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John A. Doukas
Old Dominion University, jdoukas@odu.edu

Chansog Francis Kim

Christos Pantzalis

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Divergent Opinions and the Performance of Value Stocks

John A. Doukas, Chansog (Francis) Kim, and Christos Pantzalis

Divergence of opinions among investors, manifested in the dispersion of analysts' earnings forecasts, may play an important role in asset pricing. This article reports tests of whether disagreement can explain the cross-sectional return difference between value and growth (or "glamour") stocks in the U.S. market over the 1983–2001 period. Consistent with the theoretical proposition that stocks subject to greater investor disagreement earn higher returns, the tests found value stocks to be exposed to greater investor disagreement than growth stocks. This finding suggests that the return advantage of value strategies is a reward for the greater disagreement about their future growth in earnings. Alternative multifactor asset-pricing tests supported the proposition that investor disagreement plays an important role in explaining the superior return of value stocks.

Investment strategies that call for the purchase (sale) of stocks with low (high) prices relative to dividends, earnings, book value, or other measures of value have been popular in the U.S. market since Graham and Dodd (1934). Nevertheless, the fact that value stocks (those with high book-to-market ratios) earn higher returns than growth (or "glamour") stocks (those with low book-to-market ratios) remains a puzzle in asset pricing. The exact interpretation of this "value premium" is one of the issues in the ongoing debate between those who advocate rational asset pricing and proponents of behavioral finance.

Supporters of the rational explanation (e.g., Fama and French 1993) argue that the value premium is compensation for bearing risk; value stocks are fundamentally riskier. Lakonishok, Shleifer, and Vishny (1994) claimed, however, that value stocks produce superior returns because investors consistently overestimate the future earnings of growth stocks relative to value stocks.[1] The essence of this argument is that investors, tying their expectations of future growth in earnings to past bad (or good) earnings, are excessively pessimistic (optimistic) about value (growth) stocks. That is, investors make systematic errors in predicting future growth in earnings of value stocks and their pessimism about the future for value stocks is the cause of the superior performance of value stocks relative to growth stocks. Subsequent studies that provided evidence in favor of this behavioral explanation of the value premium include La Porta (1996) and La Porta, Lakonishok, Shleifer, and Vishny (1997). (The non-risk-based explanation is also known as the "extrapolation" or "errors-in-expectations" explanation.)

Recently, Doukas, Kim, and Pantzalis (2002), using U.S. analyst earnings forecasts as a proxy for the market's expectations of future earnings, provided evidence against the errors-in-expectations view. Therefore, the abnormal return of value stocks on earnings announcement days found by La Porta et al. must be caused by some mechanism other than the surprise in the level of earnings.[2] We suggest that disagreement among investors is such a mechanism and focus our article on this possibility.

Proponents of the rational explanation of the value premium argue that value stocks are fundamentally riskier than growth stocks, which implies that the higher average returns of stocks with high book-to-market ratios reflect compensation for risk. These proponents reject differences of opinion as a possible source of risk.

John A. Doukas is professor of finance and Eminent Scholar at the Graduate School of Business, Old Dominion University, Norfolk, Virginia. Chansog (Francis) Kim is associate professor of accounting at the City University of Hong Kong. Christos Pantzalis is associate professor of finance at the University of South Florida, Tampa.

Editor's Note: This research was conducted when John Doukas was a visiting professor at the Stern School of Business, New York University.

Disagreement among investors is widely recognized, however, as a potential determinant of asset prices.[3] In a standard capital asset pricing model (CAPM) framework, Williams (1977) introduced heterogeneous beliefs about future stock payoffs among investors and found a positive association between future stock returns and differences of opinion.[4] In this framework, not all investors possess completely accurate probability beliefs; heterogeneous expectations among investors matter in asset pricing because the opportunity set is partially unknown.[5] Thus, the degree of difficulty investors face in accurately assessing the probability distribution of stock return payoffs should have important pricing implications.[6] Specifically, when investors are uncertain about the true probability structure of stock return payoffs, they tend to hold *different* subjective opinions about the future payoffs. When the future prospects of stocks are highly uncertain and beliefs diverge, investors will demand high rates of return in order to invest.[7]

In an alternative framework, higher returns for stocks exposed to greater disagreement among investors arise because in imperfect capital markets, capital market equilibrium requires the simultaneous determination of asset prices and of the identity of investors (that is, investors' opinions) trading in each asset.[8] Dispersion of opinion, then, potentially represents a unique source of risk, and its impact on prices should be compounded by the degree of disagreement.

