SURVEY EVIDENCE ON DIFFUSION
OF INTEREST AMONG
INSTITUTIONAL INVESTORS

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Survey Evidence on Diffusion of Interest

Among Institutional Investors

ABSTRACT

Contagion or epidemic models of financial markets are
proposed in which interest in or attention to individual stocks
is spread by word of mouth. The models give alternative
interpretations of the random walk character of stock prices. A
questionnaire survey of institutional investors was undertaken to
ascertain the relevance of such models. Questions elicited what
fraction of these investors were unsystematic and allowed
themselves to be influenced by word-of-mouth communications or
other salient stimuli. Rough indications of the infection rate
and removal rate were produced. Investors in stocks whose price
had recently increased dramatically to a high P/E ratio were
contrasted with a control group of investors.

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Contagion models, like those used by epidemiologists to
study the transmission of disease (e. g., Bailey [1975]) or
social psychologists to study rumors or fads (e. g., Bartholomew
[1982]) would seem to be naturally of relevance to understanding
the spread of investor interest in specific financial assets, and
hence to understanding the predictability of returns, volatility
of prices or volume of trade in financial markets. Psychologists
have shown that direct interpersonal communication among peers is
of singular importance in the transmission of attitudes (see for
example McGuire [1969]). Interpersonal communication among peers
seems to produce the kind of attention and reassurance that leads
to changes in behavior. This fact is well recognized today in
marketing: advertisements often try to create the impression of
such communication.

The relevance of such contagion models in finance remains
today one of conjecture; there is little concrete evidence
concerning them. Researchers perhaps despair of studying them,
since they feel that they do not know how to disentangle such
behavior from behavior that is purposeful and intelligent. It
should be noted, though, that the psychological literature does
not hypothesize that the above models apply only to the less

intelligent individuals. Our hypothesis here is that the above
models apply in important ways to many of those investors, whom
we will call "diffusion investors", who do not use trading rules
that cause them to respond systematically to evidence but allow
attitudes to diffuse through them by word of mouth. Of course,
other "systematic investors" may tend to offset somewhat the
effect of the diffusion investors on price.

The present study is concerned only with professional
institutional investors, who would seem likely to be more
intelligent and knowledgeable than most other investors. The
object of our study was to ascertain by survey methods the
importance among them of diffusion investors and to inquire into
the source, time pattern, and interpersonal extent of their
attention to particular stocks. Since diffusion investors may
not be equally distributed across stocks, the study distinguishes
between a control group of randomly selected stocks and a group
of stocks in which diffusion investors were thought possibly
concentrated.

Models of Investor Behavior

The classic general epidemic model of Kermack and
McKendrick [1927] used to represent the spread of contagious
diseases has also been used to represent the time pattern of
rumors, attitudes or fads. The model in its simplest form

hypothesizes that the number I_t of infectives (or, in our application, interested people) is increased by an amount per unit of time equal to an infection rate b_t times the number of infectives, while b_t is itself proportional to the number S_t of susceptibles. At the same time, infectives cease to carry the disease (in our application, lose interest) and become immune to the disease at a rate per unit of time equal to a constant removal rate g times the number of infectives. The time path of I_t can show a hump shaped pattern through time, rising at first and then declining, or a decaying form in which the epidemic only declines from its initial intensity.

A number of modifications to this model may seem appropriate for modelling word-of-mouth communications. There may be an additional source of "infection" other than just word-of-mouth communication, Bartholomew [1982]. Something had to start the epidemic, and it may continue to exert influence. The assumption that persons are ultimately immune may be inappropriate, and it may be that persons removed from the infective pool become again susceptibles, Bartholomew [1982]. The constant removal rate assumption may be replaced by the assumption that persons stop spreading after encountering others who have already heard (Daley and Kendall [1965]). The complete mixing assumption that underlies the simple general epidemic model may be replaced by assumptions of a spatial pattern to transmission (Mollison [1972]).

Common to all these variations on the classic general epidemic model are some notions of an infection rate and removal rate. We can get some rough idea of their values directly from survey data. In this paper, we shall estimate the infection rates and removal rates as constants, and in particular we shall modify the general epidemic model so that the infection rate does not depend on the number of susceptibles. This makes sense in terms of the general epidemic model if the number of infectives remains sufficiently small in our sample that the number of susceptibles is always close to the entire population. The differential equation for the total amount of interest for a particular stock among all people I_t is then just:

(1) $$dI_t/dt = (b-g)I_t + u_t$$

where u_t is due to the "source" of the epidemic.

