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Bubbles, Human Judgment, and Expert Opinion

Robert J. Shiller

The widespread public disagreement about whether the U.S. stock market has been undergoing a speculative bubble since about 1995 reflects underlying disagreement about how to view human judgment and intellect. Many argue that the market, or major components of it, has been undergoing a bubble and that, with the P/Es of major companies still very high, the bubble has not burst completely. This group includes some writers for the *Economist*, the *Wall Street Journal*, and *Barron's*. Apparently, it is essential to their notion of a bubble for investors' actions to have been, in one way or another, foolish. Others sharply disagree with the bubble stories, and it is precisely this intimation of foolishness that seems to bother them. Of course, some investors are foolish, they will admit, but they find the idea that investors by and large have been foolish to be simply implausible. Rather, they will say, the high valuations the market has placed on the stock market recently can be attributed to the actions of rational investors who are wrestling with hard-to-interpret evidence about such issues as how much recent technological innovation will promote future earnings growth. Suggesting that investors in general have been irrational seems arrogant and presumptuous.

The dispute about whether we have been in a bubble is not simply about whether P/Es have become too high. One can argue that P/E multiples have been or are too high without saying that something irrational underlies the high values. One can argue that the market has merely not taken certain facts into account and will do so once these facts have been properly disseminated. The idea that there has been a speculative bubble goes beyond high or low P/Es; the concept of "bubble" implies some less-than-rational aspect of investor behavior.

Has investor behavior been irrational? One of the most important arguments that foolishness has not brought us the high valuations in the aggregate market comes from observing the decisions made by experts—for example, managers of university

endowments. Before the market peak in March 2000, those who manage university endowments had not withdrawn *en masse* from the stock market. According to a National Association of College and University Business Officers (NACUBO) Endowment Study, in 1999, the median endowment had 54.7 percent in U.S. equity and another 10.5 percent in non-U.S. equity. And most endowment portfolios remained in U.S. stocks, so they continued to be involved in, not withdrawing from, the market just before its peak.

Those who manage university endowments have at their disposal some of the finest scholars and university trustees drawn from the highest ranks of the business world. Who would presume to call these people foolish? But if one wishes to attribute the market's behavior to human error, calling the experts foolish is apparently what one must do.

I believe that the stock market has indeed been caught in a speculative bubble in recent years (Shiller 2000). But the kind of less-than-perfectly-rational behavior that underlies the bubble is not abject foolishness. It is not the error of fools. It is more the error that afflicts some of Shakespeare's tragic figures—in the sense of having subtle weaknesses or a partial blindness to reality. The kinds of errors that people have been making and that underlie the recent stock market bubble do reflect human shortcomings—but exactly the kinds of shortcomings that can infect the thinking of professors, analysts, and trustees as much as anyone else's. The current situation in financial markets is simply a fertile ground for the amplification of the kind of errors even experts can make.

My aim is to draw attention to human foibles that we all are subject to and that research in psychology, behavioral finance, and other social sciences reveals thoroughly and systematically. What I am doing is rather like what psychologists do when they show, using certain optical illusion charts, that we all tend to make certain characteristic visual-recognition errors and like what sociologists do when they point out how contagion of idea patterns underlies the spread of political ideologies.

In this article, I will expand on the sort of irrationality that seems to be at work in the mechanism by which bubbles are amplified. I will pursue the nature of less-than-perfect rationality not

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only among the general class of investors but also among experts—that is, the errors characteristic of investment professionals.

Feedback and Bubbles

The essence of a speculative bubble is the familiar feedback pattern—from price increases to increased investor enthusiasm to increased demand and, hence, to further price increases. The high demand for the asset is generated by the public's memory of high past returns and the optimism the high returns generate for the future. The feedback can amplify positive forces affecting the market, sending the market to higher levels than it would go if it were responding only directly to these positive forces. Note that a bubble is not indefinitely sustainable: Prices cannot go up forever. And when price increases end, the increased demand that the price increases generated also ends. Then, a downward feedback pattern can replace the upward pattern.

