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Stock Prices and Financial Analysts' Recommendations

JAMES H. BJERRING, JOSEF LAKONISHOK, and THEO VERMAELEN*

ABSTRACT

The recommendations of a Canadian brokerage house are evaluated by a number of techniques. The results reveal that an investor following the recommendations would have achieved significantly positive abnormal returns, even after allowing for transactions cost.

DURING THE RECENT DECADE, considerable evidence has been produced in support of the hypothesis that stock prices reflect all publicly available information. The apparent difficulty of "picking winners" has generated a certain skepticism about the economic value of professional investment advice. In 1933 Cowles [8] concluded that several types of investment advice were not of value to investors. Similar conclusions were reached by Colker [5], Diefenback [9], and Logue and Tuttle [15]. Other studies by Cheney [4] and the more recent ones by Lloyd-Davies and Canes [14], Groth, et al., [11], Black [2], Copeland and Mayers [6], and Givoly and Lakonishok [10] provide evidence that brokerage houses and investment advisory services do provide valuable investment advice to their customers. It is interesting that the more recent studies which report positive abnormal performance are more careful in adjusting for risk, and concentrate on returns achieved by customers of the brokerage house/investment adviser, rather than by readers of a more widely disseminated publication (such as the *Wall Street Journal*).

The purpose of this paper is to add to the existing performance measurement literature by evaluating the investment advice of a leading Canadian brokerage house. Although similar in scope, this study differs in several ways from previous studies in this area. First, the brokerage house recommendations involve both Canadian and U.S. stocks; this permits analysis of comparative advantage in information acquisition. Second, the investment recommendations utilized are disseminated to fewer market participants than is the case in previous studies. Finally, the firm produces several types of investment advice, reflecting different expectations about possible abnormal returns.

* University of British Columbia; Tel-Aviv University, currently visiting at University of North Carolina at Chapel Hill; and Catholic University of Leuven and E.I.A.S.M. (Brussels) respectively. The paper was written when the authors were at the University of British Columbia. The authors would like to express their appreciation to the Financial Research Foundation of Canada and to the brokerage firm which provided the data for the study. Computational assistance was received from Do Kyu Lee. Helpful comments were received from Michael Brennan, Paul Halpern, Richard McEnally, Mark Rubinstein, the participants of the Finance Workshops at U.B.C., and U.N.C., and the 1982 F.R.F. Conference in Kingston, Ontario, and R. A. Brealey.

I. Data Description

The data for the study were provided by a regional Canadian money management and investment service company, which since September 1977 has published weekly a "recommended" and a "speculative" list of stocks, and monthly a "representative" list.

Stocks on the *recommended* list are buy recommendations and are expected to generate positive abnormal returns. *Speculative* stocks are viewed as riskier, and often created disagreement among the members of the brokerage firm's investment committee. They are included in our analysis only for the sake of completeness. Finally, there are two typical ways for a stock to reach the *representative* list. First, most of the common stocks which have been dropped from the recommended list are put on the representative list. In the presence of transaction costs, the appropriate interpretation is that investors holding such a stock should not sell it, but investors who do not hold the stock are not encouraged to buy it. Second, most of the initial recommendations of a new analyst go on the representative list. The presence on the representative list indicates to investors that an analyst follows this company and will make known any change in his expectations regarding it.

Our data consist of all the recommended, speculative, and representative lists from September 1977 to February 1981, 179 weeks of data. Most of the security price data were provided by I.P. Sharpe, a firm whose data bank is used by many investment companies in Canada. In cases for which the companies did not have data on I.P. Sharpe tapes (the I.P. Sharpe tapes include only surviving companies), price data were collected from standard published sources. In total, there were 221 additions to the advisory lists. These 221 additions involved only 93 different companies, so each of the companies was added to a list an average of 2.4 times. The median length of stay on a list was 20 weeks, the average 30 weeks. The distribution of the 221 additions among lists and countries is given in Table IA.

Of the 221 additions to a list, 71 percent came from the T[oronto] S[tock] E[xchange], 23 percent came from the NYSE, and the remaining 6 percent came from the Vancouver Stock Exchange, AMEX, and OTC. Forty of the 67 *Canadian* firms are natural resource companies (oil and gas exploration, metal mining, and forest products), while the remaining 27 companies belong to 11 different 2-digit SIC industries. This concentration is not as dramatic as it seems: natural resource companies account for more than 40 percent of the weight in the TSE 300 (the proxy for the market index used, see infra). A similar concentration is not

Table IA

Number of Additions to Advisory Lists

List	Canada	U.S.	Canada + U.S.
Recommended	66	26	92
Speculative	8	5	13
Representative	86	30	116
All	160	61	221

apparent in the U.S. sample in which the 26 companies belonged to 17 different industries and no industry group contained more than three firms.

Table IB shows the distribution of the length of time stocks were on various lists. Seventy-five percent of the listings were for a period longer than 10 weeks and 25 percent of the listings lasted for more than 39 weeks. One company was listed for only one week, and one company was on a list throughout the entire 179 week period.

Finally, Table IC shows the distribution of the week of initial listing for our entire observation period (179 weeks). The table shows that a disproportionate number of listings occurs in the first 36 weeks. This concentration is caused by a "beginning" effect in the first week of September 1977 when 16 stocks were added to the recommended list, 1 to the speculative list, and 26 to the representative list. Ignoring these first-week listings, the distributions reported in Table IC are not significantly different (at the 5 percent significance level) from a uniform distribution according to chi-square tests.