Supposing that $g < b$ and that the source u_t of the epidemic has an influence only for an instant (as would be the case if, for example, the source was a single widely publicized news story at time 0) then the total interest in the stock would follow an exponential decay pattern. However, hump shaped patterns for total demand for the stock could still be produced by assuming that total demand for the stock is a distributed lag on I_t (if investors take time to invest after their initial interest) or if the "source" continues to attract interest for a while, as for example if it too had an exponential decay pattern.

Other plausible assumptions will produce I_t that closely
resembles a random walk. Suppose that g is only a little smaller
than b and that the "source" is serially uncorrelated noise
(formally we may replace $u_t$dt with the stochastic differential of
a Wiener process). Such serially uncorrelated u_t might come
about as attention is drawn to the stock by random associations
with other events. Here, the uncorrelated shocks to demand are
cumulated by an (ever changing) pool of interested investors, to
produce a level of interest whose change is nearly
unforecastable. Such an outcome could be part of the reason for
the approximate "random walk" behavior of stock prices, though of
course the actions of some systematic investors must also play a
role in producing such behavior.

Sampling Procedure

A control group of 10 stocks was selected at random from
the Standard and Poor's Daily Stock Price Records for the New
York Stock Exchange, American Stock Exchange and Over the Counter
Stocks. An "experimental" or "boom" group of 10 stocks was
selected from the list of 25 stocks experiencing highest price
increases in the preceding year, as reported on the first page of
Trendline's Current Market Perspectives of June, 1985 and the OTC
Chart Manual of May-June 1985. Each stock in the list was given a
score equal to the average of the standardized values of the

stock's price increase over the preceding year, and
price/earnings ratio. A news search was done for the stocks, to
exclude special events; these were merger and acquisition
announcements in which the company was the target. Also excluded
were stocks that had had higher split-adjusted price in an
earlier year than the maximum achieved in the sample year. From
the remaining, the stocks with the top 10 scores were selected.[1]

The average (weighted by number of completed
questionnaires) E/P ratio in the experimental group in June 1985
was .025, compared with .056 in the control group. The weighted
average price increase from the end of June 1984 to the end of
June 1985 in the experimental group was 184.5%, compared with
9.0% in the control group.[2] The weighted average turnover rate
of shares (all investors, individual as well as institutional) in
June 1985 in the experimental group was 8.0%, compared with 4.7%
in the control group. The weighted average change between June
1984 and June 1985 in the consensus forecast of fiscal 1985
earnings as reported on the IBES Earnings Forecast Data Base was

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1. The experimental group stocks for which we have completed
questionnaires (number in parentheses) were: Barris Industries
(1), Chilton Corp (1), Limited, Inc. (11), Marion Labs (3),
Mylan Labs (4), Rollins Environmental Services (5), Safecard
Services (1), U. S. Health Care Systems (12), and Zenith Labs
(3). The control group stocks were Continental Illinois Holding
Company (2), NCR Corporation (12), Pittston (5), Service
Fracturing (1), Stocker and Yale (2), and Unitrode (8).

2. E/P ratios and price increase figures exclude Continental
Illinois Holding Company.

35.6% in the experimental group and -25.3% in the control group.[3]

The experimental group was chosen in response to recent studies showing negative abnormal returns for high price increase and high P/E stocks. DeBondt and Thaler [1985] found that stocks whose price had risen very dramatically tended to have negative abnormal returns in subsequent years. A number of other studies have shown that stocks whose price is high relative to earnings tend to have negative abnormal returns. Reinganum [1981] claimed that the effect of the price relative to earnings was really subsumed by a "size effect," however Reinganum's finding was disputed by Basu [1983] and Peavey and Goodwin [1983]. These studies thus suggest that high price increase and high P/E stocks may be overpriced (perhaps because of a fashion or fad) and thus tend to do poorly subsequently.

