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Imagery, Affect, and Financial Judgment

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Traditional theories of finance posit that the pricing of securities in financial markets should be done according to the quality of their underlying technical fundamentals. However, research on financial markets has tended to indicate that factors other than technical fundamentals are often used by market participants to gauge the value of securities. This phenomenon may be quite prevalent in markets for initial public offerings (IPOs), where securities lack a financial history. The imagery and affect associated with securities can be a powerful basis upon which to judge their worth.

Advanced business students in a securities analysis course were asked to evaluate a number of industry groups represented on the New York Stock Exchange in terms of a set of judgmental variables. After providing imagery and affective evaluations for each industry group, the participants judged the likelihood that they would invest in companies associated with each industry. Imagery and affective ratings were highly correlated with one another and with the likelihood of investing. Judgments of performance correlated poorly to moderately with actual market performance as measured by weighted average returns for the industry groups studied. The results suggest that imagery and affect are part of a coherent psychological framework for evaluating classes of securities, but that framework may have low validity for predicting performance.

Research on financial markets has found that, in general, investors' reactions to market information are too extreme given the actual predictive value of that information (e.g., Dreman [1982]; Dreman and Berry [1995a, 1995b]). For example, research on earnings forecasts of traded companies has found that earnings predictions are generally too extreme; typically, high forecasts are not met, and low forecasts are exceeded. This has led investigators to conclude that stocks with high P/E ratios, which indicates an optimistic earnings forecast, have market prices too high for the predictive value of the forecast. Alternatively, stocks with relatively low P/E ratios have undercapitalized the value of earnings forecasts in their market prices.

Investors' errors in using earnings predictions appear to result, in part, from judgmental strategies that fail to sufficiently regress earnings forecasts for individual stocks to the overall performance of the market (e.g., Thaler [1993]). These findings are supported by psychological research that suggests the accuracy of judgmental forecasts is influenced by cognitive biases that arise when the processing of complex information is simplified (e.g., Tversky and Kahneman [1984]). Even when warned about the existence of such biases, forecasters often appear unable to compensate for their effects (Fischhoff [1982]).

One of the most fundamental psychological processes that people use to comprehend their world is affective evaluation (Damasio [1994]; Zajonc [1980]). Affect can be viewed as a quality assigned to a stimulus or object, such as a company or an investment opportunity. Typically, affective evaluations are of the form good versus bad, attractive versus unattractive, or pleasant versus unpleasant. In essence, affective evaluations vary along a bipolar dimension of positive versus negative impressions. Because they are a fundamental component of human information processing, affective evaluations can contribute significantly to other judgments about the same stimulus object.

For example, a stock offering with a highly positive affective evaluation is likely to be seen as good in terms of a number of other specific attributes, such as the quality of its management or its prospects for long-term financial success. However, the basis for the affective evaluation may not be related to management quality or financial goodness, but rather to the association of the company with the exciting or glamorous qualities of its business sector. Indeed, the image of the company may play a potent role in its affective evaluation, thereby resulting in a discounting of other information that should be incorporated into a judgment of its overall quality or worth. For new companies, such

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Table 1. *Images, Ratings, and Summation Scores for Respondent 132*

	San Diego		Denver		Las Vegas		Los Angeles	
Image No.	Image	Rating	Image	Rating	Image	Rating	Image	Rating
1	Very Nice	2	High	2	Rowdy Town	−2	Smoggy	−2
2	Good Beaches	2	Crowded	0	Busy Town	−1	Crowded	−2
3	Zoo	2	Cool	2	Casinos	−1	Dirty	−2
4	Busy Freeway	1	Pretty	1	Bright Lights	−1	Foggy	−1
5	Easy to Find Way	1	Busy Airport	−2	Too Much Gambling	−2	Sunny	0
6	Pretty Town	2	Busy Streets	−2	Out of the Way	0	Drug Place	−2
Total Score		10		1		−7		−9

Note: Based on these summation scores, this person's predicted preference order for a vacation site would be: San Diego, Denver, Las Vegas, and Los Angeles. Reprinted from "Perceived Risk, Stigma, and Potential Economic Impacts of a High-Level Nuclear Waste Repository in Nevada," by P. Slovic, M. Layman, N. Kraus, J. Flynn, J. Chalmers, and G. Gesell, 1991, *Risk Analysis,* 11, pp. 683–696. Copyright 1991 Society for Risk Analysis. Reprinted with permission.

as those involved in initial public offerings (IPOs) that often have a very limited track record, the image of the company and its affective evaluation may be the major basis on which potential investors make investment decisions.

