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## From Rational Decision-Makers to a Psychology of the Foreign Exchange Market

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*What is the foreign exchange market? Is it a part of human rationality? I don't know. Ask Rene Descartes or somebody, not me!*

Foreign exchange trader

From the outside, financial markets appear “dry, technical, and economic in nature—[all about] percentage declines, volume, margin calls, and paper losses. [However, their] inner mechanism is psychological. All markets, financial or otherwise, are arrangements where goods, money, and real and financial assets change hands. It is vital to remember that the hands are *human* and are attached to thinking, feeling hands and bodies,” according to economist Shlomo Maital.<sup>1</sup> Or, as articulated by James Grant, of *Grant's Interest Rate Observer*, markets “are normally as objective as people watching the ninth inning of the seventh game of the World Series, with the teams at a tie.”<sup>1</sup>

The contrast between the outcome-based outside appearance and the inner decision-making dynamics of such financial markets as the foreign exchange market is reflected in substantial differences between the traditional economic and the psychological views. “There aren't many human beings populating the world of economic models,” economist Richard Thaler observes.<sup>2</sup> Focusing on aggregate pricing dynamics, traditional economic models of the market have

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<sup>1</sup> Personal communication.

assumed that individuals are “fully rational” and make decisions optimally. In contrast, psychology has observed how they *fail* to be rational from an economic viewpoint when making decisions in the markets.<sup>3–6</sup>

In this book, I demonstrate that the notions that market participants are rational and the foreign exchange market is efficient have to be supplemented by a more complex understanding of *psychological* and *social* market processes. The traditional economic models of financial markets have provided innumerable valuable insights into optimal portfolio allocations and into how markets operate in an ideal world. While these models will always serve as important benchmarks against which to evaluate competing concepts, they are fundamentally and critically incomplete, as there are many important aspects of real-life financial market behavior that they simply cannot explain. Departures from market efficiency, such as the stock market valuing the entire 3Com Corporation less than one of its subsidiaries in 2000,<sup>7</sup> are not just exotic exceptions. Instead, these “exceptions” reflect departures from perfect rationality that are so pervasive as to be inherent to financial markets. Indeed, it is possible that psychology and—to put it in the words of finance—“imperfect rationality” influence the foreign exchange dynamics more than do perfect rationality and efficiency.

Placing the emphasis on psychology in understanding financial markets closely reflects the actual experience and observations of those who take part in financial markets. In the words of one trader, “Psychology does play a huge role in people making decisions and influencing [market] behavior.” As the chapters of this book illustrate, market participants themselves readily acknowledge their inability to achieve full rationality in the economic sense. Accordingly, they frequently observe that their information-processing capabilities are limited and that in the second-to-second dynamics of the market, there is not enough time for a full analysis of relevant information. Such insights were the inspiration for economic models of “bounded” rationality developed some decades ago by economic Nobel laureate Herbert Simon.<sup>8</sup> In recent years, economists have built on this foundation, integrating many psychological insights into their models, and thus building a bridge between finance and psychology, which promises a more accurate and a more differentiated understanding of human actors in financial markets. Fortifying this bridge and fostering a new understanding of the markets, this book shows that, rather than being rational and efficient, the very nature of the foreign exchange market is *psychological*.

## TRADITIONAL VS. BEHAVIORAL FINANCE: A PARADIGMATIC SHIFT IN APPROACHING FINANCIAL MARKETS

Contemporary financial markets, such as the foreign exchange market, can be approached from a variety of useful perspectives. To give some examples, history, sociology, political science, psychology, and economy all provide exciting angles for examining the complex meanings and inner workings of financial markets. While these disciplines often complement each other, they certainly are not always in agreement. Indeed, a closer examination of how economists have thought about financial markets and market participants reveals plainly that, even within the same discipline, approaches may contradict and even conflict entirely with each other. Thus, one of the core questions posed by economists today is the extent to which psychology may help in understanding and explaining the workings of financial markets, and in the building of more accurate market models.

Traditional economic models assume that all market participants are *fully rational*. This means that participants process information using the best known statistical techniques, that they fully understand the structure of the market, and that their decisions are optimally suited to achieving their personal goals. In the context of portfolio formation, for example, the assumption of perfect rationality has helped to define how portfolios should be allocated when investors care primarily about expected return and volatility.<sup>9</sup> Some readers will be familiar with the powerful concepts of “mean-variance optimization” and “efficient frontiers,” both of which come from this literature.<sup>ii</sup> Rationality is especially important in the context of how market participants form expectations, where it implies that their forecasts should not consistently be biased in any direction, that forecasters should learn from their mistakes, and that forecasts should not be amenable to improvement using readily available information.