II. Methodology

The analysis was conducted for Canadian and U.S. securities separately as well as for all the securities together. In general, then, we had three "countries," Canada, U.S., and Canada plus U.S., and four advisory lists: recommended, speculative, representative, and all together. We call each of the $3 \times 4 = 12$ country-list combinations a *subset.*

Each addition was treated as a separate *case.* Thus, if a company was added seven times to one or more lists, it would comprise seven cases. From the time a case is added to the list to the time it is removed, the case is said to be *active.*

In order to assess the value of a case, we followed two distinct approaches. The Market Model approach involved computing "abnormal" returns on the basis of

Table IB

Distribution of Time Spent on Advisory Lists

Number of Weeks	Recommended	Speculative	Representative	All
1–4	11	2	6	19
5–8	7	1	12	20
9–26	40	7	38	85
27–52	19	2	40	61
>52	15	1	20	36

Table IC

Distribution of Initial Listing on Advisory Lists

Week of Listing	Recommended	Speculative	Representative	All
1–36	33	5	48	86
37–72	14	2	17	33
73–108	13	1	12	26
109–144	20	4	26	50
145–179	12	1	13	26

the Market Model. The Control Period approach involved comparing raw returns during the active period with the returns during a control period surrounding the active period.

The Market Model approach itself was performed using two distinct methods of portfolio construction. In the first method, the abnormal return for a portfolio in week t was defined as the average of the abnormal returns its constituent securities experienced in week t of their listing. This is the standard method of portfolio construction in event studies. We call these portfolios *event time portfolios.* In the second method of portfolio construction, the abnormal return of a portfolio in week t was defined as the average of the abnormal returns its constituent securities experienced in calendar week t (see Jaffee [12]). We call these portfolios *calendar time portfolios*

As is discussed in subsequent sections, the event time portfolios demonstrate the pattern of stock price performance following recommendations; the calendar time portfolios lead to more valid statistical tests and also represent a more realistic trading strategy.

The Market Model Approach

According to the Market Model, the abnormal return e_{it} for each security i in each week t is

$$e_{it} = R_{it} - (\alpha_i + \beta_i R_{mt})$$

where

R_{it} is the realized return (including dividends if any) of the ith security in week t; and

R_{mt} is the realized return of a market index for week t.

For each security, α and β were calculated by simple linear regression of the returns of the security on the returns of a market index for the 52 week period consisting of weeks $-60, -59, \cdots, -9$, where week zero is the week the security first appeared on any list.

The market index used for Canadian securities is the TSE 300, adjusted for dividends. The market index used for U.S. securities is the Standard and Poor's 500 adjusted for dividends (SP 500).

Event Time Portfolio Method

For each of the 221 cases, we computed the abnormal return in the tth week of listing for $t = -28, -27, \cdots, -1, 0, 1, 2 \cdots$. We then computed a mean abnormal return AR(t) for each of the twelve subsets and each time $t = -8, -7, \cdots, 179$. More specifically, for each subset, AR(t) is the mean abnormal return for week t over all cases active in week t (that is, over all cases still in the subset t weeks after being added).

Each mean abnormal return, AR(t), was tested for significant difference from zero using a t-test involving the "crude dependence adjustment" described in Brown and Warner [3] for handling cross-sectional dependence. To estimate the standard error for AR(t) for the t-test, the mean abnormal return for week w was computed over all cases active in week t which had valid data for week w. The standard error is then the standard deviation of these mean abnormal returns over $w = -28, -27, \cdots, -9$.

The number of cases remaining on a list for an extended period is small, so the standard deviation of the means of the returns of these long lived cases over weeks $w = -28, -27, \cdots, -9$ is large. In fact, by the Central Limit Theorem, the standard error of $AR(t)$ is inversely proportional to the square root of the number of cases active at time t. This explains why the cumulative abnormal return described below is a weighted sum.

The cumulative mean abnormal return for week t, $CAR(t)$, is a weighted sum of the weekly mean abnormal returns over weeks 0 to t with the weights proportional to the number of cases active at time w. That is,

$$CAR(t) = \frac{t+1}{M(t)} \sum_{w=0}^{t} N(w)^* AR(w)$$

where

$N(w)$ = number of stocks still on the list at time w; and
$M(t) = \sum_{w=0}^{t} N(w)$

$CAR(t)$ corresponds to the cumulative abnormal return that an investor would achieve by investing a fixed dollar amount in each of the securities on the list each period. If $N(w)$ is constant over time, $CAR(t)$ reduces to the familiar $\sum_{w=0}^{t} AR(w)$. Our formula takes account of the fact that the number of observations declines as we move further away from the event date.[1]

The standard error of $CAR(t)$ is given by

$$SE(CAR(t)) = \frac{t+1}{M(t)} [Var(\textstyle\sum_{w=0}^{t} N(w)^* AR(w))]^{1/2}$$
$$= \frac{t+1}{M(t)} [\textstyle\sum_{w=0}^{t} (N(w)^* SE(AR(w)))^2]^{1/2}$$

Note that in deriving the standard error, we assumed that average rates of return are independent over item. This is not strictly true, as week w of listing for one stock could be the same calendar week as week x of listing for another.[2] This problem does not exist with the calendar time portfolios discussed below.

[1] Note also that if $AR(w)$, $w = 1, \cdots, t$ are serially independent and have variances inversely proportional to $N(w)$, then $CAR(t)/(t+1)$ is the best linear unbiased estimate of the mean of $AR(w)$ over $w = 1, \cdots, t$.

[2] The dependence in the average abnormal return is a traditional problem in event studies and can best be illustrated by an example. Consider two gold mining stocks, one recommended on 1 January 1979, the second one recommended on 1 February 1979. Now, assume an event which affects only the gold mining industry, e.g. a Russian invasion on 1 March 1979. Assume further, that at that time both stocks are still on the recommended list. Because stock #1 is in its eighth week of recommendation and stock #2 is in its fourth week of recommendation, both AR(8) and AR(4) are affected by the returns in the first week of March. Thus, the *cross-sectional* dependencies in the stocks (i.e. because they are in the same industry) induces dependencies over *time* in the $AR(t)$ series. This effect is potentially important, considering that half of the recommended stocks stay on the list more than 20 weeks and considering our rather short ($3\frac{1}{2}$ years) observation period.