Measurement of Imagery and Affect

One of the basic approaches for measuring affect relies on the method of images or word associations. Word association techniques are strongly rooted in the history of psychology and are capable of revealing the cognitive and affective elements of images people hold about complex stimuli. The method involves presenting subjects with a target stimulus, usually a word or very brief phrase, and asking them to provide the first thought or image that comes to mind. The process is then repeated a number of times, say, three to six, or until no further associates are generated. Subjects are then asked to rate each image on a scale ranging from very positive (e.g., +2) to very negative (e.g., −2), with a neutral point in the center. Scoring is done by summing or averaging the ratings to obtain an overall imagery index (Slovic et al. [1991]).

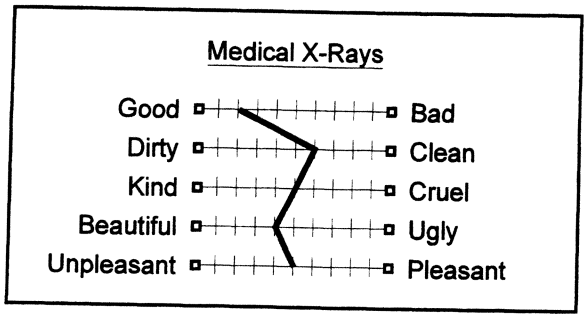
An example of this technique is shown in Table 1. The data in Table 1 are from a study in which images were used to measure the affective meanings that influence people's preferences for different cities and states. The ratings in Table 1 are for a single individual who responded to four different cities, giving six images for each. These images were subsequently rated by the same individual and summed to give an overall image score. For this particular individual, the imagery was strongly positive for San Diego, but negative for Los Angeles. Based on these summation scores, this person's predicted preference order for a vacation site would be: San Diego, Denver, Las Vegas, and Los Angeles. Indeed, image ratings such as these have been shown to be predictive of people's ultimate vacation choices (Slovic et al. [1991]).

A second measurement approach is derived from the semantic differential, a well-known psychological technique developed by Osgood to assess meaning (see Osgood, Suci, and Tannenbaum [1957]). In this approach, the subject provides ratings of stimuli on a set of bipolar adjective scales. An example is shown in Figure 1. Here a technology, in this case medical X-rays, is rated on five different semantic differential scales measuring affect. Each scale is comprised of a positive-negative adjective pair. The ratings for each scale can be analyzed and studied separately, or the ratings can be averaged or summed to obtain an overall affective score.

The two approaches to measuring affect differ in the amount of structure provided to the respondent. In the case of word associations, relatively little structure is given, with the advantage that respondents are free to express images in their own natural language terms. The disadvantage of this approach is that the content of the imagery may not be equivalent across respondents. The more structured approach offered by semantic differential scales overcomes this difficulty, but at the expense of constraining respondents' expression of affect to the scales provided.

In this study we used both measurement paradigms, word associations and semantic differential scales. These techniques were used to assess affect and imagery for a set of financial stimuli in the con-

FIGURE 1
Example of Semantic Differential Scales



text of investment judgment and decision-making. The study used informed but inexperienced research subjects, no information about specific securities, and name-only descriptions of industry groups. Under these conditions, we predicted that affect and imagery were likely to have a powerful effect on judgments about the performance and quality of securities.

Study Design and Stimulus Materials

We tested the hypothesis that affect can play a significant role in financial forecasting by studying the responses of a group of fifty-seven university-age business students enrolled in an upper division investment banking course at James Madison University in Harrisonburg, Virginia. The students were asked to produce images and image ratings and to make various other judgments for twenty different industry groups characterized by name only (e.g., computer software, pharmaceuticals, railroads, managed healthcare). The groups were based on company data provided by S&P Compustat and furnished through FactSet for firms traded domestically on the New York Stock Exchange, the American Stock Exchange, and Nasdaq. These firms were then subdivided according to their FactSet industry classification.