On the assumption that all investors are rational, financial theorists have been able to characterize how markets should price individual assets. They have found that only the price risk that is correlated with the overall market should be valued, while asset-specific price risk should not: Rational investors can eliminate asset-specific price risk through diversification, but they are stuck with the price risk that is correlated with the overall market no matter what they do. The analogy of an ocean ship illustrates this concept. The risk that the

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<sup>ii</sup> Mean-variance optimization determines how investors should combine various financial assets for the highest return at a given level of risk (as measured by volatility). The group of all optimal portfolios is called the efficient frontier.

ship will reach its destination depends not only on the ocean conditions (i.e., the market risk), but also, among other factors, on the sobriety of the crew (i.e., the asset-specific risk). While freighters can control the risk related to the crews, the risk related to the ocean remains. These insights, in turn, have spawned an entire industry devoted to measuring “market risk,” and such related concepts as “alpha,” the excess of expected return over its theoretically appropriate value.

Another implication of universal rationality is that market prices should be “informationally efficient.” This means that prices should always be at their fundamentally correct values, which, in turn, implies that public news generally brings quick, once-and-for-all price changes: rational agents will immediately drive prices to the value consistent with existing information. Economists often summarize an efficient market as one in which market prices appropriately reflect all available information at all times.<sup>10</sup> Because all relevant information is already factored into current prices, a perfectly efficient market provides no opportunities to earn excess (risk-adjusted) profits.

For decades, the concepts of rationality and market efficiency have provided the economic analysis of financial markets with a consistency never enjoyed by psychological approaches.<sup>11</sup> In contrast to the concept of universal rationality, psychological theories address human motivation, cognition, and behavior. For example, Sigmund Freud’s notion of personality is certainly a far cry from the extremely rational decision-maker depicted in economic textbooks. Freud describes the fundamental part of personality as a “cauldron full of seething excitations”<sup>12</sup>; indeed, central to psychoanalysis are the notions of the unconscious and the primacy of the pleasure principle, which is irrational, over the reality principle, which is based on reason. In stark contrast, the behaviorism of B. F. Skinner conceives of the human mind as an impenetrable black box. Instead, behaviorism focuses first on behavior, which it perceives as governed by antecedents and consequences in the outside world or as learned by observing others.<sup>13</sup> Cognitive-behavioral approaches, a more recent offspring of behaviorism, focus on thinking and information-processing in how people feel and in what they do.<sup>14–16</sup> A third disparate branch of psychology, Carl Rogers’ and Abraham Maslow’s humanistic theory, emphasizes people’s subjective experience, free will, and human self-determination.<sup>17–19</sup>

Some economists object that these theories are perhaps valuable in personal therapy, but have little significance in financial markets. As economists point out, financial market participants are motivated by high pay to process information rationally. Since departures from rationality hinder them from maximizing profits (or more generally maximizing well-being), individuals will either become rational or go bankrupt and leave the market.<sup>20</sup>

However, the traditional economic view is crumbling. Debate now rages about whether imperfect rationality, and the psychology research that documents it, may be critical to financial markets. The two central points of debate concern the very nature of financial markets: (1) Are market participants rational? (2) Are financial markets efficient?

*Are market participants rational?* In recent years economists have begun to look beyond optimal human behavior to focus on actual human behavior in financial markets. They now often turn to psychology and sometimes even do their own original research. The consistent conclusion from this new focus is that full rationality is not an accurate description of human decision-making. There are regular divergences from what economists define as rational even in such professional settings as financial markets, where the goals of participants are seen as clearly defined and the results of their decisions as easily measurable. Financial decision-makers, for example, typically take mental shortcuts inconsistent with full rationality. Additionally, they are influenced by such “irrelevant” information as the way things are presented as opposed to the information content of the presentation.<sup>iii</sup> Market participants’ forecasts violate three critical dimensions of economic rationality: they are biased, they do not incorporate lessons from past mistakes, and they can be improved using readily available information.<sup>21–24</sup>

*Are financial markets efficient?* Evidence against the efficient markets hypothesis has also accumulated rapidly in recent years. Simple trading rules of when to buy and sell currencies were quite profitable in currency markets for many years and may still be;<sup>25,26</sup> an efficient market would not allow such rules to exist. For if indeed the market were *truly* efficient, then individual market participants could not systematically outsmart the market and there should be no possibility for trading rules or strategies that systematically perform better than other strategies, as there is by definition no piece of information that is not already factored into the market’s rates.<sup>27,28</sup> Just as telling is the fact that “market risk” does not appear to matter for stock prices, while other factors apparently unrelated to risk—such as the ratio of a firm’s stock market value to its accounting (or “book”) value—do appear to matter.<sup>29–33</sup>

Also, the so-called momentum and reversal effects that have been observed in market prices contradict the assumption of efficient markets. If the markets were efficient, they would behave according to a random walk (i.e., there would not be any correlation between present, past, and future market prices).<sup>34</sup>

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<sup>iii</sup> Examples of such mental shortcuts (also called “heuristics”) and “framing effects” (in which the way a situation is presented or perceived, not its objective content, influences decisions) are discussed in Chapter 2, “Psychology of Trading Decisions”.