Our survey chanced upon a boom in companies related to the movement toward cutting health care costs: there were three generic or consumer drug companies in our experimental group and a manager of health maintenance organizations Labs. Others in the experimental group were diverse: there were a producer of young women's apparel, and a disposer of concentrated industrial

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3. These data on earnings forecast changes exclude Barris Industries, Chilton Corporation and Safegaurd Services (these accounting for a total of three respondents) in the experimental group and Continental Illinois (2 respondents) in the control group. Most firms in the experimental group experienced little earnings forecast change: the percentage changes were Limited, Inc., 0.8%, Marion Labs, 6.9%, Mylan Labs, 0.0%, Rollins, 44.9%, U. S. Health 89.0% and Zenith Labs 10.8%

waste. Five of the nine firms on which we had responses had doubled their earnings between 1982 and 1984. Four paid no dividends in 1984.

Institutional stockholders in each of the 20 stocks were randomly selected from those firms who had reported to the Securities and Exchange Commission that they held one of the stocks on either March 31 or June 30, 1985.[4] It was found that a number of institutions were selected twice, as holding more than one of the stocks in our sample. It was considered infeasible to ask participation regarding more than one stock by a single institution. Thus institutions were dropped from the lists of stocks until each institution appeared only once.

Of course, since for our experimental group we selected investors in stocks whose prices have increased a lot, we perhaps also selected for successful investors, since most bought some of the stock before the full price increase. However, since our sample was based on stockholders of record in March or June, 1985, they also held the stock after the price increase that caused stocks to be singled out for our study. Moreover, 73% of those in the experimental group (as also 85% in the control group) reported that they still held shares as of the survey

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4. All institutional investment managers exercising discretion over accounts with combined equity assets exceeding $100 million must report on Form 13f. Equity holdings below 10,000 shares and also below $200,000 in market value need not be reported. We accessed this information using Computer Directions Advisors, Inc., SPECTRUM III: 13f Institional Stockholders Survey.

date.

The survey of the decision makers then followed Dillman's [1978] "total design method" fairly closely, and was implemented by Donald Deluca at the Roper Center at Yale University. All letters were sent to senior officers of the institutions asking that the questionnaire be forwarded to the "decision makers" who were responsible for the institution's holding of the stock in question. We emphasized that only actual decision makers should fill out the questionnaire. Respondents were urged to call us collect if they had any questions (we received about 20 phone calls).

Great effort was made to keep the response rate high by repeated followups of those who did not respond first. A high response rate is more important to the validity of questionnaire results than is sample in the thousands, since a high response rate diminishes the likelihood of important sample selection bias. Questionnaires were first mailed September 17, 1985 with a letter, self-addressed envelope and printed brochure describing the project. The letter emphasized that the results of the project would serve a useful social purpose, and that results would be made public. It was promised that all respondents would remain anonymous and that they would promptly receive a report giving all of our results. The report would include results broken down by individual stocks, so long as this did not reveal identities of participants. The report to them was offered as an

incentive to participate, as well as some assurance that we were not trying to secure private advantage from the information gathered. On September 23 a followup letter was mailed, reminding them of the questionnaire and reasserting its importance for research on financial markets. On October 9 a third letter was sent out to those who had not yet responded, with a duplicate questionnaire (in case the respondent had lost the first) and another letter (noting the lack of response) and self-addressed envelope. On November 13 a final letter was sent to those who still had not responded, certified mail, with another questionnaire and self-addressed envelope. The timetable and letter format conformed closely to those that Dillman found yielded high response rates.

Initially, 216 questionnaires were sent, 89 to the control group and 127 to the experimental group. There were 74 completed questionnaires, although after we classified three questionnaires (based on margin comments) as out of frame the total was reduced to 71, 30 in the control group and 41 in the experimental group. We received 54 letters or phone calls that indicated that the respondent was out of frame, so that a total of 57 were out of frame. Of these, 24 said that they never held the stock, and 24 said that they did not decide to buy the stock (that the stock was in a custodial account only, or that it was received as a part of a distribution). We believe that some who said they never held the stock actually held it as part of custodial accounts, which they did not check for us. The remainder of the

57 was accounted for by 6 index funds, 3 institutions that used a
rigid formula for their investments, and one options manager
whose holdings were due solely to rising options premiums. We
received 14 letters declining to fill out the questionnaire, and
1 letter indicating that the decision maker was deceased. The
remaining 73 institutions did not respond in any way to our
letters.