Altogether, forty different industry groups were used, divided into two sets of twenty. Approximately half the subjects received one set, and half received the other. The industry groups were selected on the basis of average price returns of stocks within each group for the period January 1, 1994, through December 31, 1994. Half the industry groups were particularly high performers (e.g., > 20% return) , and the other half were particularly low performers (e.g., < 13% return). Therefore, of the twenty industry groups assessed by each subject, ten were high performers and ten were low performers based on the past year's price returns. The study was conducted on May 8, 1995, which provided an opportunity for subjects to judge industry group performance for the previous year (1994), as well as expected performance for the current year (1995).

The task was divided into two parts. First, subjects were given a booklet with one industry group appearing at the top of each page (e.g., *Photographic Products*). Below the name of each industry group, space was provided to write the first three images that came to mind. Subjects were given the following instructions for this part of the task (emphasis in original):

> On each of the following pages of this booklet is the name of a different industry group printed at the top in bold letters. We want to know the *images and associations* that you have for each group. For example, if someone mentions the word *baseball,* you might think of the *World Series, Reggie Jackson, labor disputes, summertime,* or even *hot dogs.* We are interested in the first three thoughts or images that come to mind when you think about a particular industry group. Look at the name of the group and write the **first** thought or image that comes to mind in the space provided. Then, look back at the name of the group and give us the **second** thought or image that comes to mind. Look back at the name of the group again and write down your **third** thought or image. Don't spend too much time trying to come up with a thought or an image. We want your initial reactions. If you can't come up with a second or third thought or image, go on to the next industry group. Work through all of the pages in this section of the booklet in the order given.

Subjects then rated each image on the following scale:

Highly Negative	Somewhat Negative	Neutral	Somewhat Positive	Highly Positive
–2	–1	0	+1	+2

In the second part of the task, subjects received another booklet that contained the same twenty industry groups with one per page as before. For each industry group, subjects made affective ratings on the semantic differential dimensions shown in Table 2.

In addition, subjects indicated for each group their familiarity with companies in the group, and whether a significant company in that group came to mind. Finally, subjects judged each industry group on three performance criteria: 1) returns of the group in the past year relative to the market (Judge 1994); 2) predicted returns relative to the market for the coming year (Judge 1995); and 3) the likelihood that they would buy an IPO of a company belonging to the group (Buy IPO). Table 3 contains the complete wording of each scale along with its response format.

Table 2. *Scales for Semantic Differential Ratings*

Bad	1	2	3	4	5	6	7	Good	*(Bad/Good)*
Boring	1	2	3	4	5	6	7	Exciting	*(Exciting)*
Worthless	1	2	3	4	5	6	7	Valuable	*(Valuable)*
Strong	1	2	3	4	5	6	7	Weak	*(Strong)*
Passive	1	2	3	4	5	6	7	Active	*(Active)*
Not Risky	1	2	3	4	5	6	7	Highly Risky	*(Risky)*

Note: Labels in parentheses are scale descriptors used in subsequent analyses.

Table 3. *Scales Used to Evaluate Industry Groups*

How familiar are you with companies in this group? ***(Famil.)***

Not Familiar	Slightly Familiar	Somewhat Familiar	Very Familiar
1	2	3	4

Does one or perhaps two significant company(ies) come to mind when you think of this industry group? ***(Think Co.)***

Yes	No

Compared to the market average for all stocks traded on the New York Stock Exchange, how well do you think stocks in this industry group did *last* year (1994)? ***(Judge 1994)***

Well Below Market Average	Below Market Average	At Market Average	Above Market Average	Well Above Market Average
1	2	3	4	5

Compared to the market average for stocks traded on the New York Stock Exchange, how well do you think stocks in this industry group will do *this* year? ***(Judge 1995)***

Well Below Market Average	Below Market Average	At Market Average	Above Market Average	Well Above Market Average
1	2	3	4	5

If you were considering buying stocks in new companies, how likely would you be to buy shares of a new company that belonged to this industry group? ***(Buy IPO)***

Very Unlikely	Somewhat Unlikely	Somewhat Likely	Very Likely
1	2	3	4

Note: Identifiers in bold italics correspond to variable names in the analysis of data.

Results

Table 4 shows the ordered means for the top ten and bottom ten industry groups on the three judgmental scales (Judge 1994, Judge 1995, and Buy IPO), two measures of imagery, and weighted average returns[1] by industry group for 1994 and 1995. Table 5 shows the intercorrelations between the three summary measures of financial return. The correlation coefficients shown in Table 5 were calculated across the forty industry groups studied. The intercorrelations between the three summary measures were moderate, with the highest correlation between the simple average and the median price return for stocks within a group.