In one model of a speculative bubble (Shiller 1990), the demand for shares depends on a "distributed lag" of past returns—that is, on a weighted moving average of past returns, with weights that decline through time into the past—and depends on some other precipitating factors, such as earnings growth, that affect perceptions of stocks independently of returns. In this model, demand is most strongly boosted by past returns if the high returns came in the past few months, less strongly boosted if the high returns came not in the past few months but within the past few years, and only a little boosted if the high returns came not in the past few years but in the past few decades. The reasons that the weights in the weighted average of past returns decline into the past are that we remember the more distant past less clearly, we hear stories about the more distant past less often, and we tend to be aware of institutional or cultural changes that make the more distant past seem less relevant than the near past.

If supply is relatively fixed, this demand model implies that price is itself a distributed lag on the other factors that affect demand. The impact of these other factors is amplified by the feedback. The model explains excess volatility in financial markets, explains overreaction to such factors as earnings growth, and at the same time (although the model does not imply that stock prices are exactly a random walk) is consistent with the kind of approximately random walk of speculative prices that we actually observe.

Now that the field of behavioral finance is becoming an active area in academic finance, a number of explicit models of bubbles deriving from

investor feedback have been defined. For example, Barberis and Shleifer (2000) developed a model of speculative bubbles that relates demand for a particular investing style to an average of past returns, but in their model, excess returns are defined as excess returns of investments in one style over another. They used their model to show that not only does the feedback amplify price movements, it also causes assets in one style to move together too much. They also showed that assets in different styles may tend to move together too little. Their model can explain such events as the Nasdaq bubble and burst of 1995–2001 at a time when the nontechnology stocks showed relatively mild bubblelike behavior (see also De Long, Shleifer, Summers, and Waldman 1990 and Hong and Stein 1999).

In this article, I want to step back from the formal models of speculative bubbles and ask (1) whether this kind of feedback of price change to further price change is plausible at all and (2) whether it is consistent with what we know about investment experts who, apparently, commonly go along with bubbles or, at least, do not act to offset bubbles.

It is important to realize that the bubble theory requires only that past price changes produce an inconstancy in our judgments, not that we foolishly believe that past increases must continue. The theory does not require that we forecast future price changes by some mechanical extrapolation rule or that we place rulers to chart paper to forecast. It requires only that our observations of the past price changes alter the way we resolve the confusing array of conflicting information that we must all sift through in judging the market.

Ultimately, people who make asset allocations must use their subjective judgment about the probability that stock trends will continue. This necessity is true for experts as well as the general public. Although experts have the help of formal statistical models, we all understand that these models are only as good as their specific assumptions. Assessments of trends and probabilities that underlie asset decisions are inherently subjective.¹

Intuitive probability has many aspects. One is the "representativeness heuristic," identified originally by psychologists Tversky and Kahneman (1974). They showed that in forming subjective judgments, people have a tendency to disregard base-rate probabilities and to make judgments solely in terms of observed similarities to familiar patterns. For example, Tversky and Kahneman performed an experiment in which subjects were asked to guess the occupations of individuals whose personalities were briefly described to them.

They tended to guess rare occupations that seemed to match perfectly the personality descriptions without regard for the rareness of these occupations—that is, their low base-rate probabilities. The subjects would have been closer to the mark if they had guessed the humdrum and common occupations more often than the exotic.

We can expect the same representativeness heuristic to encourage people to see patterns in stock market price changes (simple patterns such as bull or bear markets), even though such sequences of same-sign price changes are actually quite rare. Thus, the representativeness heuristic's effect on intuition encourages people to expect past price changes to continue, even if they know from professional training that the trends should not.

This tendency to fit one's future expectations to salient images or simple patterns is tempered somewhat by a tendency toward conservatism. Psychologists have conducted experiments in which subjects' abilities to revise probabilities in light of new evidence was tested (Phillips and Edwards 1966). The experiments were constructed so that a single correct answer existed to the probability-revision problem posed to the subjects; the answer could be deduced by application of Bayes' Law, which is a fundamental principle from probability theory.² They found that subjects tended to revise their probabilities in the correct direction but tended not to revise them far enough. This finding that people respond insufficiently to new information has been replicated in a number of studies and is now referred to as "conservatism bias" (Beach and Braun 1994).

Economists have developed the twin principles of representativeness heuristic and conservatism bias into a model of speculative bubble propagation (Barberis, Shleifer, and Vishny 1998). In this model, the representativeness heuristic encourages people to react to price changes in an exaggerated manner, but the conservatism bias spreads this pattern out through time. Their model of the propagation of a speculative bubble, relying as it does on only a couple of subjective probability biases, is undoubtedly oversimplified, but it offers useful insights.