However, empirical studies on the returns of various financial assets have shown that market prices autocorrelate positively in the short term (momentum), and negatively in the long term (reversal). For example, stocks with a successful recent performance have a tendency to perform highly over the following month,<sup>35</sup> while stocks that have performed either extremely well or extremely badly over longer horizons of some years reverse this pattern.<sup>36</sup> Finally, market prices have been shown to be affected by irrelevant news; this also contradicts efficient markets theory. For example, returns and volumes of stocks with similar ticker symbols correlate with each other significantly, due to the confusion of investors,<sup>37</sup> and newspaper reports about old information that was already publicly available affect stock prices.<sup>38</sup> In one striking case in point, a potential breakthrough on cancer research reported in a Sunday edition of the *New York Times* caused the company owning licensing rights to soar massively. On the following Monday morning, stocks of Entremed opened at more than seven times their Friday closing price, and they sustained a considerable portion of these gains over the following weeks. However, the newspaper report provided no relevant new information whatsoever. The “news” had already been reported in a scientific journal and in various newspapers (including the *New York Times* itself) some months earlier.<sup>39</sup>

Such market “anomalies” (from the viewpoint of traditional economics) are found in real-life markets, as well as in experimental market settings.<sup>3</sup> Increasingly, the evidence against full rationality and the efficient markets hypothesis has encouraged some financial economists to challenge the traditional view of finance. The young discipline of “behavioral finance” has paved the way to a new paradigm of financial markets.<sup>40</sup> Why, behavioral finance researchers ask, should the people who form trading decisions in the ambiguous complexity of the daily markets always have perfectly rational solutions for problems that even trained economists have a hard time analyzing?<sup>2</sup> “Even in the Olympics,” in the apt words of finance professor David Hirshleifer, “no one runs at the speed of light; some cognitive tasks are just too hard for any of us.”<sup>41</sup> Thus, proponents of behavioral finance claim that a more realistic and complete understanding of investors’ decisions and market dynamics comes from considering psychology.

Unlike traditional economics, the view of financial markets offered by behavioral finance builds on less-than-perfectly rational traders and investors, and explains investor behavior and market phenomena by *human decision-making characteristics*.<sup>2,42–45</sup> Thus, the representatives of behavioral finance have started to build market models that explain how psychological aspects of decision-making translate into deviations from market efficiency, for instance, how these processes may lead to the observed short-term momentum and

long-term reversals in stock returns and the ability of market-to-book-value ratios to forecast returns.<sup>46–48</sup> Behavioral market models are based on such aspects as considering the representativeness bias (people often form likelihood judgments by simply viewing events as typical of some class and by ignoring their knowledge about base rate probabilities); conservatism (people update their expectations and models in the face of new evidence only slowly); biased self-attributions (people usually perceive the reasons for their successes as internal—i.e., as due to their own abilities—and the reasons for their failures as external—i.e., due to the environment); and overconfidence (people tend to overestimate their own knowledge and skills), particularly overconfidence about the accuracy of their private information.

### ECONOMIC DEFENSE OF THE EFFICIENT MARKET VIEW

“Market efficiency survives the challenge,” economist Eugene Fama vehemently declares,<sup>49</sup> and, indeed, mainstream economists defend the efficient market paradigm against behavioral finance in a variety of ways. Often they will attempt to provide explanations for apparent anomalies consistent with the theory. For instance, they argue that if a firm’s ratio of market-to-book-value matters for its stock price, then that ratio must somehow be related to risk, even if it is not apparent just how.<sup>50</sup> Consistent with the efficient markets hypothesis itself, these explanations sometimes rely on an underlying assumption of full rationality.

To support the notion of efficient markets, economists also appeal to the famed economist Milton Friedman’s “as if” defense (namely, that theories should be judged by the validity of their *predictions*, not by their assumptions).<sup>20</sup> These economists maintain that finance theory based on the notion of full rationality has, after all, still been very successful in predicting market outcomes and that markets are efficient to a first approximation. A successful baseball player helps to exemplify this line of thinking. Without actually knowing the underlying physical forces that determine a baseball’s voyage, and with no inkling of the equations expressing these forces, celebrated hitters from Babe Ruth to Barry Bonds frequently connect with the ball.

