
THE PRACTITIONER'S PERSPECTIVE

Unconscious Herding Behavior as the Psychological Basis of Financial Market Trends and Patterns

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Human herding behavior results from impulsive mental activity in individuals responding to signals from the behavior of others. Impulsive thought originates in the basal ganglia and limbic system. In emotionally charged situations, the limbic system's impulses are typically faster than rational reflection performed by the neocortex. Experiments with a small number of naïve individuals as well as statistics reflecting the behavior of large groups of financial professionals provide evidence of herding behavior. Herding behavior, while appropriate in some primitive life-threatening situations, is inappropriate and counterproductive to success in financial situations. Unconscious impulses that evolved in order to attain positive values and avoid negative values spur herding behavior, making rational independence extremely difficult to exercise in group settings. A negative feedback loop develops because stress increases impulsive mental activity, and impulsive mental activity in financial situations, by inducing failure, increases stress. The interaction of many minds in a collective setting produces super-organic behavior that is patterned according to the survival-related functions of the primitive portions of the brain. As long as the human mind comprises the triune construction and its functions, patterns of herding behavior will remain immutable.

Experimental research suggests that human beings possess biologically based psychological sources of unconscious emotional imperatives that cause a cooperative interaction on the part of financial market participants. If so, not only might mass emotional change be the primary mover of financial market prices, but we may also expect its operation to be immutable.

The Triune Brain

Paul MacLean, former head of the Laboratory for Brain Evolution at the National Institute of Mental Health, has developed the concept of a "triune" brain, i.e., one that is divided into three basic parts: the brain stem, the limbic system and the neocortex.¹ While the neocortex processes ideas by reason, the more primitive portions of the brain control impulses and emo-

tions that propel actions that are lifesaving or life-enhancing under most circumstances. Along with such matters as fighting, fleeing, hoarding, territorialism and breeding, the basal ganglia control *herding* behavior, while the limbic system produces emotions as a spur to further these objectives. The rational cortex cannot influence the impulses generated by these portions of the brain.

As a primitive tool of survival, emotional impulses from the limbic system impel a desire among individuals to seek signals from others in matters of knowledge and behavior and therefore to align their feelings and convictions with those of the group. The desire to belong to and be accepted by the group is particularly powerful in intensely emotional social settings, when it can overwhelm the higher brain functions.

Anatomically related studies (Ledoux, 1989) led to the discovery of neural pathways for emotional response that do not go through the neocortex and which are up to 40 milliseconds faster than the neocortex. Because the limbic system is quicker in response than the neocortex, emotions are often not reactions to considered *ideas* but immediate reactions to *perceptions* relayed by the senses. Herding behavior, because it de-

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rives from the same primitive portion of the brain, is similarly unreflective and impulsive.

When are individuals' herding impulses most likely to be activated, making people join together to produce collective agreement in thought and action? Dependence upon the behavior of others most easily substitutes for rigorous reasoning when knowledge is lacking or logic irrelevant. In a realm such as investing, where so few are knowledgeable, or in a realm such as fads and fashion, where logic is inappropriate and the whole point is to impress other people, the tendency toward dependence is pervasive. Trends in such activities are steered not by the rational decisions of individual minds but by the peculiar collective sensibilities of the herd.

Herding Psychology and Financial Markets

In the 1920s, Pigou connected cooperative social dynamics to booms and depression. His idea is that individuals routinely correct their own errors of thought when operating alone but abdicate their responsibility to do so in matters that have strong social agreement, regardless of the egregiousness of the ideational error. In Pigou's words,

Apart altogether from the financial ties by which different businessmen are bound together, there exists among them a certain measure of *psychological interdependence*. A change of tone in one part of the business world diffuses itself, *in a quite unreasoning manner*, over other and wholly disconnected parts. (Vittachi & Faber, 1998)