Based on the ratings of the word associations, the industry group with the most positive image is *Recreational Products* ($\bar{X}$ = 1.45), followed by *Generic Drugs* ($\bar{X}$ = 1.27) and *Major Pharmaceuticals* ($\bar{X}$ = 1.19). However, image ratings overall tended to be positive; the average image rating across all forty groups is +0.56 out of a possible range of –2.0 to +2.0. Only four of the forty groups received negative imagery ratings: *Military Electronics, Savings and Loans, Managed Healthcare,* and *Tobacco.*

On the three judgmental measures, however, a somewhat different picture emerged. The industry group judged to be the best performer across all three judgmental measures is *Computer Software* (see Table 4). This is followed by *Cellular Telephones* for Judge 1994 and Judge 1995. Subjects indicated they were *most likely* to buy shares of an IPO from new companies in *Computer Software, Major Pharmaceuticals,* and *Cellular Telephones,* and *least likely* to buy from *Military Electronics, Savings and Loans,* and *Railroads.*

Correlation coefficients involving judgmental measures were calculated using the mean response across subjects for each of the forty industry groups. Overall, the three judgmental measures were highly correlated, as shown in Table 6. Likelihood of IPO purchase was most highly correlated (r = 0.81) with judged performance in the coming year (1995).

Respondent judgments of financial performance were, in general, only modestly correlated with the actual market performance of the forty groups. The relatively high level of internal consistency apparent in the performance judgments of these respondents did not translate into an equivalent ability to predict actual market returns.

The values shown in Table 6 are standard correlation coefficients, which are measures of association and provide an indication of the degree to which variance in a set of data comprised of two (or more) variables is shared. Interpreting the meaning of the size of a correlation coefficient can be difficult, however. A common practice is to square the coefficient to obtain an indication of the strength of association, which is generally expressed as a percentage of shared variance. By this method, the correlations between judged performance and actual performance are modest.

For example, the 0.39 correlation between Judge 1994 and the weighted average returns for 1994 (see Table 6) indicate that approximately 15.2% of the

Table 4. *Ordered Means of Ten Highest and Ten Lowest Industry Groups on Key Judgmental and Market Performance Variables*

Judge 1994		Judge 1995		Buy IPO		Image Rating		Bad/Good		Market Returns: 1994 Weighted Average (%)		Market Returns: 1995 Weighted Average (%)	
SOFT	4.14	SOFT	4.07	SOFT	3.43	RECREAT	1.45	SOFT	6.43	MEDICAL	41.91	BIOTECH	90.72
CELLPH	3.71	CELLPH	3.93	PHARM	3.09	GDRUGS	1.27	ELECTRON	6.08	SOFT	30.79	AIRLINE	66.08
DATA	3.70	PHARM	3.73	CELLPH	3.00	PHARM	1.19	GDRUGS	6.08	ALUM	21.62	AEROSPAC	64.69
DISCOUNT	3.67	RECREAT	3.71	FOOD	2.85	BOOKS	1.12	RECREAT	6.00	SEMICOND	21.47	SEMICOND	60.29
ELECTRON	3.65	DATA	3.70	RECREAT	2.79	PHOTO	1.08	CELLPH	6.00	ALCOHOL	14.54	EKECTRON	58.14
GDRUGS	3.58	ELECTRON	3.62	ALCOHOL	2.79	ALCOHOL	1.04	MOVIES	5.89	DATA	14.29	PHARM	56.05
RECREAT	3.57	CONSUM	3.57	CLOTH	2.73	CONSUM	1.00	BOOKS	5.81	METALS	13.87	S&L	52.48
CONSUM	3.57	ALCOHOL	3.54	OFFICE	2.71	ELECTRON	0.99	MEAT	5.62	MEAT	12.77	TOBACCO	52.01
NURSING	3.50	MOVIES	3.54	ELECTRON	2.69	MOVIES	0.99	NURSING	5.62	PHARM	12.10	SOFT	47.21
ALCOHOL	3.46	FOOD	3.54	OIL	2.68	CLOTH	0.95	AEROSPAC	5.58	HEALTH	10.92	MILITARY	45.04
*		*		*		*		*		*		*	
*		*		*		*		*		*		*	
MARINE	3.00	ADVER	3.15	AEROSPAC	2.12	BIOTECH	0.30	PAPER	4.63	REAL	–12.10	MARINE	17.46
ALUM	3.00	ALUM	3.15	BLDG	2.08	AIRLINE	0.26	RAILROAD	4.63	BIOTECH	–13.51	REAL	14.58
DRUGST	2.96	TOBACCO	3.13	ALUM	2.00	BLDG	0.21	MEDICAL	4.62	GDRUGS	–13.94	PAPER	12.25
CLOTH	2.87	MARINE	3.07	MARINE	2.00	OIL	0.17	BLDG	4.62	FOOD	–15.44	RECREAT	12.13
PAPER	2.81	HEALTH	3.04	PAPER	1.89	RAILROAD	0.16	MILITARY	4.50	CLOTH	–15.67	METALS	10.94
BLDG	2.75	DRUGST	2.96	HEALTH	1.88	MEDICAL	0.10	AIRLINE	4.43	DISCOUNT	–15.78	HOTEL	10.86
RAILROAD	2.74	BLDG	2.92	DRUGST	1.85	MILITARY	–0.05	CASINO	4.33	RAILROAD	–17.23	CELLPH	2.54
AIRLINE	2.71	PAPER	2.88	MILITARY	1.64	S&L	–0.29	HEALTH	3.92	AIRLINE	–25.43	CLOTH	2.36
MILITARY	2.69	S&L	2.69	S&L	1.62	HEALTH	–0.64	S&L	3.60	BLDG	–25.77	CONSUM	1.88
S&L	2.00	RAILROAD	2.65	RAILROAD	1.50	TOBACCO	–1.05	TOBACCO	2.73	CASINO	–31.79	DISCOUNT	1.84