However, the success of the baseball player in this metaphor—and likewise the success of economic theory—can be disputed. One could, for example, suggest that Ruth could have hit the ball more frequently had he known the physical forces and critical equations. Likewise, behavioral economist Richard Thaler points out that finance theory is not very useful at predicting market developments.<sup>2</sup> Moreover, the very nature of the “as if” defense is problematic

when it is contrasted with the truthfulness requirement demanded of science by philosopher Michael Polanyi. Truthfulness rests on an actual link between theory and reality.<sup>51</sup> “Scientific knowing,” Polanyi asserts, “consists in discerning Gestalten [‘figures’] that are aspects of *reality*.”<sup>52, emphasis added</sup> In other words, an accurate description of financial markets (i.e., one close to reality) is critical if we want to more fully understand them.<sup>53</sup>

An accurate description of financial markets must include the fact that some agents are *not* perfectly rational, as noted earlier. Still, traditional finance argues that markets can still be efficient, provided that the mistakes of the imperfectly rational agents are mutually independent. Individual irrationalities will then effectively cancel each other out at the level of the overall market. Suppose, for example, that the dollar–yen exchange rate is at its fundamentally correct value of ¥110/\$, but one trader mistakenly thinks that the correct rate is ¥100/\$ (maybe because this trader is Japanese and highly optimistic of the Japanese economy) and another trader mistakenly thinks it is ¥120/\$ (maybe because this trader is from the U.S., and because this is the price where the trader bought the yen some time ago). The first trader will choose to sell dollars at ¥110/\$ while the second trader will choose to buy dollars. In this way, the two traders’ decisions will cancel each other out, leaving the yen stable at ¥110/\$. Thus, despite the presence of imperfectly rational individual investors, the market overall could efficiently reflect the fundamentally correct price.

Unfortunately for this argument, there is ample empirical evidence that the decisions of people are psychologically influenced in *systematic* ways and not just randomly. In other words, in the above scenario psychological processes may lead to misvaluations of the dollar–yen exchange rate that show the same trend for the traders; although the fundamental value is ¥110/\$, these processes make them both willing to trade (say, at ¥100/\$ or at ¥120/\$). For example, as we will see in Chapter 2, “Psychology of Trading Decisions,” the so-called framing effects found by psychologists Daniel Kahneman and Amos Tversky describe methodical deviations from what economic rationality would suggest.<sup>43,54,55</sup> Framing influences decision-making by how the situation that requires a decision is described and subjectively perceived, as opposed to the objective information content of the situation. Framing effects have been found to have a crucial influence on the risk-taking of investors. Because these and other psychological factors in decision-making constitute a systematic departure from the traditional economic model of rational decision-makers, aggregation does not make them vanish but may even reinforce them.<sup>56</sup>

On the market level, the resulting inefficiencies may even be additionally intensified by self-reinforcing patterns among investors who imitate each other.<sup>57</sup> To give an example, people tend to find patterns with predictive

power where there are none.<sup>58,59</sup> This tendency has contributed to an entire industry, known as “technical analysis,” in which people believe that price patterns predict future price movements. As technical analysis is now widely disseminated in organized courses (e.g., by the New York Institute of Finance) and through textbooks, many of whose authors are familiar names within finance, any mistakes fostered by this discipline will be shared by many market participants. Finance researchers Jennifer Chu and Carol Osler, for example, find that even though the famous “head-and-shoulders pattern” has no predictive power, it nonetheless generates additional trading equivalent to 60% of a day’s normal trading volume.<sup>60</sup> Moreover, technical analysis influences price levels in the market, as many technical strategies involve positive feedback trading, in which price rises generate purchases and price declines generate sales. As a result, technical analysis may contribute to sustained price changes beyond fundamentally correct values.<sup>61</sup> Such a possibility was apparently the concern of Federal Reserve chairman Alan Greenspan in 1996, when he famously asked if “irrational exuberance” might have let U.S. stock market prices soar excessively.<sup>iv</sup>

Still, there is a final line of defense that traditional finance uses in favor of efficient markets. This defense concedes that unsophisticated market participants may indeed exhibit shared psychological biases and thus distort the efficient market equilibrium. However, the distortions will not last because other market forces will neutralize them. Overall market efficiency, in this line of reasoning, is guaranteed by rational market participants, called “arbitrageurs,” who hasten to exploit the profit opportunities created by imperfectly rational ones.<sup>56</sup> Because the arbitrageurs know the rational and correct prices, they can trade profitably with anybody behaving irrationally. When the market is overpriced due to “irrational exuberance,” for example, the “smart money” will sell aggressively, thus bringing prices down to more sensible levels. Although the two traders in our example, and the majority of the other traders, are willing to trade dollar–yen at ¥120/\$, some rational arbitrageurs suffice to bring the overpriced dollar down to its fundamentally correct value of ¥110/\$.