Interpreting the model more broadly, I think we can say that investors have overconfidence in a complex culture of intuitive judgments about expected future price changes and an excessive willingness to act on these judgments. This overconfidence is a powerful force in the market; the intuitive judgments are ultimately behind both the upward feedback that underlies the bubble and the downward feedback that signals the end of a bubble.

A lot of evidence indicates that such overconfidence in intuition is a powerful force in the markets. For example, a questionnaire I used to survey individual and institutional investors right after the October 19, 1987, stock market crash provided such evidence (Shiller 1989). I sent out 3,000 questionnaires within a week of the crash to a random sample of both wealthy individual investors and institutional investors asking them what they were thinking on the day of the crash, and I received nearly 1,000 responses. Among the questions I asked was whether they recalled that they had a "pretty good idea when a rebound was to occur" on that day. I found that 29.2 percent of the individual investors (47.1 percent of buyers of stocks) and 28.0 percent of institutional investors (47.9 percent of buyers of stocks) said yes. These percentages were remarkably high in light of the uncertainty of that day. The next question asked those who answered yes what made them think they knew a rebound would occur. The answers they wrote can only be described as merely intuitive. They spoke of gut feelings, of vague comparisons with past events, or of a sense that market psychology had changed. Thus, the intuitive judgments that the psychologists have been studying are ultimately vital in determining the direction of the market.

Another part of the mechanism by which past price increases boost demand for an asset class has to do with the simple attention that such price increases attract. As long ago as the 19th century, the psychologist William James noted that attention is a fundamental aspect of human intelligence and that anomalies of attention are behind many errors that people make (James 1890). People generally do not know what has attracted their attention and cannot explain the attraction. Psychologists have documented a social basis for attention; that is, people tend to pay attention to what others are paying attention to. Not surprisingly, speculative assets whose prices have gone up a lot recently gather a great deal of attention. People are more likely to buy assets that have their attention simply because they are thinking about them more than assets that have not garnered the attention of big price increases.

The capriciousness of attention is apparently characteristic even of professional investors. In one study, John Pound and I surveyed institutional investors who had reported holdings of stocks whose price had increased greatly in the recent past, the experimental group, and compared their answers with those of institutional investors in random stocks, the control group (Shiller and Pound 1989). In regard to their holdings, we asked both

groups if they agreed with the statement: "My initial interest was the result of my, or someone else's, systematic search over a large number of stocks (using a computerized or similar search procedure) for a stock with certain characteristics." In the experimental group, only 25 percent agreed, whereas in the control group, 67 percent agreed. The design of this experiment reveals that institutional investors, as well as individual investors, have their attention ultimately attracted by past price increases.

Another part of the mechanism by which past price increases affect the judgments that are actually made about investing for the future has to do with the feelings of confidence and self-esteem that past successes in investing give successful investors. Success in investing usually involves some acquired skills in understanding the particular category of investment and in the strategy of dealing with it. When a substantial number of people acquire such skills regarding a category of investments, the demand for those investments tends to increase. Psychologists Heath and Tversky (1991) showed through experiments that, *after probabilities are held constant*, people prefer to bet in situations in which their perceived competence is high. In their experiments, Heath and Tversky asked subjects to answer general knowledge questions, such as questions about football, or to give political predictions and then to assign probabilities that their answers were right. The subjects were next asked whether they would prefer to bet on their answers or on a chance lottery with the same probability of winning. They found that subjects were likely to want to bet on their own answers when they had assigned high probabilities that their answers were right or when they thought they knew a lot about the subject.

In addition, people who recently benefited from a price increase in an investment class tend to have a personal association with the price increase, and investment positions in appreciated assets tend to lead investors to an expectation of future price increases. Having been emotionally involved with an investment strategy causes us to overestimate the benefits of the strategy. Julius Caesar said, "Men willingly believe what they wish."³ His insight was on target. A number of psychological studies have shown that people suffer a "wishful thinking" bias; that is, they overestimate the probability of success of entities with which they feel an association. For example, soccer fans give exaggerated probabilities that "their" team will win (Babad 1987), and supporters of political candidates give strikingly upwardly biased probabilities that their candidate will win (Uhlener and Grofman 1986). I

believe that wishful thinking plays a role in the propagation of a speculative bubble. After a bubble has continued for a while, many people have become committed to the investments—emotionally and reputationally as well as financially.