Legend:

ADVER = Advertising
AEROSPAC = Aerospace
AIR_FR = Air freight
AIRLINE = Airlines
ALCOHOL = Alcoholic beverages
ALUM = Aluminum
BIOTECH = Biotechnology
BLDG = Building products
BOOKS = Books and magazines
CASINO = Casino operators
CELLPH = Cellular telephones
CLOTH = Clothing and shoe chains
CONSUM = Consumer electrical products
DATA = Electronic data processing peripherals
DISCOUNT = Discount chain stores
DRUGST = Drugstore chains
ELECTRON = Electronic products
FOOD = Food distributors
GDRUGS = Generic drugs
HEALTH = Managed healthcare
MARINE = Marine transport
MEAT = Meat, poultry, and fish
MEDICAL = Medical/dental distributors
METALS = Metals and minerals
MILITARY = Military electronics
MOVIES = Movies and entertainment
NURSING = Nursing and medical services
OFFICE = Office equipment
OIL = Oil and gas production
PAPER = Paper
PHARM = Major pharmaceuticals
PHOTO = Photographic products
RAILROAD = Railroads
REAL = Real estate
RECREAT = Recreational products
S&L = Savings and loan associations
SEMICOND = Semiconductors
SOFT = Computer software
TOBACCO = Tobacco

Table 5. *Intercorrelations Between Three Measures of Financial Performance (1994 Market Year)*

	Weighted Average	Median Return
Simple Average	0.58	0.68
Weighted Average	—	0.64

variance is held in common. The problem with this interpretation of a correlation coefficient is that it fails to account for impact. In the case where even relatively minor variance in a predicted variable carries with it, for example, significant economic value, a small correlation can be of enormous practical importance (e.g., Rosenthal and Rubin [1982]).

Semantic Differential Ratings

Table 7 shows the intercorrelations of the six semantic differential scales used to assess affect, as well as their correlation with average image ratings for each industry group (Imagery) and a dichotomous variable representing whether respondents could think of a company belonging to each of the industry groups (Think Co.).

The table reveals a mixed pattern of intercorrelations. The Bad/Good scale correlated moderately well with Exciting, Valuable, and Strong, but relatively poorly with Active and Risky. Indeed, the Risky scale tended to have quite low correlations with the remaining five semantic differential scales, suggesting that it is a somewhat distinct measure.

Correlations of the six semantic differential scales with imagery ratings varied greatly, from a high of 0.83 (with Bad/Good) to a low of 0.15 (with Active). Imagery correlated quite poorly with whether a significant company came to mind, suggesting it is not simply a result of the association of an industry group with a particular company. Indeed, memorable association of a company with industry groups, as reflected in the measure Think Co., correlated rather marginally with all the affective variables, again suggesting that affect and imagery go beyond mere salience in memory.