To examine whether the superior performance of value stocks is associated with investors' disagreement about future payoffs, we used the dispersion in analysts' earnings forecasts as a proxy for investors' heterogeneous beliefs. We hypothesized that value (growth) stocks have greater (lower) exposure to dispersion in analysts' forecasts and thus should earn a higher (lower) return.

Sample Selection

We used information on analysts' forecasts from I/B/E/S files—the U.S. Summary History and Detail History datasets. The Summary History File contains the summary statistics on analyst forecasts, which I/B/E/S calculates on the basis of all outstanding forecasts as of the third Thursday of each month. The Detail History File contains individual analysts' forecasts organized by the date on which the forecast was issued. Each record also contains a revision date (i.e., the date on which the forecast was last confirmed as recent).[9] We used (1) analysts' forecasts issued in June and (2) analysts' forecasts issued in May or April and last confirmed as recent in June. For example, if the forecast was made in April or May and was last confirmed as recent in June, we used it in our computation of averages and standard deviations for June. If an analyst made more than one forecast in a given period, we used only the last forecast in our calculations.

To be included in the study, each stock had to be covered by at least two analysts because we defined dispersion as the standard deviation of earnings forecasts scaled by the stock price at the beginning of the year. All forecasts for diluted EPS were converted into primary EPS by using adjusting factors listed in the I/B/E/S database.

The return data are from the CRSP Monthly Stocks Combined File, which includes NYSE, Amex, and NASDAQ stocks. We used book equity for the fiscal year-end, for which book values came from Compustat. For the company size data, we retrieved the market value of equity as of the end of June of each year from CRSP.

We followed the Fama and French (1993, 1996) procedure in constructing portfolios based on book value to market value (BV/MV) and size. Annual portfolios based on dispersion of analyst forecast rankings were constructed by using the information from I/B/E/S as indicated previously. Reported portfolio returns are average monthly equal-weighted portfolio returns computed for the annual period starting in the beginning of July of year t and ending at the end of June of year $t + 1$.

The study covers the period June 1983 through December 2001. The starting point for the study was determined by the beginning date for data in the I/B/E/S Detail History File, 1983. The intersection of the three datasets (I/B/E/S, CRSP, and Compustat) resulted in a sample of 35,719 company-year observations.

Empirical Results

We begin with a description of our findings concerning the relationship between investor disagreement and the value premium and between investor disagreement and the size premium. We then report the results of robustness tests of these findings.

Dispersion of Forecasts and Equity Risk. To examine whether the value premium is a manifestation of investor disagreement, we used the dispersion of analysts' earnings forecasts (DISP) to capture investors' divergence of opinion about the future prospects of companies. DISP was calculated as the standard deviation of the one-year-ahead earnings forecast identified as being current (i.e., nonstale) as of June each year, standardized by the stock price per share at the beginning of the year.[10] In the context of our analysis, if investors have greater difficulty assessing the probability distribution of future payoffs of value stocks than growth stocks, value stocks should be subject to greater earnings forecast dispersion than growth stocks.[11]

Table 1 provides the answer to whether the median values of analysts' forecast dispersion change with portfolios sorted on BV/MV and size. The table reports the mean and median values of dispersion in analysts' earnings forecasts for portfolios formed after classifying stocks into 1 of 25 portfolios on the basis of the stocks' BV/MV and size quintiles. The mean value of forecast dispersion among analysts is highest (0.0326) for the highest-BV/MV–smallest-size portfolio; the corresponding mean for the lowest-BV/MV–biggest-size portfolio is the lowest (0.0024). Consistent with the view that small-capitalization and high-BV/MV stocks are subject to more heterogeneous beliefs among investors than large-cap and low-BV/MV stocks, dispersion in analysts' earnings forecasts decreases as size increases and tends to increase as BV/MV increases.

Tests of the mean and median differences for the extreme portfolios (Quintiles 1 and 5) sorted on BV/MV and size show significantly higher investor disagreement, measured by the dispersion of analysts' forecasts, to be present in high-BV/MV and small-cap stocks. These findings suggest that the value and small-cap return patterns that have been observed in the U.S. market may be associated with an investor disagreement premium that is not accounted for in conventional CAPMs.

Table 2 provides the mean and median values of DISP for portfolios formed after sorting company-year observations independently on BV/MV, size, and number of analysts following the stock (NAF). This test was carried out to ensure that the results reported in Table 1 were not driven by the extent of analyst coverage. High-BV/MV portfolios display significantly larger dispersion than low-BV/MV portfolios even after controlling for the size and analyst coverage effects.