We thus received cooperative responses from $(71 + 57)/216 =$
59% of those in our sample. We are pleased with this response
rate. It is lower than those attained by Dillman, but our study
suffered the handicap that we had to obtain the cooperation of
two persons for each questionnaire, and that the questionnaire
asked questions that respondents may feel are sensitive.

Questionnaire Design

Separate questionnaires were prepared using a word
processor for each of the 20 companies in our sample. The name
of the company appeared throughout the questionnaire, to affirm
clearly our interest in investor behavior with regard to that
stock only.

Some of the questions on the questionnaire were aimed at
evaluating and calibrating the kinds of models described above,
and some were aimed at stimulating the interest of the

respondents. Their interest was important, as the only incentive

offered to participate in the survey was that respondents were

promised all the results of the survey. When possible the

questions were worded so that the same question could be directed

to individual investors if there is a subsequent survey of them.

In each of the questions that follows, the average answers

among those answering the question to the question are shown in

brackets [] for the control group first, and then the

experimental group. In questions in which respondents answer by

choosing among items, the numbers in parentheses are the percent

among those answering the question who chose that item in the

control and experimental groups respectively. Standard errors

(in percentage points when what appears above is a percent)

appear below, in parentheses (). Also shown, after n:, are the

number answering the question in the two groups.

Sources of Initial Interest

It is important for our purposes to identify to what extent

attention was drawn to the stocks by interpersonal

communications. Moreover, the identification of the "diffusion

investors" is necessary for the estimation of parameters of the

model above which describes them.[5]

    Did any of the following motivate your initial interest in a way that led to your purchase _____ Corp. stock?

<div align="right">

[CIRCLE ONE NUMBER FOR EACH]
</div>

	Yes	No

    a. An investment professional.

	Yes	No
	1	2
	[53%,75%]	[47%,25%]
	(9%,7%)	(9%,7%)

n:30,40

    b. A person who is not an investment professional.

	Yes	No
	1	2
	[10%,30%]	[90%,70%]
	(5%,7%)	(5%,7%)

n:30,40

    c. A newspaper, magazine, television or radio show.

	Yes	No
	1	2
	[0%,15%]	[100%,85%]
	(-,6%)	(-,6%)

n:30,40

    If YES, name of periodical or show:

    _____

_____

5. This question asks subjects to report on the sources of their own behavior, and thus is of the kind that is widely criticised. However, even critics of such questions will admit that "Accurate reports will occur when influential stimuli are salient and are plausible causes of the responses they produce." (Nisbett and Wilson, 1977.) We think that it is plausible that investors can accurately report what first attracted serious interest in a stock.

d.   An Investment advisory newsletter or
brokerage house recommendation.

$$
\begin{array}{cc}
1 & 2 \\
[30\%, 52\%] & [70\%, 48\%] \\
(8\%, 8\%) & (8\%, 8\%)
\end{array}
$$

n:30,40

   If YES, name of newsletter
        or brokerage house:
   _____

   e.   My initial interest was the result of my,
   or someone else's, systematic search over a
   large number of stocks (using a computerized
   or other similar search procedure) for a
   stock with certain characteristics.

$$
\begin{array}{cc}
1 & 2 \\
[67\%, 25\%] & [33\%, 75\%] \\
(9\%, 7\%) & (9\%. 7\%)
\end{array}
$$

n:30,40

   The wording "motivate your initial interest that led to

your purchase" in the above question was chosen with the idea

that it would induce the respondent to think of a discrete event

when serious active attention was first shown the stock.   They

often checked more than one as yes, but it is plausible that more

than one of these items were involved in the event.   For example,

both a and e could be yes if a professional colleague reported a

systematic search.   A number of respondents circled only yes's,

and left other lines blank.   If a respondent checked only yes's

in a multiple-item question like this, the blanks were

interpreted as no's in the percentages reported here.

   The most striking contrast between the control and

experimental groups is in item e. Notably, most of the investors

in the experimental group denied that they were systematic in

their decision to buy the stock, that is, they answered no to

part e.[6] We regard this result as providing significant support

to the general notions in the contagion models described above as

applied to stocks in the experimental group. Those answering no

to part e will be defined as "diffusion investors" for what

follows.

The experimental group also showed somewhat more tendency,

relative to the control group, to be influenced by other

investment professionals, as well as by nonprofessionals, mass

media, and investment newsletters.

