Notes from "Irrational Exuberance," Robert Schiller, 2nd Edition, 2005
Princeton University Press, Princeton, New Jersey

In a broad sense, this book, from its first edition in 2000, has been about trying to understand the change in thinking of the people whose actions ultimately drive the markets. It is about the psychology of speculations, about the feed-back mechanism that intensifies this psychology, about the herd behavior that can spread through millions or even billions of people, and about the implications of such behavior for the economy and for our lives. Although the book originally focused directly on current economic events, it was, and is, abut how errors of human judgment can infect even the smartest people, thanks to overconfidence, lack of attention to details, and excessive trust in the judgments of others, stemming from a failure to understand that others are not making independent judgments but are themselves following still others—the blind leading the blind.

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Unsubstantiated belief systems, insubstantial wisps, do create bouts of irrational exuberance for significant periods of time, and these bouts ultimately drive the world economy.

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However, there are serious risks inherent in relying too heavily on such pristine models as the basis for policy discussion, for these models deal only with problems that can be answered with scientific precision. If one tries too hard to be precise, one runs the risk of being so narrow as to be irrelevant. The evidence I present in the following chapters suggests that the reality of today's stock market is anything but test-tube clinical. If the theroy of finance is to grow in its usefulness, all economists eventually will have to grapple with these messier aspect of market reality. Meanwhile, participiants in public debate and economic policy formation mjust sort out this tangle of market factors now before it is too late.

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Deutsch and Gerard concluded that the wrong answers in the Asch experiment had been given in large part because people simply thought that all the other people could not be wrong. They were reacting to the *information that a large group of people had reached a judgment different from theirs*, rather than merely the fear of expressing a contrary opinion in front of a group. This behavior is a matter of rational calculation: In every day living we have learned that when a large group of people is unanimous in its judgment on a question of simple face, the members of that group are almost certainly right.

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[Referring to Milgram's experiments] These results were widely interpreted as demonstrating the enormous power of authority over the human mind. Indeed the results may be understood partly o those terms. But there is another interpretation: that people have learned that when experts tell them something is all right, it probably is, even if it

does not seem so. … Thus the results of Milgram's experiment can also be interpreted as springing from people's past learning about the reliability of authorities.

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These [Asch's and Milgram's] studies are as interesting as ever when viewed from the standpoint of this information-based interpretation. The experiments demonstrate that people are ready to believe the majority view or to believe authorities even when they plainly contradict matter-of-fact judgment. And their behavior is in fact largely rational and intelligent. Most people have had many prior experiences of making errors when hey contradicted the judgments of a larger group or of an authority figure, and they learned from these experiences. Thus the Asch and Milgram experiments give us a different perspective on the overconfidence phenomenon: people are respectful of authorities in formulating the opinions about which they will later be so over-confident, transferring their confidence in authorities to their own judgments based upon them.

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Even completely rational people can participate in herd behavior when they take into account the judgments of others, and even if they know that everyone else is behaving in a herdllike manner. The behavior, although individually rational, produces group behavior that is, in a well-defines sense, irrational. This herdlike behavior is said to arise from an *information cascade*.

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Ultimately, all such information cascade theories are theories of the f*ailure of information about the fundamental value to be disseminated and evaluated.*

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The conventional media—print media, television, and radio—have a profound capability for spreading ideas, but their ability to generate active behaviors is still limited. Interpersonal and interactive communications, particularly face-to-face or word-of-mouth communications, still have he most powerful impact on our behavior.

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Studies by sociologists and communications researchers have found that telephone conversations come very close to face-=to-face communications in information transmission and problem-solving functions, though they still fall somewhat short in conflict-resolution and person-perception functions,

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The mathematical theory of the spread of disease has been used by epidemiologists to predict the course of infection and mortality. These models can be used to better understand the transmission of attitudes and the nature of the feedback mechanism supporting speculative bubbles.

In the simplest epidemic model, it is assumed that the disease has a given i*nfection rate* (the rate at which the disease spreads from contagious people to susceptible people) and a

given *removal rate* (the rate at which infected people become no longe3r contagious, through recovery or death).

If he removal rate is zero, the graphical plot of number of infected people after the introduction of one contagious person follows a mathematical curve called the *logistic curve*. [13]

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[13] The logistic curve is $P = 1/(1+e^{-rt})$, where P is he proportion of the population infected, r is the infection rate per unit of time, and t is time. The expression is a solution for the differential equation $dP/P = r(1-P)dt$, and $(1-P)$ is the proportion of the population that is susceptible to infection.

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Although disease spread and ant behavior are of theoretical interests in our consideration of stock market bubbles, or greatest practical relevance is the fact that epidemic models have been applied by sociologists to predict the course of word-of-mouth transmission of ideas. Here the infection rate is the rate of communication of ideas, and the removal rate is the rate of forgetting or of losing interest. The dynamics of such transmission may mimic that of disease. The formal mathematical theory of epidemics appears, however, to be less accurate for modeling social processes than for modeling disease spread or ant behavior, and it has yet to spawn an influential and successful literature by social scientists. This lack of success may be explained by the fact hat the basic parameters of these models are not as constant in the social sciences as in biological applications.

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The social attention mechanism generates a sudden focus on the attention of the entire community on matters that appear to be emergencies. Thus, to return to the epidemic model, the infection rate may suddenly and drastically increase. A sudden major move in the stock market is one of those events that pushes aside all other conversation,.

This social basis for attention, operating by word-of-mouth and facilitated by media transmission of ideas, can generate attention focuses that spread rapidly across much of the world. With a substantial fraction of the human minds on the planet suddenly grabbed by the market, it should not be at all surprising that markets on opposite sides of the lobe move together, even if the fundamentals in different countries do not suggest any reason for such co-movement.

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