Overall, the evidence is strongly in favor of the view that investors perceive small-cap and high-BV/MV stocks to be exposed to greater disagreement among analysts than large-cap and low-BV/MV stocks. Because small-cap and value stocks are often associated with higher returns, our findings also suggest that disagreement about a stock's future prospects is of concern to investors. This concept is addressed in the next section by an examination of whether investor disagreement enters the return-generating process.

Table 1. Dispersion of Analyst Forecasts for Portfolios of Companies Sorted Independently on Size and BV/MV, 1983–2001 Data
(medians in brackets)

	Size Quintile						
BV/MV Quintile	Q1 (small)	Q2	Q3	Q4	Q5 (big)	All Companies	Q5 – Q1
Q1 (low)	0.0125 [0.0042]	0.0059 [0.0026]	0.0049 [0.0019]	0.0037 [0.0017]	0.0024 [0.0012]	0.0055 [0.0019]	–0.0101** [–0.0030]**
Q2	0.0115 [0.0048]	0.0073 [0.0034]	0.0059 [0.0031]	0.0054 [0.0026]	0.0044 [0.0026]	0.0069 [0.0031]	–0.0071** [–0.0022]**
Q3	0.0137 [0.0051]	0.0100 [0.0044]	0.0071 [0.0038]	0.0072 [0.0036]	0.0060 [0.0040]	0.0088 [0.0041]	–0.0077** [–0.0011]**
Q4	0.0180 [0.0065]	0.0101 [0.0048]	0.0076 [0.0043]	0.0081 [0.0045]	0.0077 [0.0046]	0.0104 [0.0048]	–0.0103** [–0.0019]**
Q5 (high)	0.0326 [0.0097]	0.0212 [0.0087]	0.0184 [0.0081]	0.0150 [0.0071]	0.0092 [0.0052]	0.0219 [0.0080]	–0.0234** [–0.0045]**
All companies	0.0178 [0.0057]	0.0097 [0.0039]	0.0073 [0.0032]	0.0067 [0.0029]	0.0049 [0.0025]	0.0093 [0.0034]	–0.0129** [–0.0032]**
Q5 – Q1	0.0201** [0.0055]**	0.0153** [0.0061]**	0.0135** [0.0062]**	0.0113** [0.0054]**	0.0068** [0.0040]**	0.0164** [0.0061]**	

Note: The last column and bottom rows report mean (median) differences between extreme portfolios and their significance levels from the corresponding *t*-statistics and Wilcoxon rank-sum tests.

*Significant at the 5 percent level.
**Significant at the 1 percent level.

Table 2. Dispersion of Analyst Forecasts for Portfolios of Companies Sorted Independently on Size, BV/MV, and Analyst Following, 1983–2001 Data
(medians in brackets)

	Small			Medium			Big		
BV/MV	Low NAF	Medium NAF	High NAF	Low NAF	Medium NAF	High NAF	Low NAF	Medium NAF	High NAF
Low	0.0110	0.0085	0.0119	0.0044	0.0048	0.0059	0.0025	0.0031	0.0032
	[0.0032]	[0.0038]	[0.0037]	[0.0013]	[0.0021]	[0.0029]	[0.0008]	[0.0012]	[0.0017]
Medium	0.0139	0.0125	0.0131	0.0054	0.0069	0.0096	0.0027	0.0044	0.0068
	[0.0041]	[0.0053]	[0.0071]	[0.0020]	[0.0036]	[0.0059]	[0.0011]	[0.0025]	[0.0042]
High	0.0241	0.0266	0.0281	0.0083	0.0134	0.0200	0.0058	0.0064	0.0115
	[0.0065]	[0.0096]	[0.0120]	[0.0032]	[0.0057]	[0.0102]	[0.0014]	[0.0030]	[0.0067]
All companies	0.0159	0.0146	0.0175	0.0055	0.0071	0.0101	0.0032	0.0041	0.0060
	[0.0043]	[0.0054]	[0.0074]	[0.0019]	[0.0031]	[0.0049]	[0.0010]	[0.0019]	[0.0031]
High – Low	0.0131**	0.0181**	0.0162**	0.0039**	0.0086**	0.0141**	0.0033*	0.0033**	0.0083**
	[0.0033]**	[0.0058]**	[0.0083]**	[0.0019]**	[0.0036]**	[0.0073]**	[0.0006]*	[0.0018]**	[0.0050]**

Note: NAF (number of analysts following) is the number of forecasts used to estimate DISP.