Judging the Judgments of Others

In making asset-allocation decisions, long-term investors should realize the essentially judgmental nature of the task. Investing for the long term means judging the distant future, judging how history will be made, how human society will evolve, how the world economy will change. Reaching decisions about such issues cannot proceed from analytical models alone. Major input must come from judgment that is essentially personal and intellectual in origin. Asset-allocation decisions involve a bewildering complex of relevant factors, some represented by quantitative data, others only suggested by cases or events, still others suggested by intangible intellectual currents in society. One must decide among a wide array of investment strategies, each of which is described by some advocates as "supported by evidence" but for which no clear proof of success exists. With such a confusion of factors, it is hard for anyone to make objective judgments without being influenced by the recent behavior of the market and the recent success of one's investments.

The complex judgments that institutional investors and portfolio managers must make about these factors is inevitably influenced by the judgments of others. The reason is that in making major allocation decisions, managers almost inevitably wind up trusting to a common view or consensus view about the future. No one person can be at once a historian, political scientist, economist, and psychologist rolled into one. Few of us, even the best investment professionals, can even make much of a beginning at the task. Most professionals have too many things to do in a day, too many other claims on their time. Institutional investors who attend seminars and keep abreast of research make an effort to synthesize all this knowledge, but unfortunately, synthesizing the knowledge, deciding who is "right," is an even more difficult task than trying to add a piece of scholarly evidence. Professionals ultimately end up assuming that what their colleagues believe is true.

The errors in judgment that underlie the bubble do not stem from naiveté or credulousness. Major speculative bubbles are always supported by some superficially plausible popular story, a "new-era theory," that is widely viewed as having sanction from some authoritative figure(s). The

judgment errors arise from the difficulties of assessing where the public prominence of the new-era theory came from and assessing how accurate the theory is. Despite some concrete facts as part of its story, a new-era theory has, in fact, no solidity; the concrete facts cannot lead to a new-era conclusion without the insertion of some outright guesses. The error people make is to presume that someone else has verified the conclusion carefully when, although some will have tried, no one has really been able to do so. In other words, the error people make is to assume that the *currency* of the new-era theory is evidence that many people have completed all the missing links in the argument when, in truth, its currency is evidence of the bubble itself.⁴

Prudent Person Standard. Conforming one's actions to conventional wisdom, the truths that one assumes on the basis of having heard them reiterated again and again, is not only a natural thing to do, but for fiduciaries, it is required by law. Fiduciaries have been held by common law for hundreds of years to the prudent person standard, which obliges them to invest in a way that would be *generally* regarded as prudent. The prudent person rule was enshrined for pension funds in the Employee Retirement Income Security Act of 1974 (ERISA), which states that investments must be made with

the care, skill, prudence, and diligence, under the circumstances then prevailing, that a prudent man acting in a like capacity and familiar with such matters would use in the conduct of an enterprise of a like character and with like aims.

After ERISA became law, pension managers were at a loss to know how to translate this standard into concrete actions; many apparently thought that the standard meant that fiduciaries should simply do whatever people had been doing for a long time (O'Barr and Conley 1992). One manager spoke of his reaction to ERISA at the time: "If you can find a guy who works in a building that's got granite on the outside and it says 'Established a long, long time ago,' then you're probably complying."⁵ But as the prudent person standard evolved, it became clear that the rule does not specifically mean that the prudent person is someone who lived 100 years ago or someone who is pathologically risk averse. The prudent person standard refers to someone who does what most of us think is sensible. Ultimately, it must refer to conventional wisdom.

That fiduciaries have been given such a rule is understandable. The need does exist to restrain the

egos of investment managers, who often make the error of hubris. For example, Boston University invested nearly 20 percent of the university's portfolio in one biotech company, Seragen, with disastrous results. Yale University, in the 19th century, invested virtually its entire endowment in one firm, Eagle Bank, and lost it. We must tell fiduciaries not to do such things.

