumulate to 0.028. Given the approximate standard error of 0.0493, this sum is insignificantly different from zero. Although not reported, the thirty-day pre-announcement period for this sample is also insignificant: the average *SER*'s cumulate to -0.004 and the standard error is 0.0853 ($0.0156 \times \sqrt{30}$). These *SER*'s suggest that the timing of the dividend announcements is unlikely to explain the positive net dividend announcement effect.

An alternative approach to testing the influence of announcement timing, we use expected rather than actual announcement dates in the tests for unbiasedness. Because the expected dates are estimated independent of the current quarter's actual announcement date, the use of expected dates avoids the timing problem. We estimate each quarter's expected announcement date as a naive projection of last year's actual announcement date. For example, if a firm announced its fourth quarter dividend on the third Wednesday of November in 1982, the expected announcement date for the fourth quarter of 1983 would also be the third Wednesday of November. The results of using this naive expectations model for the announcement dates are similar to the results reported in tables 4 and 5: the *SER*'s for the announcement period, days 0 and +1, are significantly positive both before and after controlling for the ex-dividend period.¹⁴ With these results, or lack thereof, it is difficult to conclude that the timing of dividend announcement explains the positive announcement effect.

8. Conclusions

Our investigation has focused on two aspects of the market's response to dividend announcements: the timeliness and the unbiasedness. Like the earlier study by Charest, we find a lag in the market's response to dividend announcements. A closer examination reveals that this lag is due to the confounding of ex-dividend effects with announcement effects. When we control for the ex-dividend effect, there is no evidence of a lag in the market's response to dividend announcements.

In contrast to the results for the timeliness tests, the tests for unbiased expectations of the market with respect to dividend announcements yield results that conflict with market rationality. Although our sample of dividend announcements was constructed to avoid any ex-post selection bias, the average excess returns on the announcement day and the day following the announcement are positive and highly significant, suggesting that the market is either overly pessimistic in forecasting dividends or overly optimistic in assessing the informational content of dividend announcements. Following Kalay and Loewenstein, we attempt to relate this result to changes in risk during the announcement period. However, our formal test shows no evidence of significant increases in beta risk during the announcement period. We also consider several potential sampling problems: missing data, a survivorship bias, non-trading, and the discretionary nature of dividend announcement dates. Taken one at a time, these potential explanations are incapable of explaining the observed phenomenon. Although they may be able to explain it if considered

¹⁴ Kalay and Loewenstein use an identical expectations model for their sample of 302 large firms and also report significantly positive excess returns for the announcement period.

jointly, we are unaware of any test that would allow us to test for their effects simultaneously.

Ignoring the joint effect of the potential explanations, an obvious interpretation of the results is that the market's reaction to dividend announcements is positively biased: a violation of market rationality. To reach such a conclusion, we must consider the magnitude of the observed deviation. Although the abnormal returns during the two-day announcement period of 0.09% is statistically significant, the arbitrage profit opportunity is too small to cover the trading costs of even those investors with the lowest transaction costs. Nonetheless, our results imply a mispricing in the stock market and a portfolio trader (an investor who intends to trade for portfolio reasons and therefore faces zero marginal transaction costs) can profit by timing trades. Assuming that the average security has four dividend announcement days in a year, the average announcement effect implies an annual excess return of about 0.36%. In light of the fact that the average annual return of the securities included in our sample was about 14%, it is difficult to judge if the observed deviation of 0.36% is economically significant or within the bounds of reasonableness.

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