The arbitrageurs have two important consequences. First, they ensure that the market reaches its “efficient” price level. Second, they profit handsomely at the expense of the irrationally exuberant individual investors. Thus, the irrational market participants either learn to trade rationally or they run out of funds and leave the market. Accordingly, it is argued, that through expertise

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<sup>iv</sup> Speech at the American Enterprise Institute on December 5, 1996.

and learning effects, the market will in the long run always be dominated by rational players.

Once again, market reality fails to support this particular line of argument. “Very much does not support the strong versions of the experts-get-things-right and in-the-real-world-people-learn hypotheses,” economist Matthew Rabin summarizes in his discussion of psychological findings relevant to economics.<sup>62</sup> People are often very resistant to learning from their past mistakes,<sup>63</sup> and the rich mental representations of such complex subject matters as financial markets held by experts may even introduce a paradoxical hazard of *increased* noise and scatter in their predictions, as compared with those of novices.<sup>64</sup> Moreover, as Harvard finance professor Andrej Shleifer argues, in real life possibilities for arbitrage are limited and they bring along risks.<sup>42</sup> For example, most “rational” assessments of the U.S. stock market in 1997 indicated that it was overvalued by fundamental measures. This led some arbitrageurs to sell short, in the expectation that they would buy stocks back cheaply soon thereafter, exactly according to theory. However, this strategy led to losses for two straight years. Indeed, because the market “mispricing” became worse for a while, rather than disappearing, those arbitrageurs paid dearly. The well-regarded Brandywine mutual fund, for example, went heavily into cash at the end of 1997 and then hemorrhaged funds when the market shot forward the next quarter. This happened even though earnings reports were disappointing, as the fund had forecast.

“Nothing is more suicidal than a rational investment policy in an irrational world,” the eminent economist John Maynard Keynes is alleged to have declared, in reference to his 1936 book, *The General Theory of Employment, Interest, and Money*. In a trader’s words, “[if] you find someone else is making [a price] just as bad as you, hopefully worse than you, then you make money, and you actually make more money when people are trading on a rational price.” In short, arbitrage to bring prices into line with fundamentally appropriate values may be extremely limited. As the following section discusses in depth, these limitations also play a central role in traders’ own observations of market rationality.

## **TRADERS’ VIEWS OF RATIONALITY IN THE FOREIGN EXCHANGE MARKET**

One may well ask what foreign exchange traders themselves think about rationality and market efficiency in response to all the academic ink that has been spilt over the question. In answer, while some traders observe that the

foreign exchange market is “completely rational,” this view does not refer to the traditional economic notion that the market at all times correctly reflects all economically relevant market information; instead, this observation expresses that exchange rate movements always *reflect the decisions of market participants* and that, even when these movements seem inexplicable at first sight, they *ultimately can be explained*. Thus one trader observes frankly, “I don’t think there is any irrationality in the foreign exchange market, because it’s driven by supply and demand—that defines the foreign exchange market. You may have an opinion that is totally one way, but your opinion is not the foreign exchange market; it could not matter less. If [the market] is going higher and you are short, *you* are wrong. Because it is all about supply and demand, and any opinion you have beyond that is really a second-order sort of thing!” The same understanding of market rationality can be found in the response given by another trader: “If you have the information, [the market] is very logical. For example, an economic figure comes out and the dollar should be bought, that would be logical. But just one big fund decides, ‘I’ve made enough money, I’ll switch out of the currency.’ So the market drops rather than rises. To those who don’t know that the fund sold out, it is very illogical, very irrational. But can you say that the market has behaved irrationally?”

In the accounts of traders, market rationality thus frequently emerges as a *subjective explanatory concept* that depends on the subjective point of view. “What is perhaps rational for me, is irrational to someone else, and vice versa. In the places where I say the market is irrational, for somebody else it is rational,” one trader explains. This makes it evident that to these market practitioners, “rationality” lies in the eye of the beholder, and assessing a certain market development as rational or irrational is a matter of perspective. Accordingly, traders observe that recourse to so-called irrationality is often used as a reaction to events that contradict a previous expectation or the personal point of view. Irrationality is then defined by the question of whether or not the decision-maker can retrospectively explain a market process. “People call irrational what they don’t understand,” one trader declares unequivocally. Another trader concurs with this statement, remarking dryly that “irrational is always used by those who can’t explain.” Likewise, some traders comment that in the context of actual trading, the term irrational is often used to describe the reasons for trading losses. “If you are the wrong way around, you call it irrational, and if you are the right way around, it’s rational,” one trader notices. “I have never seen a trader that made a ton in trading gold [say] ‘that was an irrational move but I got rich,’” another trader sagely remarks.