In order to assess whether longer lived cases have higher average weekly abnormal returns than shorter lived ones, we compute MCARS, the mean cumulative abnormal return for survivors. MCARS(t) is the mean cumulative abnormal return to time t for those cases still active at time t.

Thus, we define CAR(c, t), the cumulative abnormal return for case c for week t, as

$$\mathrm{CAR}(c, t) = \textstyle\sum_{w=0}^{t} e_{cw}$$

MCARS(t) is then the average of CAR(c, t) over all cases c active at time t.

Note that MCARS(t) involves only those cases still active at time t, whereas CAR(t) is influenced by all cases, albeit with higher weights for the longer lived.

The mean abnormal return over cases still active at time t was computed for each week $w = 0, 1, \cdots, t$. Note that the same number of cases is involved at each time $w = 0, 1, \cdots, t$, so each mean abnormal return has the same standard error. Thus the standard deviation over $w = 0, 1, \cdots, t$ of these mean abnormal returns multiplied by $\sqrt{t+1}$ is an estimate of the standard error of MCARS(t). The test statistic is MCARS(t) divided by this standard error estimate.

Calendar Time Portfolio Method

For each week in the test period from September 1977 to January 1981, (a total of 179 weeks), we formed an equally weighted portfolio for each subset consisting of all securities in the subset in week t. For each such portfolio we computed the market model parameters,[3] the standard deviation s of the portfolio abnormal return over the twenty week period $t - 28, t - 27, \cdots, t - 9$, and the standardized abnormal return for week t, $z_t = r_t/s$, where r_t is the portfolio abnormal return for week t. Assuming that weekly security returns are serially independent, z_t is independent of z_w for $t \neq w$. Moreover, under the assumption that individual abnormal returns are normally distributed with mean zero, z_t has a t-distribution with $n - 1$ degrees of freedom, where n is the number of securities in the portfolio. Since n is in general large, z_t is approximately normally distributed with mean zero and unit standard deviation.

A calendar time portfolio for week t is an equally weighted portfolio of all stocks active in week t. Thus calendar time portfolios correspond to the holdings of an investor who each week allocates the same dollar amount among all active stocks in the subset, with an equal dollar amount invested in each stock in a given week. Note the difference with the interpretation of the previous method. Event time results correspond to the performance of an investor who each week owns a fixed dollar amount of each active stock, so his total dollar investment changes every week. For each subset, we have under the null hypothesis a sequence $z_1, z_2, \cdots, z_{179}$ of standardized abnormal returns which are independent and approximately normally distributed with mean zero and standard deviation

[3] Computation of the market model parameters is described in Section II.C.1, "Computing Abnormal Returns." The data used are described in Section I, "Data Description."

one. Thus by the Central Limit Theorem,

$$\bar{z} := \frac{1}{179} \sum_{t=1}^{179} z_t$$

is approximately normally distributed with mean zero and variance 1/179. Thus, $\sqrt{179}\,\bar{z}$ is approximately standard normal. We used $\sqrt{179}\,\bar{z}$ to test the significance of the calendar time portfolio abnormal returns.

Scholes-Williams Procedure

In addition to the simple linear regression method of estimating α and β, we also used Scholes and Williams method [18] designed to adjust for thin trading. The underlying assumption of the method as employed here is that there is at least one trade in each time interval used to compute returns. In this respect, it should be noted that, except for two cases, each of the 93 securities involved in the study was traded at least once in each week of the study.

Control Period Approach

In order to assess the sensitivity of our results to our specification of abnormal returns, an alternative method was used to measure abnormal performance. For each case, the average weekly (unadjusted) return over its active period was compared with the average weekly return over a thirty-week control period consisting of 15 weeks immediately before the case was added to the list, and 15 weeks immediately after the case was deleted from the list. The comparison was made using a t-test of a difference between two means.[4]

As in the calendar time method described above, a joint test was obtained by approximating each individual t by a standard normal. The resulting statistic was used to test whether the recommended companies had higher weekly returns while on the list than they did during their thirty-week control period. Note that, because each case is its own control, this method reduces biases introduced by industry and size factors.[5]

III. Results

Event Time Portfolio Method

The results for the event time portfolio method for weeks −8 to 38, 51, 103, and the last week for which any case was active, based on the *recommended* list, are provided in Tables II, III, and IV. Table II includes only Canadian stocks, Table III includes only U.S. stocks, and Table IV combines the results of the two countries.

The second column in Tables II, III, and IV shows the number of recommendations still on the list after t weeks. The median length of stay on the recom-

[4] A similar approach was proposed by Masulis [16] and, specifically in a performance measurement framework, by Cornell [7].

[5] If only oil stocks were recommended, then the performance of the list would be compared against only oil stocks. The effect of size on returns is discussed by Banz [1] and Reinganum [17].