If the respondents indeed interpreted this question as we

intended, we see that interpersonal communications among peers

were quite important as a source of interest. For both the

experimental group and control groups, the majority asserted that

their initial interest was prompted by discussions with other

investment professionals. The results are emphatic that initial

interest is not generally produced by individuals outside the

investment community or by general news media.

Of course, these results might also be interpreted as

confirming what we might expect of any professionals: they learn

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6. Only 2 respondents, or 5% of the 75% reported above as
answering no had left the line blank, the others actually circled
no and thereby asserted that they were unsystematic.

from each other more than from primary sources. But the fact

that they are professionals does not itself necessarily imply

that initial interest in individual stocks comes from

colleagues. Professionals might well interact by discussing

broader strategy or exchanging general information, and interest

in individual stocks could well be the result of calculations

made by individual decision makers. We see that this is not

generally the case.

Further evidence on the plausibility of contagion of

interest, particularly among the experimental group, can be found

in their reported recollections of their expectations, on the

date when their shares held reached their maximum, for the

percentage increase in their holdings in the succeeding year: an

average increase expected of 33% for the control group and 54%

for the experimental group. We also asked whether the respondent

was "sufficiently enthused about your purchase of _____

Corp. that you thought about it during your leisure hours." Of

the control group, 37% said yes, of the experimental group, 63%

said yes. We did not think it feasible to ask respondents to

recall their level of enthusiasm before they purchased, so the

difference between groups on this question may be due only to the

success of the experimental group. But with such expectations

and enthusiasm contagion of interest is certainly plausible.

Removal Rates and Infection Rates

As a preliminary, the following two questions about timing were asked:

> As nearly as you can remember, on what date was it that the number of shares you held (in your own portfolio or portfolios you manage) in _____ Corp. reached its maximum?[7]

>   month_____   year_____
>   [1984.55,1984.80]
>   (.47,.25)   n:29,39

> Roughly how long had it been before the DATE WHEN SHARES HELD REACHED MAXIMUM (preceding question) that you were first actively involved (thinking about investing or actually investing) in _____ Corp.?

>   months_____
>   [24.3,12.5]
>   (7.4,3.2)   n:27,39

We will call the date of the questionnaire minus the answer to the first of these questions t_1, represented in units of years. and the answer to the second (in years) t_2. Then we will define the total time since the individual became interested in the stock as $T = t_1 + t_2$.

To estimate the parameter g, the rate of decay of interest, we made use of the following question:

_____

7. The distribution of dates in the answer was quite skewed to the left; most dates were more recent than the average date.

Approximately what percent of your total time did you
spend thinking about, analyzing, and discussing
_____ Corp. in a typical week near the date when
shares held reached maximum (question 1, above)?

[4.5%,9.0%]
(.89,1.7)   n:28,39

In a typical week, approximately what percent of your
total time do you currently spend thinking about,
analyzing, and discussing _____ Corp.?

[1.5%,2.3%]
(.27,.40)   n:28,39

Calling the answers to the above questions y1 and y2
respectively, for each individual the estimate of g was taken as
$g = ln(y2/y1)/t_1$. The sample average g was computed for
diffusion investors who did not round either y1 or y2 to zero and
for whom t1 was at least 4 months. There were 18 such
investors. The estimate of average g was 1.42 with a standard
error of .35. This estimate of average g implies a half life
(ln2/g) for interest of .49 years. One survey (McGuire [1969])
on estimates in the psychology literature of removal rates from
memory after persuasive communications concluded that the
"typical persuasive communication has a half-life of six months"
but that different experiments produced widely different half
lives.[8] Thus, our estimate of average g is consistent with the
notion that the decline of interest is due to the same process of
forgetting that has been studied by psychologists.

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8. McGuire, "The Nature of Attitudes," pp. 253-4. There is also
a literature in marketing which produces estimates of half lives
for memory that are not widely different from these. See Bagozzi
and Silk [1983].

To get an idea of b, the infection rate, the following
questions were asked:

Roughly how many people have you personally talked to
explicitly about _____ Corp. stock?

$$[7.2,21.0]$$
$$(1.4,6.5) \qquad n:28,41$$

How many of these people would you guess might have
become seriously interested in _____ Corp. as a
result of your discussion with them?

$$[4.2,10.0]$$
$$(1.2,4.1) \qquad n:27,37$$

How many institutional investors in _____ Corp.
(outside your own firm, if you are affiliated with an
institution) have you spoken to about _____
Corp.?

$$[0.8,2.9]$$
$$(.32,.58) \qquad n:29.39$$

We were surprised at how big the answers to the above

questions were. If we take the answers to the second question at

face value, there is extensive contagion of interest. The

answers to the third question suggest, given the relatively small

number of institutional investors in the individual stocks, that

the set of institutional investors in a particular stock in the

experimental group is so interconnected that it might even be

regarded as a "small group" as defined by social psychologists.