In seeming agreement with traditional economic theory, some traders observe that there may be individual irrationalities that become neutralized by opposing market forces on the collective market level. "There is some irrationality on a single level behavior. But that is washed out of course when you go over that because you have those buying and you have those selling, and at the end it is zero. So the market is not irrational but individual traders in their initial decision-making process may be," one trader asserts. Another trader agrees, commenting that "At some point, there are rational players in the markets that take a look at things at a more fundamental or value basis, and there are flows out there that provide the necessary adjustment." In additional support of traditional economic theory, traders also observe that the quality of information available to large market players allows them to benefit at the expense of those who are ill-informed. In the words of one trader, "There are ways to take advantage of some of that irrational behavior . . . provided you have some information advantage."

However, traders stress that possibilities for arbitrage are limited in market reality and that trading at a price level that may seem rational to economists may turn out to be costly. In the ironic words of one trader, "if you have a degree in economics, I think you would lose a lot of money, because the market is completely the opposite!" The limits and dangers of arbitrage in the real-life market are addressed by another trader who vividly describes the dilemma of a rational market player during a phase of prolonged market "irrationality." "You say, well, there has to come red; I can put my chips on red. Now black comes once again. What are you doing to not lose money? You double up with red . . . and as long as you can double up, you gain back what you have lost, *as long as you can double up*. But there are certain situations when you are stopped: you might run out of money or the casino might set a table limit. Then you are wiped out and you lose. And this is the same situation you might encounter in foreign exchange. You will reach a limit, your risk-taking capacity is full, so at times you are no longer influenced by what happens in the market in terms of information and macroeconomic data!"

Far from being homogeneous, the picture of rationality and irrationality on the market level portrayed by traders is differentiated and variable. Traders observe, for instance, that the market knows of more and less rational periods; in the words of a trader, at times, "the market is totally irrational; there is no rational reason behind any move. And then, for a certain period of time, the market reacts quite, as you would say, rational." Moreover, various aspects of the foreign exchange market such as different decision time horizons, trading locations, trading instruments, and roles of market participants are associated with different degrees of rationality. With regard to different time horizons,

traders remark that, “Rationality, of course it exists to a certain extent, but in the daily market, it does not,” and “short-term logic and rational do not apply to this market.” To this, another trader adds that, “In terms of minutes, I would say 80% is emotional. [But] as you go forward through time, in which case the information can be processed and analyzed, it is more of a rational reaction, and much less of an emotion . . . Long-term investors tend to be more influenced by analysis than by feelings.” “Over time, the markets are largely rational in terms of major trends,” yet another trader agrees. “But,” he adds meaningfully, “most of the market participants do not or cannot have a time horizon that is consistent with that because of their own earning pressures, or accounting treatment on trading positions, or their own risk appetite!”

While most foreign exchange traders thus agree that the role played by rationality in the market overall is limited, they differ in their views on how the market has changed over time. On the one hand, some traders observe that the role of irrationality has increased. “When I started in the business . . . the market was behaving in a more logical way than it is today,” one trader notes, to which another trader adds his description of the market as, “mostly irrational, and more and more!” One important reason for this development is seen in the growing importance of international investment flows relative to trade flows: “With the liberalization of capital flows, you have more people and individuals that have access to money, that handle money, that are rich. And consequently they go cross-border, they go from one currency into another currency, and then they get a part of that pure speculation. The motivation behind [their trading] is purely speculative,” one trader explains. On the other hand, other traders address market aspects that are seen as signs of enhanced rationality. For example, one trader notices that today, “a lot of noise is eliminated, and the market now tends to shift very quickly from price point to price point. So, [the traders] will all be stuck at a point for a reasonable amount of time, and then there will be some news or flow coming into the market, and it will move to the next price point and stop. Whereas previously, because price discovery was less efficient, what would happen when news or flows came into the market, it was like an elastic band: it would go down and come back up until it settled.”