Predicting Judgments of Financial Performance

Table 8 shows the results of three stepwise multiple regressions, predicting each of the three judgmental performance scales from the set of image and affect scales.

Table 6. *Intercorrelations Between Three Judgmental and Three Actual Measures of Financial Performance*

			1994			1995		
	Judge 1995	Buy IPO	Simple Average	Weighted Average	Median Return	Simple Average	Weighted Average	Median Return
Judge 1994	0.78	0.74	0.42	0.39	0.28	0.20	–0.05	0.04
Judge 1995	—	0.81	0.29	0.22	0.11	0.28	–0.01	0.09
Buy IPO		—	0.24	0.23	0.09	0.25	–0.04	0.09

Table 7. *Intercorrelation Coefficients for Six Semantic Differential Scales*

	Exciting	Valuable	Strong	Active	Risky	Imagery	Think Co.
Bad/Good	0.52	0.78	–0.63	0.28	–0.23	0.83	–0.20
Exciting	—	0.33	–0.51	0.77	0.36	0.43	–0.33
Valuable		—	–0.62	0.32	0.02	0.50	0.04
Strong			—	–0.67	0.02	–0.49	0.38
Active				—	0.45	0.15	–0.33
Risky					—	–0.30	0.04
Imagery							–0.28

Table 8. *Summary of Stepwise Regression Analyses Predicting Judged Financial Performance from Affect and Imagery Measures, with Imagery Ratings Forced into the Regression First*

	Judge 1994	Judge 1995	Buy IPO
Imagery (forced)	0.44	0.49	0.56
Strong	0.60	0.71	0.64
Bad/Good	0.21		
Valuable	0.27		
Familiarity		0.18	0.28
Overall R^2	0.68	0.78	0.80

Note: Table entries are partial correlations ($p < 0.05$), followed by the multiple R^2 value for each judgmental variable.

In all three cases, the imagery variable was forced into the multiple regression first, and the remaining variables were allowed to enter according to the usual stepwise rule. The simple correlations of image ratings with the three judgmental variables were moderately high.

All three judgmental variables were highly predictable from a combination of imagery and affective ratings. The multiple R^2 values ranged from a low of 0.68 for Judge 1994, to a high of 0.80 for Buy IPO. Once again, the results reveal a high level of internal consistency in subjects' judgmental frameworks, with judgments of financial performance of industry groups strongly related to a combination of the strength of imagery associated with the various industry groups as well as affective evaluations based on semantic differential ratings.

Discussion

The results of the study were somewhat mixed. The judgmental framework applied by the respondents to the tasks they performed exhibited a high degree of internal coherence. Imagery scores and affective ratings of industry groups correlated nicely with predictions and expectations of financial performance, including willingness to purchase shares of an initial public offering for a stated industry group. Affect and imagery appear to have a strong influence on judgments of the quality of financial stimuli, particularly under conditions where specific, individuating information about a particularly company or firm is absent. Indeed, under conditions of very general and somewhat vague information about a financial offering (i.e., industry groups), imagery and affect may very well be the only judgmental basis on which individuals are able to rely.

Correlations between judged and actual performance for the 1994 market year were moderately high ($r = 0.39$). Of course, subjects performed their task at the end of the year and were judging past rather than future performance, and they could be expected to have some awareness of market trends for the preceding year. Correlations between judged future and actual performance for the 1995 market year were considerably lower ($r = -0.01$). The results suggest that images of the market may bear a moderate relationship to what has actually occurred in the market, but may prove a relatively poor basis for judgment when applied to prospective judgments.

It remains to be shown how the power of imagery and affect are influenced as the information environment for judging financial performance becomes richer. Although it may be tempting to predict that solid, concrete information about a financial offering will significantly dilute the role that affect and imagery play in judgments of financial performance, alternative predictions can be made as well. For example, as the sheer quantity of information becomes larger, human judgment tends to become more reliant on simplifying rules or heuristics that either take advantage of only partial information or process information in incomplete ways. One can easily imagine circumstances in which the evaluation of a financial prospect takes place in an environment of both highly dense and conflicting information. In these circumstances, the complexity of the task may drive the respondent to weigh affective cues more heavily than technical indicators. For a demonstration of this in judgments about the risks and benefits of a variety of activities and technologies, see Finucane et al. [2000].

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Note

1. Computation of the weighted average was done by weighting the returns of individual companies within each industry group by their number of shares.

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