However, 44% of the respondents in the experimental group

answered zero to the third question.

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9. Two extreme outlier answers were dropped from the sample. We
thought that the question must have been misinterpreted.

The total interest engendered by the individual is, by the
model,

$$(2) \qquad b \int_0^T I(s)\,ds \;=\; (bI_0/g)(1-e^{-gT}).$$

To convert the total interest engendered to the total number of
people who became interested, we may divide the above expression
by I_0. Setting the resulting expression equal to the answer x to
the second of the above questions and solving for b, we find that
$b = xg/(1-e^{-gT})$. This estimate of b was computed for each
individual and the individual estimates averaged to produce an
estimate of average b. For the experimental group the average
infection rate was 15.64, with a standard error of 6.03, while
for the control group the average infection rate was 7.46 with a
standard error of 2.23.

The estimated infection rates are so high as to be wildly
implausible as inputs to our model. Since it is so much higher
than the removal rate, this estimated infection rate would imply
a rapidly exploding interest for both experimental groups and
control groups. We believe that answers to the second question
above on which the estimate of the infection rate is based cannot
be taken at face value. It will probably be very difficult to
pin down the value of the infection rate with any accuracy;
suffice it to say only that our results are consistent with the
notion that it may be significantly greater than zero.

What is certainly suggested by the estimated infection

rates, even if they have an upward bias, is that the infection

rate is higher for the experimental group than it is for the

control group.[10]

Timing of Discussions

An important aspect of our view of contagion of interest is

that interest spreads from person to person and does not tend to

bunch around dates of news events. To check this, we asked:

    When were you most active in discussing _____
    Corp. stock with others:

                                [ENTER DATE IN BOXES]
                        Month:_____Year_____
                                    [1984.16,1984.55]
                                       (.30,.56)
                                       n:24,35

There was little such apparent bunching of dates. For two

firms (Zenith Labs and Stocker and Yale) there was one date given

twice. For one firm, Limited Inc., one date was given by three

respondents. But there was no other such coincidence of dates.

For the experimental group, active discussion came on average 1.6

months (s. e. 1.4) before the date when holdings reached

_____

10. The experimental group was selected in such a way that it
contains a large number of successful investors, and if people
like to boast this may account for the fact that those in the
experimental group talked more to others about their investment.
This consideration alone would not suggest that they got more
people seriously interested in the stock.

maximum, for the control group 3.2 months (s. e. 1.7).

Discussion

While there is no proof here, and we should not always take answers at face value, we have seen a number of indications that contagion of interest, along lines described in the simple epidemic models, may be important in describing the behavior of institutional investors.

As noted before, it is likely that contagion of interest does not proceed evenly for all stocks at all times: only certain stocks are "interesting". We selected our "experimental" or "boom" stocks for which we thought such contagion likely to be important. This selection was done on the basis of price. We do not have information that any of the stocks in the experimental group were mispriced, only that behavior was observed that might, given information in psychology, suggest that they might be mispriced.

The differences between the groups sorted as they were using price are striking: those in our experimental or boom group were less likely to be systematic, were more influenced by interpersonal communications, talked more to others, were more enthusiastic and optimistic. These differences are likely of course to be due in part to the arrival of some genuine new

information that reached some institutional investors, which they then spread. This environment, however, is conducive to the judgmental errors uncovered by psychologists, and that may explain why high P/E stocks experiencing high price increases as a group tend to have negative abnormal returns subsequently.

We think these results are in a way confirming of the idea, already expressed in the literature on anomalous statistical evidence, that notions of market efficiency need to be modified. Yet it is far from our minds that we should reject the notions altogether. Certainly there is some tendency for some "smart money" to move prices in the direction indicated by efficient markets theory. There is already a substantial literature that describes how this might happen, models with both optimizing investors and "noise" investors, "rule of thumb" investors, or the like.

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