Table II

Event-Time Portfolio Method. Canadian Stocks—Recommended List

(1) Week of Listing	(2) Number of Stocks	(3) Abnormal Return	(4) Abnormal Return t-Value	(5) Cumulative Abnormal Return	(6) Cumulative Abnormal Return t-Value	(7) MCARS[a]	(8) MCARS[a] t-Value
−8	66	0.2756	0.55				
−7	66	−0.2835	−0.56				
−6	66	0.2423	0.48				
−5	66	−0.7288	−1.44				
−4	66	0.2676	0.53				
−3	66	0.5832	1.15				
−2	66	0.2268	0.45				
−1	66	0.1518	0.30				
0	66	1.8010	3.56	1.80	3.56	1.80	3.56
1	65	0.6929	1.30	2.50	3.41	2.54	3.37
2	64	−0.3466	−0.65	2.18	2.40	2.21	2.37
3	59	−0.1629	−0.28	2.08	1.94	1.83	1.60
4	56	−0.5941	−1.00	1.59	1.30	1.39	1.05
5	56	−0.3911	−0.66	1.26	0.93	1.00	0.69
6	55	0.0665	0.12	1.34	0.91	0.78	0.52
7	53	−0.4908	−0.81	0.92	0.58	0.33	0.19
8	51	1.1004	1.78	1.90	1.12	1.11	0.60
9	51	0.1884	0.30	2.09	1.16	1.30	0.67
10	49	−0.2610	−0.41	1.89	0.99	1.20	0.57
11	46	0.7815	1.26	2.57	1.28	2.27	1.06
12	43	−0.0233	−0.04	2.59	1.23	2.67	1.17
13	43	−0.1214	−0.19	2.54	1.16	2.55	1.08
14	42	0.4074	0.67	2.90	1.27	2.60	1.10
15	42	−0.2550	−0.42	2.73	1.16	2.34	0.96
16	41	1.3868	2.24	3.87	1.58	3.48	1.36
17	38	−0.6342	−0.98	3.45	1.37	1.16	0.42
18	33	1.4942	2.23	4.50	1.72	4.77	1.64
19	28	0.9629	1.53	5.15	1.91	2.14	0.76
20	27	−0.5704	−0.89	4.94	1.78	1.78	0.61
21	27	0.6096	0.95	5.39	1.89	2.39	0.80
22	26	1.2438	1.84	6.20	2.11	5.06	1.56
23	25	1.4956	2.35	7.15	2.37	5.44	1.74
24	25	−0.3924	−0.62	7.06	2.28	5.05	1.59
25	25	−0.3292	−0.52	6.99	2.21	4.72	1.45
26	23	1.2300	1.78	7.77	2.40	6.96	1.94
27	23	0.3317	0.48	8.09	2.44	7.29	1.99
28	23	0.0809	0.12	8.26	2.43	7.37	1.98
29	23	0.2483	0.36	8.52	2.46	7.62	2.01
30	23	0.0974	0.14	8.70	2.46	7.71	2.01
31	21	0.1562	0.23	8.92	2.47	7.22	1.89
32	21	1.1686	1.73	9.67	2.63	8.39	2.16
33	21	1.8638	2.76	10.82	2.89	10.25	2.61
34	20	0.0720	0.10	11.01	2.88	8.88	2.13
35	19	0.6421	0.86	11.49	2.95	6.37	1.43
36	19	0.3479	0.47	11.82	2.98	6.72	1.48
37	19	−0.4289	−0.58	11.75	2.91	6.29	1.37
38	19	1.5911	2.14	12.74	3.10	7.88	1.70
51	11	−0.7009	−0.66	13.30	2.64	3.93	0.51
103	1	−0.6800	−0.24	23.28	2.48	−41.22	−1.44
179	1	0.8700	0.31	37.03	2.35	−58.10	−1.55

[a] MCARS is the mean cumulative abnormal return for survivors.

Table III

Event-Time Portfolio Method. U.S. Stocks—Recommended List

(1) Week of Listing	(2) Number of Stocks	(3) Abnormal Return	(4) Abnormal Return t-Value	(5) Cumulative Abnormal Return	(6) Cumulative Abnormal Return t-Value	(7) MCARS[a]	(8) MCARS[a] t-Value
−8	26	1.1523	1.50				
−7	26	−0.7677	−1.00				
−6	26	−0.3208	−0.42				
−5	26	1.5754	2.04				
−4	26	−1.4538	−1.89				
−3	26	−0.5269	−0.68				
−2	26	0.6077	0.79				
−1	26	0.7385	0.96				
0	26	0.6858	0.89	0.69	0.89	0.66	0.86
1	26	0.3208	0.42	1.01	0.92	1.10	0.92
2	26	−0.3727	−0.48	0.63	0.47	0.63	0.47
3	26	−0.4269	−0.55	0.21	0.13	0.21	0.13
4	25	0.9624	1.24	1.14	0.66	0.73	0.42
5	24	0.0033	0.00	1.16	0.61	0.53	0.27
6	24	0.0879	0.11	1.25	0.61	0.61	0.29
7	23	−1.5322	−1.93	−0.14	−0.07	−1.31	−0.58
8	23	1.2461	1.57	1.01	0.43	−0.07	−0.03
9	22	0.4668	0.55	1.44	0.58	−0.65	−0.24
10	19	0.3100	0.36	1.72	0.65	−0.82	−0.29
11	19	−1.1610	−1.36	0.81	0.29	−1.98	−0.67
12	19	0.7816	0.91	1.46	0.51	−1.20	−0.39
13	19	0.2795	0.33	1.71	0.57	−0.92	−0.29
14	19	2.2626	2.65	3.63	1.16	1.35	0.41
15	19	0.6663	0.78	4.23	1.30	2.01	0.59
16	19	0.0168	0.02	4.29	1.28	2.03	0.58
17	19	0.0663	0.08	4.38	1.26	2.10	0.58
18	17	0.5576	0.66	4.87	1.36	0.43	0.12
19	16	0.1056	0.12	5.01	1.36	2.02	0.52
20	16	1.1687	1.34	5.95	1.58	3.19	0.80
21	15	0.7000	0.92	6.53	1.69	3.64	1.02
22	14	−0.4600	−0.66	6.32	1.60	3.62	1.09
23	14	−0.3286	−0.47	6.18	1.53	3.29	0.97
24	14	0.1414	0.20	6.35	1.55	3.44	0.99
25	14	0.0036	0.01	6.43	1.54	3.44	0.97
26	11	−0.0855	−0.12	6.49	1.52	3.70	0.97
27	11	1.3927	1.90	7.39	1.69	5.09	1.31
28	11	0.7691	1.05	7.95	1.78	5.86	1.49
29	11	1.4336	1.96	8.90	1.96	7.30	1.82
30	11	−0.2109	−0.29	8.90	1.93	7.09	1.74
31	10	1.2320	1.32	9.70	2.06	9.97	1.89
32	10	0.8240	0.88	10.30	2.14	10.80	2.02
33	9	0.3922	0.44	10.65	2.17	13.05	2.51
34	9	1.9033	2.13	11.79	2.36	14.96	2.84
35	9	−0.5878	−0.66	11.64	2.29	14.37	2.69
36	8	2.2537	2.19	12.87	2.49	14.59	2.33
37	8	1.6337	1.58	13.84	2.62	16.23	2.55
38	8	−0.6875	−0.67	13.69	2.55	15.54	2.41
51	5	−0.3340	−0.32	15.50	2.34	3.14	0.42
103	1	4.5300	1.96	40.62	3.36	87.66	3.72
142	1	2.5000	1.08	63.08	3.93	145.73	5.27