"Wall Street" certainly shares aspects of a crowd, and there is abundant evidence that herding behavior exists among stock market participants. Myriad measures of market optimism and pessimism² show that in the aggregate, such sentiments among both the public and financial professionals wax and wane concurrently with the trend and level of the market. This tendency is not simply fairly common; it is ubiquitous. Most people get virtually all of their ideas about financial markets from other people, through newspapers, television, tipsters and analysts, without checking a thing. They think, "Who am I to check? These other people are supposed to be experts." Many people are emotionally dependent upon the ticker tape, which simply reports the aggregate short-term decision-making of others. This dependence is nearly universal, even among long-term investors. They are driven to follow the herd because they do not have firsthand knowledge adequate to form an independent conviction, which makes them seek wisdom in numbers. The unconscious says: You have too little basis upon which to exercise reason; your only alternative

is to assume that the herd knows where it's going. When a crowd is in command, participating individuals appear rational on the outside, but inside, their impulses and emotions are in control.

Smith, Suchanek and Williams [1988] conducted sixty laboratory market simulations using as few as a dozen volunteers, typically economics students but in some experiments businessmen. The subjects received the same perfect knowledge of coming dividend prospects and then an actual declared dividend at the end of the simulated trading day, which could vary more or less randomly but which would average a certain amount. Despite this ideal environment of perfect knowledge, *the subjects in these experiments repeatedly created a boom-and-bust market profile*. The extremity of that profile was a function of the participants' lack of experience in the speculative arena. Head research economist Vernon L. Smith came to this conclusion: "Experienced subjects frequently produce a market bubble, but the likelihood is smaller than for inexperienced subjects. When the same group returns for a third market, the bubble disappears." In the real world, "these bubbles and crashes would be a lot less likely if the same traders were in the market all the time" (Bishop, 1987), but novices are always entering the market. While these experiments were conducted as if participants could actually possess true knowledge of coming events and so-called fundamental value, no such knowledge is available in the real world. The fact that participants create a boom-bust pattern *anyway* is overwhelming evidence of the power of the herding impulse.

The lower graph in Figure 1 shows the real-world result of the public's impulse to herd. As you can see, the general investing population commits more money to the market as it rises and less as it falls, behavior opposite from that which would generate profits.

It is not only novices and individual investors who fall in line. It is a lesser-known fact that the vast majority of professionals herd just like the naïve majority. The middle graph in Figure 1 shows the percentage of cash held at institutions as it relates to the level of the S&P 500 Composite Index. As you can see, the two data series move roughly together, showing that institutional portfolio managers herd in the market's direction for the most part right along with the public.

Apparent expressions of cold reason by professional stock analysts follow herding patterns as well. Finance professor Robert Olsen [1996] conducted a study of 4000 corporate earnings estimates by company analysts and reached this conclusion:

Experts' earnings predictions exhibit positive bias and disappointing accuracy. These shortcomings are usually attributed to some combination of incomplete knowledge, incompetence, and/or misrepresentation. This article suggests that the human desire for consensus leads to herding behavior among earnings forecasters.