The challenge is to know how to tell them just what it is they are to do and not do. We cannot simply tell fiduciaries to be smart or sensible. We can tell fiduciaries that they must do certain tasks of due diligence, but we cannot ask them to be invulnerable to essentially human limitations. Many years ago, the presumption was that fiduciaries should invest primarily in fixed-income securities, but after decades of debt underperforming equity, that stricture became inconsistent with concepts of prudence. The result is that the prudent person standard is interpreted as telling fiduciaries not to deviate too far from what others think is right, which often means (given the feedback that afflicts other investors' judgments) following the investment that has outperformed in recent years.

The prudent person standard tells fiduciaries to follow conventional wisdom. The problem with the rule is, of course, that it makes fiduciaries interpreters of conventional wisdom rather than investment professionals. They cannot take action without showing that it is conventional.

The News Media. The news media play a prominent role in generating conventional wisdom. They do so more among nonprofessionals than professionals, but they do also affect investment professionals.

And the news media help reinforce conventional wisdom along some dimensions and help change it along others. The media are in a fiercely competitive business for survival as news media. So, they cannot be indifferent to public resonance with the stories they write. Success thrives on good writing. A well-written story can have a powerful impact on public thinking; indeed, it can become a news event itself. One well-written news story that succeeds in grabbing public attention begets a long sequence of follow-up stories in competing media outlets and reinforces its impact on public thinking.

The news media are, therefore, generators of attention cascades—as one focus of attention in public thinking leads to a related but slightly different focus, which leads, in turn, to yet another focus of attention. Thus, shifts in public attention to economic issues are rather like the shifts in topics of conversation at a dinner party. During a party, the focus of attention meanders and jumps as one

person after another is reminded of a related interesting story, and there is no telling where the conversation will be in another 10 minutes. The succession of attention-grabbing topics in the media is similar, although spread out over days and weeks rather than minutes.

Such cascades of public attention are an important part of the reason for the unpredictable nature of speculative price movements. Stock market price increases generate news stories, which generate further stories about new-era theories that explain the price increases, which in turn, generate more news stories about the price increases. For example, stories about the “new economics” surged around 1997 after publication of an influential *Business Week* cover story (which also alleged that Alan Greenspan was a recent convert to this new-era faith). The story appeared after the first really enormous increases in the stock market had captured everyone’s attention. All of the follow-up stories about the new economy prominently mentioned the stock market. Thus, feedback mechanisms include not only price-to-price feedback but also price-to-news-to-price feedback.⁶

Efficient Markets Theory. The expert’s task of disentangling the source of public credence in new-era theories is made more difficult by an intellectual theory that has come to dominate much thinking about financial markets—the efficient markets hypothesis. This theory (in the “semi-strong form” that is most widely accepted) asserts that prices optimally incorporate all publicly available information at all times. If one believes in efficient markets, one believes that the marketplace of ideas somehow works out optimally.⁷ Therefore, one who believes in efficient markets also believes that broad diversification, without any regard for the current market situation, is the ideal. Public information is already in prices; therefore, asset picking (let alone stock picking) based on individual judgment is useless.

Certainly, many investment professionals make no effort at all to take into account information about the long-run outlook. Many of them are not in the business of asset allocation at all, their charge being to attend to other issues such as tracking an index. Others may have the discretion to make allocations but do not do so as a matter of principle. Ellis put it bluntly in his popular book *Winning the Loser’s Game*: “Market timing is a wicked idea. Don’t try it—ever” (1998, p. 10). Swensen, in his book *Pioneering Portfolio Management*, asserts that in the major securities markets, “market timers run the risk of inflicting serious damage” (2000, p. 68) and that portfolio managers

should focus their energies on alternative asset classes where the opportunity for active managers is greater than in the broad stock market.

These writers are apparently advocating, as regards listed stocks, free riding on the judgment of others who *are* supposedly looking at the long-run outlook. The advocates have decided that their game is so well played, there is no point in trying to compete. This attitude involves a curious irony: If such astute investors as these writers never try to judge the future course of the market, who is assessing whether the market is appropriately priced and who is providing guidance to the market?

The basic problem with the efficient markets hypothesis is that it is a half-truth. Presenting market efficiency as a concept to students and amateur investors is useful lest they come to believe that it is easy to get rich quickly. It is not easy to get rich quickly by trading in speculative markets. The short-run day-to-day or month-to-month profit opportunities that many people imagine they have found are probably not there. But we should not extrapolate from this simple notion of short-run approximate market efficiency to the idea that markets are also efficient in the long run. In fact, data for long intervals of time indicate that the stock market is anything but efficient.