[a] MCARS is the mean cumulative abnormal return for survivors.

Table IV

Event-Time Portfolio Method. Canadian + U.S. Stocks Recommended List

(1) Week of Listing	(2) Number of Stocks	(3) Abnormal Return	(4) Abnormal Return t-Value	(5) Cumulative Abnormal Return	(6) Cumulative Abnormal Return t-Value	(7) MCARS[a]	(8) MCARS[a] t-Value
−8	92	0.5234	1.32				
−7	92	−0.4203	−1.06				
−6	92	0.0832	0.21				
−5	92	−0.0776	−0.20				
−4	92	−0.2189	−0.55				
−3	92	0.2695	0.68				
−2	92	0.3345	0.85				
−1	92	0.3176	0.80				
0	92	1.4858	3.76	1.49	3.76	1.47	3.72
1	91	0.5866	1.40	2.08	3.61	2.10	3.55
2	90	−0.3541	−0.85	1.74	2.44	1.75	2.42
3	85	−0.2436	−0.55	1.54	1.83	1.33	1.50
4	81	−0.1137	−0.25	1.46	1.54	1.19	1.18
5	80	−0.2727	−0.61	1.23	1.17	0.86	0.78
6	79	0.0730	0.17	1.31	1.16	0.73	0.64
7	76	−0.8059	−1.75	0.61	0.49	−0.17	−0.13
8	74	1.1457	2.42	1.63	1.25	0.75	0.52
9	73	0.2723	0.56	1.90	1.36	0.71	0.46
10	68	−0.1015	−0.19	1.84	1.24	0.64	0.37
11	65	0.2137	0.40	2.05	1.30	1.03	0.56
12	62	0.2234	0.41	2.26	1.36	1.48	0.76
13	62	0.0015	0.00	2.29	1.32	1.49	0.74
14	61	0.9852	1.89	3.12	1.72	2.21	1.09
15	61	0.0320	0.06	3.18	1.69	2.24	1.07
16	60	0.9530	1.81	3.99	2.05	3.02	1.39
17	57	−0.4007	−0.71	3.73	1.84	1.47	0.62
18	50	1.1758	2.04	4.61	2.20	3.29	1.31
19	44	0.6511	1.22	5.11	2.36	2.10	0.88
20	43	0.0767	0.14	5.25	2.36	2.31	0.93
21	42	0.6419	1.32	5.75	2.51	2.84	1.24
22	40	0.6475	1.35	6.24	2.66	4.56	1.99
23	39	0.8408	1.90	6.85	2.85	4.67	2.15
24	39	−0.2008	−0.45	6.84	2.78	4.47	2.02
25	39	−0.2097	−0.47	6.82	2.71	4.26	1.88
26	34	0.8044	1.70	7.37	2.87	5.90	2.40
27	34	0.6750	1.43	7.87	3.00	6.58	2.63
28	34	0.3035	0.64	8.16	3.05	6.88	2.70
29	34	0.6318	1.33	8.64	3.16	7.51	2.90
30	34	−0.0024	−0.00	8.76	3.15	7.51	2.85
31	31	0.5032	1.11	9.16	3.23	8.11	3.17
32	31	1.0574	2.34	9.87	3.42	9.16	3.53
33	30	1.4223	3.25	10.77	3.67	11.09	4.35
34	29	0.6403	1.43	11.25	3.77	10.76	4.06
35	28	0.2468	0.54	11.54	3.80	8.94	3.27
36	27	0.9126	1.90	12.15	3.93	9.05	3.10
37	27	0.1822	0.38	12.41	3.95	9.23	3.12
38	27	0.9159	1.91	13.04	4.09	10.15	3.39
51	16	−0.5862	−0.87	13.98	3.60	3.68	0.75
103	2	1.9250	0.98	28.65	4.01	23.22	1.16
179	1	0.8700	0.31	50.22	4.18	−58.10	−1.55

[a] MCARS is the mean cumulative abnormal return for survivors.

mended list was 18 weeks for Canadian companies and 25 weeks for U.S. companies. Note that there is one recommendation which stayed on the Canadian list for 179 weeks (i.e., the total observation period). Columns 3 and 4 in Table II show that in week zero the Canadian recommended stocks jumped a significant 1.8%. Since getting on the recommended list is a long process involving a committee decision, and since no other return is significant in weeks −8 to 15, it's unlikely the week zero result is due to fundamental effects or company news. Thus, it appears that a recommendation affects the price of a Canadian stock in the week of recommendation. By comparison, the U.S. cases (see Table III) in week zero moved only .7%, which has a t-value of less than one.