The list of examples for irrational market behavior given by foreign exchange traders is long. One important source for the observed deviations from the economic notion of rationality stems from the different needs and motivation of participants. In the frank words of one trader, “You have many participants in the foreign exchange market who take actions for radically divergent reasons.” Addressing an equally important reason for irrationalities, another trader explains: “To the extent that the market is much faster [than

before], it means that emotions play a bigger role, because people don't have enough time to do a rational analysis of the information. [However,] they have to act. So, you will see irrational moves, reactions, price actions very often in a market like the foreign exchange!" Adding to this statement, another trader remarks on exchange rate dynamics that, "75% is rumor-driven and 25% is really rational." Other relevant areas of market irrationalities are seen by traders in "the behavior of crowds and the madness of speculative movement," exaggerated exchange-rate movements when, "news is hitting the market at a very strategic moment ... and the market is taken by surprise," or institutional trading regulations that force individual traders to take trading suboptimal decisions: "Because the trader has a limit, he has to cut his position and has to get back into his limit. And although he may think that the market goes in this direction, if it has not moved in his direction and if he has a certain loss he has to cut his position. And that is, with respect to the market, irrational. You see this always in the evening; the market goes in one way and the traders had to cut their positions and the New Yorkers wait for the Europeans and know what positions they have, and they make the big money!"

Thus the interviews with traders provide a striking and significant window on the question of rationality in the foreign exchange market. The observations of traders suggest that for market practitioners, the line between rational and non-rational market behavior is quite variable, blurred, and of limited practical use. "I have a bit of a problem with saying what is rational and what is irrational," one trader admits, while another declares that, "The borderline between rationality and non-rationality is floating." Unlike traditional economic theory, traders stress the *subjective* aspects of what makes trading decisions rational or irrational. "I think there is no objective rationalism or irrationalism," in the words of one trader. "Irrational is not quite the word, I would rather say subjective. If you rather wear a black than a blue dress I do not think it is irrational!" These observations suggest a need to go beyond the abstract and theoretical notions of rationality and market efficiency, and to explore the subjective perspectives, preferences, and decisions of market participants. This inevitably leads to psychology; in the laconic words of one trader, "Psychology is not rationality!"

## TOWARD A MARKET PSYCHOLOGY

To move beyond the notions of rationality and market efficiency, it is not enough to merely look at such market outcomes as share prices in the stock

market or exchange rates in the foreign exchange market on a collective level. Instead, we need to explore the driving forces underlying trading decisions and build bridges between the experience and behavior of individuals and collective market results. Doing so not only contributes to the new paradigm of behavioral finance, but it also marks the advent of a new field within psychology: market psychology.

Why do we need a market psychology if there is behavioral finance?

(1) *Psychology offers an understanding of financial market processes which goes beyond cognitive aspects alone.* Of all fields of psychology, the subdiscipline of cognitive psychology has been most influential in behavioral finance, since it directly addresses such market-relevant topics as information-processing, decision-making, and problem-solving.<sup>65,66</sup> This dominant influence of cognitive psychology on behavioral finance can also be explained by the fact that behavioral finance has mostly been driven by economists. Similar to traditional economics, cognitive psychology is based on an implicit computer metaphor of the human mind. However, while cognitive psychology correctly emphasizes that people have only limited ability to process information,<sup>v</sup> additional vital insights into financial markets are offered by other psychological fields, such as social, personality, evolutionary, and developmental psychology.<sup>68–72</sup>

For example, economic approaches often overlook the fact that financial markets are social systems: a psychologically informed approach considers the group psychological dynamics that influence the link between market information and the behavior of market participants.<sup>73</sup> Social psychologists stress that such dynamics, like individuals' cognitive biases, are systematic and not random. As Chapter 2, "Psychology of Trading Decisions," and Chapter 5, "News and Rumors in the Foreign Exchange Market" will show, conformity and herding among investors may augment rather than reduce "irrationalities" on the collective market level, and feedback loops among decision makers result in strongly self-reinforcing patterns of perception and behavior.

Social psychology might also help to answer the question of whether the irrationalities of individual market participants neutralize each other on the collective level of the market. Social psychologists describe powerful phenomena in the problem-solving dynamics of groups, which influence the efficiency of their work and the results they produce. In so-called compensatory judgment tasks, the solution of the group integrates individual judgments to produce a result that reflects some theoretically correct value (e.g.,

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<sup>v</sup> For a more detailed comparison of the neoclassical economic and psychological approaches to decision making, see Anderson and Goldsmith.<sup>67</sup>

estimating the number of coins in a jar). Supposedly, the group's decision quality should increase with the number of group members because the errors of individual group members cancel each other out. For example, asking a group of investors to remember where the Dow Jones index stood on January 1, 2000 is likely to produce a better result than asking a single investor; the more investors are asked, the better the result should be. However, in practice, groups in such tasks suffer from considerable *process loss* (i.e., the quality of the group's judgment is not as good as it should be in theory, and after the group has reached a certain size, adding additional group members may even *decrease* group performance rather than increase it). How can this happen? In the social dynamics of groups, there is always a large number of factors unrelated to the ability and knowledge of individual group members (such as their social status, their rank in the organization, their verbal dominance) which influence the groups' decision-making and lead to distorted group results.<sup>74,75</sup>