For example, I have shown that 10-year real returns on the Standard & Poor’s Composite Index have been substantially negatively correlated with P/Es at the beginning each 10 year period (Shiller 2000; Campbell and Shiller forthcoming 2002). When the market has been high, it has tended to come down.

Thus, the ratios indicate that we should not expect stock market returns over the long run to be unchanging. Yet, using P/Es as forecasters of returns, although enshrined in quite a number of papers in finance journals going back to Basu in 1983, has never become a part of conventional wisdom about investing. Arguments have been made that the apparent forecastability of returns based on these ratios is not necessarily unexplainable in terms of some rational model of human behavior. Moreover, most studies of the forecasting of returns used very short return horizons, and questions of statistical significance are never finally resolved because one might base an analysis of these ratios on many different statistical models. For all these reasons, the conventional wisdom seems to be stuck on the idea that the stock market can be expected to provide the same real returns regardless of the P/Es.

Conformity Pressures. In his book about professionals’ herd behavior, *Groupthink*, Janis

(1982) discussed several reasons professionals operating in groups may be unwilling to deviate from the group consensus and described a number of case studies in which professional groups made serious errors because of this “groupthink.” Janis identified one of the reasons for reluctance to offer “different” opinions as people’s desire to preserve their status within the group. The result is what Janis calls the “effectiveness trap.”

The term derives from interviews Janis later made with people in the Lyndon Johnson administration during the escalation of the Vietnam War (one of the case studies of serious errors committed by experts). They told him that there was a phrase applied to dissenting members of the administration: “I’m afraid he’s losing his effectiveness.” Anyone who dissented from the prevailing view in the administration gradually began to be regarded as a “has been” and was gradually excluded from voice and power. People were allowed to express some dissension without losing effectiveness, as long as it was presented in a suitably detached way and in good humor. The dissenter would have to accept mild jokes at his expense. For instance, Bill Moyers, a close advisor to President Johnson, was referred to as “Mr. Stop-the-Bombing” and Undersecretary of State George Ball, as “the in-house devil’s advocate on Vietnam.” But, Janis concludes, their subdued and collegial criticism of the policy served more to sustain conventional wisdom than to challenge it. Their weak presence gave decision makers the mistaken impression that they had considered the dissenting view and rejected it. Moreover, the dissenters were forced to remain silent publicly about their dissension, which blunted their ability to pursue their arguments.

Janis reported that President Johnson said in his memoirs that he felt there had been substantial and open dissension within the group. The actual dissension that he remembered and reported, however, was limited to disagreements about temporary halts in bombings. Johnson did not recall any fundamental disagreements about the wisdom of the bombing campaign itself. He emphasized, instead, the unanimous assent that his advisors often gave to his decisions.

True Uncertainty and Organizations

Knight (1964), a University of Chicago professor in the first half of the 20th century, highlighted the distinction between risk and what he considered uncertainty. Risk, he explained, concerns events about which the probability law is known and which have quantifiable probabilities. Uncertainty

concerns events that are essentially unprecedented in nature, whose probability must be judged through analogous thinking and induction, by thinking globally rather than specifically. He argued that an essential reason for the success of the free enterprise system is its ability to deal with true uncertainty. Bureaucracies, he thought, are fundamentally ill equipped to deal creatively with uncertainty. Enterprise and entrepreneurship relish true uncertainty, and entrepreneurs pursue advantages that are seen only by human insight and can never be proven objectively.

In addition to the economy, examples of true uncertainty concern national issues—whether to go to war, whether to invest more in infrastructure or education, and the like. But decisions about such national issues tend to be debated in committees, with expert testimony. So also are the decisions about institutional portfolio allocations.

Uncertainty characterizes the present situation in the stock market. In judging whether the stock market remains a good investment despite high P/Es, organizations must somehow judge whether we are entering a new era, as some have claimed. Organizations and their committees are fundamentally ill equipped to make such judgments, however, just as organizations are ill equipped to write novels. An organization cannot duplicate the creative energy of one independently thinking mind.