The cumulative mean abnormal return for week t, $\mathrm{CAR}(t)$, is a weighted sum of the mean abnormal returns over weeks 0 to t with the weights proportional to the number of active cases in each week. The CAR over the total observation period (i.e., including all recommendations in the 179 week period, with each recommendation weighted as described above) is 37.03 percent for Canadian stocks and 63.08 percent for U.S. stocks. The corresponding t-statistics in Column 6 show that these values are highly significant. The results in Table IV (which combine all the recommendations of both countries) are similar to the results in Tables II and III. So, in general, the stocks on the recommended list generated positive abnormal returns.

One may question the wisdom of including *all* recommendations in the computation, considering the decline in the number of observations when we move further away from the event date. e.g., the one recommendation which is on the list for the entire $3\frac{1}{2}$ year observation period may receive too much weight. Although our weighted CAR (and corresponding t-statistics) adjust for the impact of such outliers, it may seem questionable to interpret abnormal returns after a year on the list as "unexpected" returns. However, casual inspection of Tables II, III, and IV reveals that our basic conclusions are independent of the inclusion of these outliers. e.g., Table IV shows that after 52 weeks the CAR equals 13.98 percent and is highly significant ($t = 3.60$).

The seventh column in Tables II, III, and IV is MCARS, the mean cumulative abnormal return for survivors. Recall $\mathrm{MCARS}(t)$ excludes the performance of securities which were removed from the list before week t in event time. Note that, in general, MCARS is less than CAR, particularly for Canadian stocks. Thus, cases still active at time t have lower average abnormal returns than shorter-lived ones. This is consistent with stocks being dropped from the recommended list after an adjustment in price from a low level to an efficient level.

The results above describe the performance of the stocks on the recommended list. A similar analysis was performed for the *representative* and *speculative* lists. The average weekly results (including all cases) with their corresponding t-values are summarized in Table V.[6]

The results show that, as predicted by the brokerage house, stocks on the

[6] Because our weeks are not centered around the day of recommendation, part of the abnormal returns in week 0 will occur prior to recommendation. However, although the recommended list was *published* in week 0, the actual recommendation decision was made in week −1. Many customers were informed (by their brokers) about the recommendation before publication of the list. In any case, the announcement returns are small relative to the total cumulative abnormal returns.

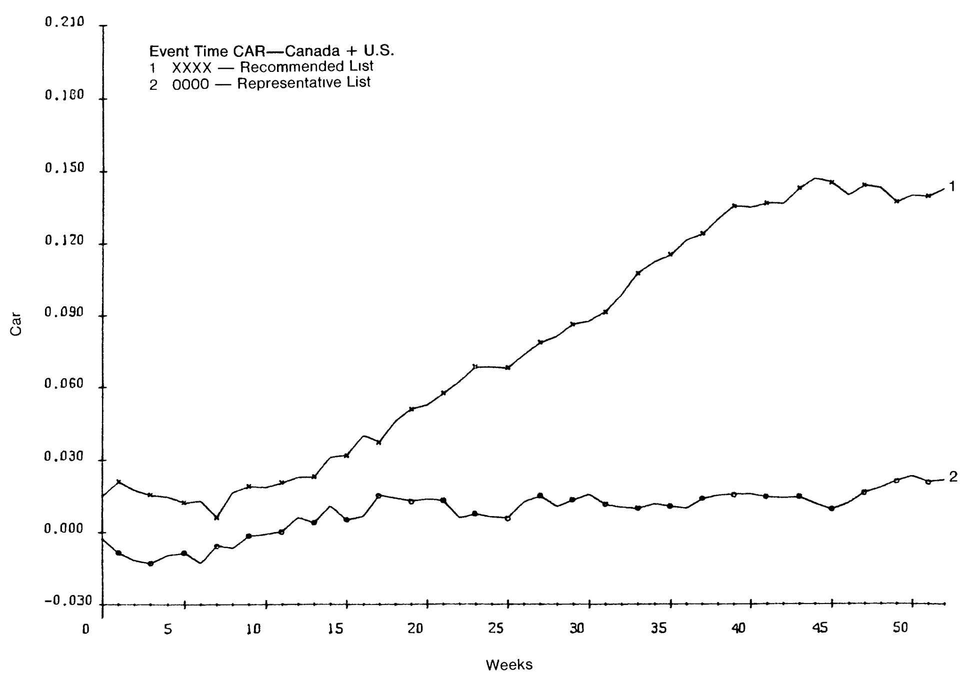
Table V
Mean Listing Period Abnormal Returns[a b]
(Event time method)

	Canada		U.S.		Canada + U.S.	
List	Mean Abnormal Return	t-value	Mean Abnormal Return	t-value	Mean Abnormal Return	t-value
Recommended	.206%	2.3*	.441%	3.9**	.279%	4.2**
Speculative	−.848%	−1.7	−.178%	−0.3	−.656%	−1.8
Representative	.074%	1.3	−.003%	−0.0	.056%	1.0
All	.085%	1.7	.194%	2.4**	.114%	2.8**

[a] The entries in the table are the mean abnormal returns per week of all cases on a list averaged over all weeks. The first line consists of the CAR's from the bottom lines of Tables II, III, and IV expressed as percent per week.

[b] One asterisk denotes significance at the .05 level and two asterisks denote significance at the .01 level for a one-tailed test.

recommended lists generate positive abnormal returns, and abnormal returns to stocks on the representative list are remarkably close to zero. It should be emphasized (as pointed out in Section I) that many stocks on the representative list come from the recommended list. Thus, to a certain extent the CAR of the representative list can be interpreted as the cumulative abnormal returns generated by the recommended stocks *after delisting*. The fact that stocks generate positive abnormal returns when they are on the recommended list and zero abnormal returns when they are off the list is impressive evidence of timing ability. Please see Figure 1.