FIGURE 1
Evidence of Herding Behavior in Stock Market Activity

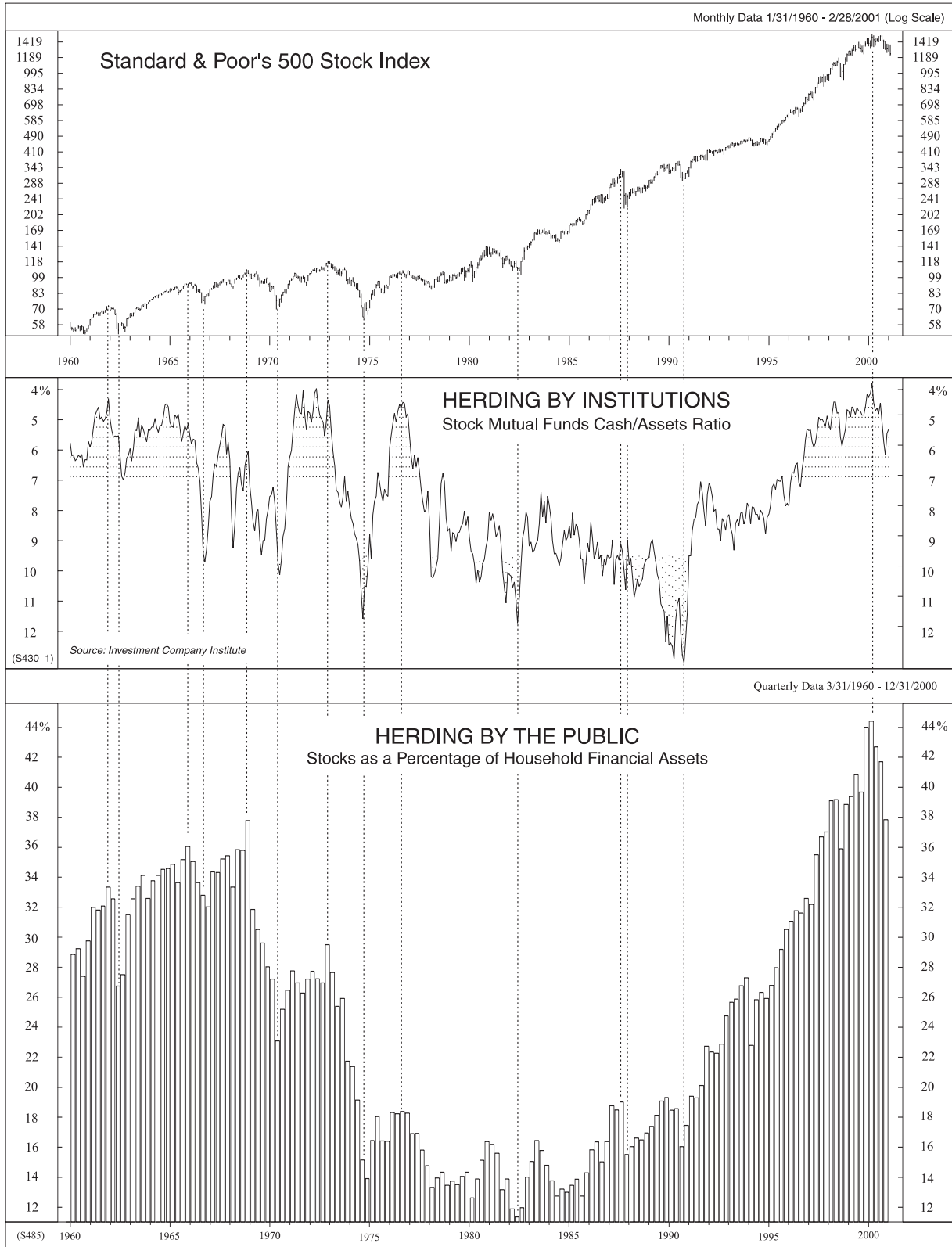


chart courtesy Ned Davis Research

In that paper, Olsen shows that the greater the difficulty in forecasting earnings per share, which is a source of stress, *the more analysts' herding behavior increases*. Equally important, the more their herding behavior increases, *the greater the bias in their earnings estimates*. The greater an aggregate bias becomes, the less accurate are the aggregate forecasts. This is a self-reinforcing system with failure the motivator of further failure. Available records show that professional corporate analysts' opinions track the trend of the market, also in precisely the opposite fashion from that which would generate profits.

The reason that forecasters' inaccuracy worsens with herding is that the net valuation of the stock market is the *result* of herding. To forecast on the basis of the current sentiments of the herd is to "forecast" the present mood, not future events. Success is simply a matter of whether the present mood maintains, which it usually does not.