(2) *Psychology provides insights into the connection between the subjective experience of market participants and objective market processes.* Psychology may lead to an understanding of market process which reflects the subjective experience and inner processes of participants. For instance, the analysis of market metaphors provides a key to understanding the experience of financial markets, for these metaphors make the abstraction of the market tangible to decision-makers on an experientially meaningful level. Moreover, far from being trivial and without consequences, these metaphors influence the way participants act, decide, and form predictions about the market (see Chapter 7, "Surfing the Market on Metaphors"). Psychology also explores the role of subjective attitudes in the expectations of market participants, thus moving beyond the hypothetical groups of rational "arbitrageurs" and irrational "noise" traders, or of purely "fundamental" and purely "technical" forecasting groups (see Chapter 4, "Expectations in the Foreign Exchange Market").

(3) *Psychology offers insights into the differences between market participants.* So far, the models of behavioral finance have paid only scant attention to individual differences between market participants. Market psychology may help fill this gap; one important application may lie in the traits and personal styles of participants. For example, examining the role of *personality* in trading decisions helps to determine whether trading performance is simply a manifestation of chance and of survivorship, or if there are psychological characteristics that systematically allow some participants to outperform others (see Chapter 6, "Personality Psychology of Traders").

From the perspective of market psychology, the economic focus on the notion of rationality needs to be questioned for a far-reaching reason:

placing the emphasis on rationality may obstruct the view of what actually happens in financial markets and keep observers from adequately perceiving and understanding so-called irrationalities. This limiting consequence of the rationality paradigm is captured perfectly by an episode described in Norse mythology. Woden, the wisdom god, once demanded to know of the king of the trolls how to vanquish the chaos that threatened to intrude middle earth. In exchange for his answer, the king of the trolls claimed Woden's left eye, which the wisdom god gave him without hesitation: "The secret is, you must watch with both eyes!"<sup>76</sup>, cited in <sup>77</sup>

How does the rationality paradigm blind market observers in one eye when, metaphorically speaking, they require both eyes? Taking rationality as the point of departure restricts our understanding of the actual dynamics of financial markets. Focusing on rationality usually implies the tacit assumption that rational market behavior is natural and that it, therefore, requires no explanation. This assumption greatly limits how we see the decisions and actions of human market participants: Psychology is considered important only when the decisions of participants or market behavior diverge from this assumed natural state.<sup>78</sup> Moreover, the focus on rationality often equates all market processes that do not conform to it (i.e., non-rationality) with anomaly, irrationality, and something negative.<sup>79</sup> When rationality is the paradigm, psychology is activated merely to supply secondary adjustments to economic theory and to explain phenomena construed as eccentric quirks in decision-making, evolutionary psychologists Leda Cosmides and John Tooby observe.<sup>80</sup>

Thus, to see with both eyes and to fully appreciate the role of psychology in the markets, a different perspective is needed. It is vitally important to recognize that the behavior of market participants which does not fulfill the economic criteria for rationality does not have to be "unreasoned." A case in point, Chapter 7, "Surfing the Market on Metaphors," shows that not one, but indeed different "rationalities" characterize how participants construe their decisions in the market. These rationalities are frame-dependent; in other words, they depend on participants' subjective understanding of what the market is about. Also, when market participants use psychological heuristics for their decision-making, they do not comply with the perfectly calculating Bayesian statisticians implied in rational models. Nevertheless, such heuristics represent systematic cognitive processes, and their use generally leads to fairly good predictions. Thus, economic rationality is not required for explanation and for prediction; many psychological theories do *not* depend on rationality assumptions and accurately explain human behavior. Likewise, the behavior of foreign exchange market participants who do not act rationally (in the

traditional economic definition) can also be explained;<sup>25</sup> basing our approach to the analysis of financial markets on psychological dynamics does not make them unexplainable or subject to random predictions.<sup>81</sup> On the contrary, psychology promises to offer more adequate, more differentiated, and less judgmental vantage points for understanding financial markets *the way they are experienced and enacted by human participants*.

Such an understanding of the markets not only explains better how decisions in the markets are actually formed, but psychology may also pay off financially.<sup>82</sup> Thus, the following point, by one of the traders in the interviews, is key both to researchers and practitioners in the foreign exchange market. “The question is,” he inquired rhetorically, “Can [you] adjust yourself, your thinking, in the same way as the market?”

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See the reference chapter at the end of the book for full details.

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