Calendar Time Portfolio Method

The abnormal returns obtained from the calendar time analyses are presented below in Table VI, along with those of the event time analyses for comparison. Recall that in the event time analyses, each case is weighted directly by the length of its stay on the list. In the calendar time analyses, however, each case is weighted directly by the length of its stay on the list, and inversely by the average number of cases concurrently active. Table VI shows that the results on the basis of calendar time portfolios are practically identical to the ones obtained by using the event time method. Therefore, the same conclusions apply.

Scholes-Williams Procedure

In addition to estimating α and β by ordinary least squares (OLS), we also estimated α and β using Scholes-Williams (SW) adjustment for thin trading [18]. While the SW adjustment had a fairly large effect on some individual α's and β's, the aggregate effect on abnormal returns was negligible. A comparison of the aggregate abnormal returns for the two techniques for calendar time portfolios is shown in Table VII. Note that the abnormal returns and their significance levels are equivalent in each of the twelve comparisons.

Control Period Method

Table VIII shows that raw returns of stocks on the *recommended* list were significantly higher during the period of listing than in the surrounding period.

Cases active in week one of the 179-week test period were considered to have been just added to the list, which they in fact were, since week one was the first time the brokerage firm had produced such a list. Cases still active in week 179, however, were considered special cases with no "after" period. Also, weeks −14 to 0 could be in the control period but not the active period. Ignoring these beginning and ending effects, add and delete dates are distributed uniformly throughout the test period. Also, the average length of stay on the recommended list is 30.5 weeks, and the average length of the control period is 27.0 weeks.

Table VI

Mean Listing Period Abnormal Returns[a b]
(Event time and calendar time methods)

	Canada		U.S.		Canada + U.S.	
List	Event	Calendar	Event	Calendar	Event	Calendar
Recommended	.206*	.204*	.441**	.503**	.279**	.267**
Speculative	−.848	−.193	−.178	−.194	−.656	−.258
Representative	.074	.127	−.003	−.113	.056	.067
All	.085	.114	.194**	.243**	.114**	.127*

[a] The entries in the table are the mean abnormal returns per week for all cases on a list averaged over all weeks.

[b] One asterisk denotes significance at the .05 level and two asterisks denote significance at the .01 level for a one-tailed test.

Table VII

Mean Listing Period Abnormal Returns[a b]
Comparison between Scholes-Williams method and the OLS method
(Calendar time portfolios)

	Canada		U.S.		Canada + U.S.	
List	Least Squares	Scholes-Williams	Least Squares	Scholes-Williams	Least Squares	Scholes-Williams
Recommended	.204*	.205*	.503**	.443**	.267**	.240**
Speculative	−.193	−.260	−.194	−.462	−.258	−.379
Representative	.127	.103	−.113	−.180	.067	.032
All	.114	.089	.243**	.176*	.127*	.091*

[a] The entries in the table are the mean abnormal returns per week of all cases on a list averaged over all weeks.
[b] One asterisk denotes significance at the .05 level and two asterisks denote significance at the .01 level for a one-tailed test.

Table VIII

Difference between Average Weekly Returns[a b] in the Active and the Control Periods
(Stocks on the Recommended list)

Country	Difference	t-value	df
Canada	.254%	1.88*	66
U.S.	.402%	1.84*	26
Canada + U.S.	.297%	2.58**	92

[a] The differences in the table are expressed as percent per week.
[b] One asterisk denotes significance at the .05 level and two asterisks denote significance at the .01 level for a one-tailed test.

Thus, each week in the test period is included in the active period about as often as it is in the control period.

Thus, the t-test described in the Methodology Section is a pure test of timing ability which does not depend on the specification of a model to adjust for market effects. According to the results reported above, the brokerage firm does indeed possess such timing ability.

Adjusting for Commissions

The *recommended* list averaged 14.8 securities (Canada plus U.S.) over the 179-week test period. On average there were .40 additions to the list per week and .40 deletions. Thus, an investor who bought the list would turn over his portfolio $.4/14.8 = .027$ times per week. If each round trip transaction cost 4%, his yearly commission payments would be $4\% * 52 * .027 = 5.6\%$ of the value of his portfolio. To illustrate the impact on our results, consider the calendar time portfolio analysis which gives the abnormal return before commissions of an investor who holds each week an equally weighted portfolio of all stocks on the list. The abnormal return for the total recommended list (Canadian plus U.S. securities combined) was .267% per week or 14.9% annually. Thus the investor who followed the recommended list would still have made

$$14.9\% - 5.6\% = 9.3\%$$

per year more than the investor who bought and held the market. Moreover, this 9.3% is a very conservative estimate since many investors pay less than 2% per transaction, and even investors who follow a buy-and-hold strategy experience some transaction costs as they invest new funds or retrieve money for major purchases.

IV. Summary and Conclusions

We estimated α and β by ordinary least squares (OLS) and by the Scholes-Williams technique (SW) which adjusts for thin trading. For each of the resulting sets of α's and β's we generated abnormal returns using the market model. We then tested these abnormal returns for significance using both event time portfolios and calendar time portfolios. In addition, for each case we compared its unadjusted return during the period of its listing with its adjusted return before it was listed and after it was delisted. The results from these various approaches are very consistent. In particular, all approaches indicate the brokerage firm's recommended list performed significantly better than expected during the test period of almost three and a half years.

A summary of the abnormal returns calculated by the various approaches for the recommended list is given in Table IX. The abnormal return for the control period method is the unadjusted return during the period on the recommended list minus the unadjusted return during the control period.