How can seemingly rational professionals be so utterly seduced by the opinion of their peers to the effect that they will not only hold, but also *change* opinions collectively? MacLean [1990] explains, "the limbic system has the capacity to generate out-of-context, affective feelings of conviction that we attach to our beliefs *regardless of whether they are true or false*." In other words, the neocortex is functionally disassociated from the limbic system. This means not only that feelings of conviction may attach to utterly contradictory ideas in different people, but also that they can do so *in the same person at different times*. In other words, a person may hold *opposite views* with equally intense emotion, depending upon the demands of survival perceived by the primitive portions of the brain. This fact relates directly to the behavior of financial market participants, who can be flushed with confidence one day and in a state of utter panic the next. As Robert Schiller put it in a *New York Times* article in 1989, "You would think enlightened people would not have firm opinions" about markets, "but they do, and it changes all the time." (Passell) In each case, they are fully capable of explaining their new conviction, all such utterances being simply (yet sometimes superficially brilliant) rationalizations obediently generated by the neocortex. As market analyst Paul Macrae Montgomery [1991] explains, "to the limbic system, the phrase 'net present value of future cash flows' is meaningless because its *only sense of time is now and only value is pleasure or relief from stress*." To relieve that stress without cognitive dissonance, the neocortex must generate "reasons" for a person's action, which justify the attendant emotional imperative. Throughout the herding process, whether the markets are real or simulated, and whether the participants are novices or professionals, the conviction of the *rightness* of stock valuation at each price level is powerful, emotional and impervious to argument.

Emotional Stress as the Limbic System's Herding Motivator

Falling into line with others for self-preservation involves not only the pursuit of positive values but also the avoidance of negative values, in which case the emotions reinforcing herding behavior are even stronger. Reptiles and birds harass strangers. A flock of poultry will peck to death any individual bird that has wounds or blemishes. Likewise, humans can be a threat to each other if there are perceived differences between them. It is an advantage to survival, then, to *avoid rejection by revealing your sameness*. D.C. Gajdusek [1970] researched a long-hidden Stone Age tribe that had never seen Western people and soon noticed that they mimicked his behavior; whenever he scratched his head or put his hand on his hip, the whole tribe did the same thing. Says MacLean, "It has been suggested that *such imitation may have some protective value by signifying, 'I am like you.'*" He adds, "This form of behavior is phylogenetically *deeply ingrained*." Thus, another advantage of herding behavior is the avoidance of seeming difference in order to defuse an excuse to attack.

This tendency toward mimicry is hardly confined to Stone Age tribes. Psychology professor Irving Janis [1972], after studying the dynamics of group decision making in the modern political setting, concluded, "In general, the greater the number of those in the decision maker's social network who are aware of the decision, the more powerful the incentive to avoid the social *disapproval* that might result from a reversal." What's more, "The greater the commitment to a prior decision, the greater the anticipated utilitarian losses, social disapproval and self-disapproval from failing to continue the present course of action and hence a greater degree of stress."

That is why, in financial markets, when the best time to buy or sell is at hand, *even the person who thinks he should take action experiences a strong psychological pressure to refrain from doing so*. He thinks, if only half consciously, "When my neighbor or advisor or friend thinks it's a good idea, then I'll do it, too. If I do it now, and I'm wrong, they will all call me a dope, and *I'll be the only dope*. I'll be singled out for ridicule, which is not only agonizing but dangerous." Pressure from, and influence by, peers, then, is at least one reason why most people cannot bring themselves to change from a bullish to bearish orientation or vice versa if to do so would go against the ideas of their associates and contacts. It also explains why a market or other social trend can continue for a long, long time and why financial valuations can become so extreme as to appear outrageous to those who believe that people ought to base their decisions rationally upon some calculable fundamental value.

The discomfort of being alone in one's convictions is so great that it involves physical reactions. "Emotional mentation," says MacLean, "represents the only

form of psychological experience that, *by itself*, may induce pronounced autonomic activity” such as sweating, twitching, flushing, muscle tightening and hair standing on end. A person’s reaction just *thinking* about taking an action apart from the herd can produce tenseness or even nausea. He knows from experience that anyone who shares a prevailing majority opinion on any subject, particularly one that is intensely attended by the emotions of the limbic system (such as politics, religion, wealth or sex), is treated with the respect due his obvious intelligence and morality. One who utters an opposing opinion is immediately punished by a chorus of deprecating smiles, cackling, mooing, snorting, nipping or outright hostility. It may sound funny, but if you are not used to verbal viciousness or rejection by the group, they are painful experiences, and most people cannot abide either.