Making a judgment about the situation in the stock market means weighing evidence about current technological advances and recent changes in national and world institutions and comparing the current situation with past innovations and past changes in institutions. We must make judgments about the importance of computer networking relative to the importance of the telephone, the importance of recent changes in free market institutions versus New Deal institutions, and so on. The judgments we make will depend on answers to questions that have animated historians, philosophers, and political scientists throughout history. No committee is competent to answer such questions.

The recent empirical literature suggests that institutional or professional investors have been able to do little better than the market. One reason that institutional investors may not do much better than the market is that they have (or believe they have) clients who have expectations of them that make it difficult to pursue their own best judgment. Clients often expect the professionals to invest in accordance with certain fads. Clients may expect them to trade frequently or, at least, may not be willing to pay high management fees unless they

do so. These effects dilute the advantages that professional investors naturally have.

Another reason that the differences between professionals' performance and the market's performance are small is that institutional investors believe they must have reasons for what they do, reasons that can be justified to a committee. They feel they do not have the authority to make trades in accordance with their own best judgments, which are often intuitive. Their obeisance to conventional wisdom hampers their investment performance.

Psychologists have argued that human thinking—individual or group—that leads to action tends to be motivated by qualitative reasons and justifications rather than abstract weighing of probabilities and scenarios. Psychologists Shafir and Tversky (1993) conducted some experiments that showed people need some salience to a justification before they take action. In one experiment, participants in one group were asked to decide which of a pair of divorcing parents to *award* child custody to and participants in another group were asked to decide which of a pair of divorcing parents to *deny* child custody to. Subjects were given brief descriptions of both parents, but one parent was described vividly with both extremely bad and extremely good characteristics and the other had a bland description. Both groups tended to pick the parent with the vivid description—so, in one group the vividly described parent was awarded custody, and in the other, the same parent was denied custody, which means the groups were contradicting each other. These groups tended to choose the parent for which more salient reasons were given, both pro and con, apparently because saliency provided a reason to offer for the decision.

The need for justifiable authority to change investing behavior that has been successful in the past imposes on professional investors a sort of conservatism—the broadly perceived conven-

tional wisdom and past procedures so dear to committees. Committees have great difficulty taking action to alter their decisions on the basis of the changing weight of evidence. To have an impact in challenging conventional wisdom thus requires more than one's intuitive assessment of probabilities. One needs a striking argument that is trenchant and on target—salient. If there is little prospect of having an impact, one tends to hold one's peace or make only perfunctory objections.

Summing Up

A number of factors help us understand the propagation of bubbles—the feedback mechanism from price change to further price change—and the interaction of this feedback with changing conventional wisdom. I have given particular attention here to the factors that relate to professional investors.

Many of the elements of the propagation mechanism have to do with the nature of subjective probability and with intuitive and personal judgments. Other elements have to do with the social environment in which decisions are made, the prominence of the news media, and the nature of human interactions within organizations.

Clearly, human patterns of less-than-perfectly-rational behavior are central to financial market behavior, even among investment professionals, but there is little outright foolishness among investors. Writers may describe the behavior of investment professionals as if it were foolish, but only because of the difficulty the writers about financial markets have in conveying the nature of irrationality. They cannot review all the relevant social science literature in their news articles. They are left with punchy references to pop psychology that are convincing to the indiscriminating reader but that also discredit them to the more careful reader, and that only amplify our sense of strong public disagreement about the nature of speculative bubbles.

Notes

1. The study of subjective probability has been a fertile field for psychologists for decades. See, for example, the volume of survey articles edited by Wright and Ayton (1994).
2. Bayes' Law determines a conditional probability (for example, the probability that a person is in a certain occupation conditional on some information about that person's personality) in terms of other probabilities, including the base-rate probabilities (for example, the unconditional probability that a person is in an occupation and the unconditional probability that the person has a certain personality).
3. Julius Caesar, *De Bello Gallico*, iii, 18.
4. The mistakes people make for this reason may be completely rational; they result simply from lack of information about others' information (see Demarzo, Vayanos, and Zweibel 1998).
5. Quoted by O'Barr and Conley.
6. Even more complicated feedback mechanisms involving the news media are no doubt at work—for instance, price to news to confidence to economy to news to price.
7. By inference, one might suppose that the prominent theories that appear to move investors' decisions are also based on the best possible information.

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