Potential Biases

When a set of security recommendations is found to outperform the market, it is often because the recommender specializes in a certain segment of the market or a specific industry which happens by chance to do better over the test period

Table IX

Abnormal Weekly Returns for the Recommended List: Summary[a b]

Approach	Canada	U.S.	Canada + U.S.
Event Time Portfolios—OLS Estimates	.206*	.441**	.279**
Event Time Portfolios—SW Estimates	.202*	.369**	.254**
Calendar Time Portfolios—OLS Estimates	.204*	.503**	.267**
Calendar Time Portfolios—SW Estimates	.205*	.443**	.240**
Control Period	.254*	.402*	.297**

[a] OLS denotes ordinary least squares, and SW, Scholes-Williams estimates.

[b] One asterisk denotes significance at the .05 level and two asterisks denote significance at the .01 level for a one-tailed test.

than other segments. The superior results reported here, however, cannot be explained by such "luck" for the following reasons.

First, the brokerage firm was successful in outperforming both the TSE 300 with their Canadian recommendations and the SP 500 with their U.S. recommendations, though conditions in the two markets were different. In particular, the Canadian market was a bull market with the TSE 300 advancing 24.3% per year during the test period, whereas the SP 500 barely kept up with inflation with a rise of 9.7% per year.

Second, many of the 93 companies floated between the recommended and representative lists. Since the recommended list did much better than the representative list (.279% abnormal return per week for the recommended list versus .056% for the representative list) we must conclude the brokerage firm has timing ability.

Finally, in one analysis the performance of each case while it was on the list (active period) was compared with its performance during the 15 weeks before appearing on the list and the 15 weeks after being removed from the list (control period). Moreover, each week in the test period was involved in the active period about as often as it was in the control period. Thus, the 93 companies did better when on the recommended list than when off, even though the individual "on" and "off" times were spread pretty evenly across the test period.

One source of potential bias could be the practice of analysts to recommend stocks after an abnormal price decline, so that the abnormal returns during the recommendation period are biased upwards. Note that this bias will creep in regardless of whether we use the Market Model approach or the Control Period approach because part of the control period includes the period before the recommendation. However, our results cannot be explained on the basis of this bias for the following reasons. The beta of the portfolio of recommended stocks equals .91 with the OLS procedure and 1.03 with the Scholes-Williams procedure. With a beta approximately equal to 1, the α of the portfolio should be equal to zero, if on the average α's and β's were computed during a "normal" period. The actual α of the portfolio equals $-.027$ percent per week with the OLS procedure and $-.038$ percent per week with the Scholes-Williams procedure. Thus, this result suggests that although the abnormal returns during the recommendation period are overestimated, the bias is too small to explain the .279 percent per week abnormal performance. As a final check of specification bias, we recomputed the abnormal returns for all the recommended stocks, using prior estimates of $\alpha = 0$ and $\beta = 1$ for all stocks. The resulting performance measures are very similar to the ones reported above. The stocks on the recommended list (Canada plus U.S.) generated .218 percent per week abnormal return (as measured by the event time method) which has a t-value of 3.18.

Implications for Market Efficiency and Security Analysis

The results in this paper show that the brokerage firm provided a valuable service to its customers in selecting stocks which achieved positive abnormal returns during the recommendation period. Moreover, the information content of the recommendations was not "immediately" reflected in market prices. The findings of this paper are similar to the ones reported by Black [2], Cheney [4], Lloyd-Davies and Canes [14], Groth, et al. [11], and Copeland and Mayers [6] who demonstrate that customers of financial analysts could have achieved superior abnormal returns by following their recommendations.

The results are consistent with the hypothesis that (at least some) financial analysts make the market more efficient by passing on information to their customers. In this respect it is interesting to note that the brokerage firm's Canadian recommendations are concentrated in a few industries (i.e. oil and gas, forest products, and mining). Because the firm is the only nationwide brokerage house with headquarters in the natural-resource-rich province in which it is centered, it may well have a comparative advantage in information acquisition with respect to local resource companies. Of course, we can't provide a similar explanation for the U.S. recommendations. The recommendations are not concentrated in any industry, and it is difficult to argue that the brokerage firm has a comparative advantage in information acquisition. However, it should be pointed out that the U.S. results are based on only 26 observations, and one should be careful in giving too much weight to such a small sample. Note that we do not know the extent of inside information used by the brokerage firm's financial analysts and that the results are also consistent with superior analysis of publicly available information.

In their study of Value Line recommendations, Copeland and Mayers [6] interpret the finding that the market does not immediately incorporate the information content of the Value Line ranking system after eight years of history as evidence against semi-strong form market efficiency. Our results differ from theirs in the following respects. First, unlike Value Line (a publication available in many public libraries), the recommendations of the brokerage firm studied here are not widely disseminated but are available only to the brokerage firm's customers. Although one could argue that "anyone could become a customer of the brokerage firm," the empirical fact is that the vast majority (especially in the U.S. market) of investors do not receive its recommendations. Market prices adjust to new information only if informed investors have enough clout to adjust the market price; for an individual risk-averse investor it does not pay to take a position until all arbitrage profits (without accounting for risk) are wiped out.[7] Second, although the *data* may be publicly available, the *information* content is clearly not. In order to assess the information content, investors may need a lengthy history for evaluation. Recall that the brokerage firm didn't start its recommendations until September 1977, and the abnormal returns may be realized several months after the recommendation.[8]

[7] Interesting in this respect is the difference in "announcement" abnormal returns between the Canadian and U.S. stocks: one would expect that the customers of the brokerage house would have more market power in Canada.

[8] For that matter, the analysts of the brokerage house themselves were pleasantly surprised with the results of our study.

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