Emotionally removed historians sometimes decry the lack of prescience among a population prior to a long-ago financial crisis or the lack of vocal critics in countries that are taken over by fascists, communists, inquisitors or witch-burners. Yet unless one is there, it is nearly impossible to imagine the social pressure to go along with the trend of the day. In many political and religious social settings, for example, “I am not like you” can mean death. The limbic system bluntly assumes that all expressions of “I am not like you” are infused with danger. Thus, herding and mimicking are preservative behavior. They are powerful because they are impelled, regardless of reasoning, by a primitive system of mentation that, however uninformed, is trying to save your life. In many cases, it does just that.

Unfortunately for humans in modern times, there are important exceptions to that benefit. Herding behavior is counterproductive to success in the world of modern financial speculation. If a financial market is soaring or crashing, the limbic system senses an opportunity or a threat and orders you to join the herd so that your chances for success or survival will improve. The limbic system produces emotions that support those impulses, including hope, euphoria, caution and panic. The actions thus impelled lead one inevitably to the *opposite* of survival and success, which is why the vast majority of people lose when they speculate.³ In a great number of situations, hoping and herding can contribute to your well-being. Not in financial markets. In many cases, panicking and fleeing when others do cuts your risk. Not in financial markets. Moreover, because impulses and emotions result from rigid, “hard wired” thought processes, repeated failure in speculation and the attendant agony usually do little to deter the behavior.

From Individuals to Aggregates

We may not characterize these primitive impulses and emotions as rational, as they operate independ-

ently of reason. Yet neither may we label them irrational, because they have a purpose, no matter how ill applied in modern life. When the unconscious mind operates, it could hardly do so randomly, as that would mean no thought at all. It must operate in patterns peculiar to it. This is clearly the case among speculators, whose impulses produce the same patterns of aggregate behavior over and over. Can we link such patterns in individuals to the formation of a super-organic collective pattern? There is evidence to support this hypothesis as well.

Sornette and Johansen [1997] specifically connect the stock market to the primitive mentation of animals, including their occasional collective mentation: “Instead of the usual interpretation of the efficient market hypothesis in which traders extract and incorporate consciously (by their action) all information contained in market prices, we propose that the market as a whole can exhibit an ‘emergent’ behavior not shared by any of its constituent[s]. In other words, *we have in mind the process of the emergence of intelligent behavior at a macroscopic scale that individuals at the microscopic scale have no idea of.*” Biologists have made similar analogies with respect to ant colonies, bee swarms and other animal populations.

To form such emergent behavior, individuals’ impulses to herd must relate to signals from the social environment. Since all participants in a particular social setting share the same environment, the combination of like minds produces global patterns of interactive dynamics in a social setting. This is particularly true of financial markets, where participants hear the same news and watch the same price quotations, thus receiving substantially identical signals. Since the participants themselves generate many of the signals, the result is a feedback loop of information and impulsivity. This process generates the trends and patterns of prices in financial markets.

As we have seen, the essential engine of the process is the mass interaction of numerous rigid, unreasoning basal ganglia and limbic systems. We may thus conclude that aggregate human interpersonal dynamics, and therefore the subset of speculative financial market dynamics, will remain immutable unless and until there evolves a change in the operation of the triune brain that constitutes the human mind.

Notes

1. I would like to thank Paul Macrae Montgomery of *Universal Economics* for alerting me to MacLean’s material.
2. Such measures include put and call volume ratios, cash holdings by institutions, index futures premiums, the activity of margined investors, and reports of market opinion from brokers, traders, newsletter writers and investors.
3. There is a myth, held by nearly all people outside of back-office employees of brokerage firms and the IRS, that many peo-

ple do well in financial speculation. Actually, almost everyone loses at the game eventually. The head of a futures brokerage firm once confided to me that never in the firm's history had customers in the aggregate had a winning year. Even in the stock market, when the public or even most professionals win, it is a temporary, albeit sometimes prolonged, phenomenon. The next big bear market usually wipes them out if they live long enough, and if they do not, it wipes out their successors. This is true regardless of today's accepted wisdom that the stock market always goes to new highs eventually. Aside from the fact that this very conviction is false (Where was the Roman stock market during the Dark Ages?), what counts is *when* people act, and that is what ruins them.

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