*Significant at the 5 percent level.
**Significant at the 1 percent level.

Robustness Tests. The previous results indicate that investors' return expectations are likely to be influenced by investor disagreement about future growth in the stocks' earnings. This likelihood raises the question of whether the demand for risky (especially out-of-favor) assets is sensitive to investors' concerns about the unpredictable nature of future earnings prospects. That is, does investor disagreement have a distinct and pervasive influence on the determination of asset returns? If asset prices are systematically influenced by investor disagreement (manifested in analysts' divergence of opinion), a disagreement risk factor (DRF) should have an effect on the cross-section of stock returns.

To examine the robustness of our previous findings, we explored whether investor disagreement, in the form of DRF, is priced in an explicit asset-pricing model. Fama and French (1993) suggested that a three-factor model may explain the cross-section of stock returns. Their three factors are the excess return (in excess of the risk-free rate) of the value-weighted market portfolio (RMF), the return on an arbitrage (zero-investment) portfolio consisting of the return on the big-company portfolio subtracted from the return on the small-company portfolio (SMB),[12] and the return on an arbitrage portfolio consisting of the return on the portfolio of high-BV/MV stocks minus the return on the portfolio of low-BV/MV stocks (HML).[13] To these three factors, Carhart (1997) proposed adding a momentum factor (MOM) that captures the difference in returns of value-weighted portfolios of companies with high and low prior momentum.

To test whether returns are sensitive to investors' disagreement about the payoffs of stocks, as reflected in analysts' diverse forecasts, we constructed an asset-pricing model for portfolios based on the Fama and French (1993) three factors, the momentum factor, and the disagreement risk factor.[14] To construct DRF, we ranked company-year observations by DISP and formed two equal-weighted return portfolios based on the top 30 percent and bottom 30 percent DISP rankings. Monthly returns were computed for these portfolios for the next 12 months. This process was repeated annually and led to the construction of return series of 210 monthly observations for the top 30 percent and for the bottom 30 percent portfolios from July 1983 through December 2001. The variable *DRF* is the return difference between the top 30 percent and bottom 30 percent portfolio returns. This metric of risk is an expectational risk measure and does not rely on assumptions about the stability of risk, as do most other methods of deriving risk proxies.

We tested the null hypothesis that *DRF* is not priced in the stock market (i.e., will have a zero value) against the alternative hypothesis that it is priced. Defining all returns to be nominal, we obtained factor sensitivities b, s, h, m, and d from regressing excess monthly portfolio returns on the following multifactor model (Model 1):

$$R(t) - R_f(t) = a + bRMF(t) + sSMB(t) + hHML(t) + mMOM(t) + dDRF(t) + e(t), \quad (1)$$

where

$R(t)$ = return of the portfolio
$R_f(t)$ = risk-free return (return on the one-month T-bill)
$RMF(t)$ = excess return of the value-weighted market portfolio
$SMB(t)$ = return of the small minus big portfolio
$HML(t)$ = return of the high-BV/MV (value) minus low-BV/MV (growth) portfolio
$MOM(t)$ = momentum
$DRF(t)$ = disagreement risk factor
e = error term

—all at time *t*. The slope coefficients (factor loadings) determine investors' expected risk premiums for bearing a stock's exposure to these sources of risk. If disagreement is of concern to investors, then *DRF* should be priced (i.e., command a premium). As a result, the coefficient on the disagreement factor, *d*, should have explanatory power for the comovement in stock returns. In line with our previous findings, if the future growth prospects of value and small-cap stocks are perceived by investors to be more difficult to predict than those of growth and large-cap stocks, the coefficient on *DRF* should be substantially more significant for the returns to the value and small-cap stock portfolio. That is, disagreement arising from the difficulty of assessing the probability distribution of future payoffs of value stocks should influence investors' confidence and, therefore, raise their reward–risk expectations. Because this effect assumes that risk-averse investors are also averse to disagreement, we expected our tests to shed light on whether divergence of opinion is relevant to asset pricing. Note here that conventional asset-pricing models, such as the CAPM, ignore the importance of disagreement risk, on the premise that it either does not matter or does not exist (i.e., the CAPM assumes homogenous expectations).

To ensure that our results would not be driven by a particular asset-pricing specification, we also considered an alternative return-generating model. We checked the robustness of our previous results by estimating a Ferguson and Shockley (2003) model but adding the *MOM* factor and *DRF*. As in Model 1, we tested the hypothesis in Model 2 that *DRF* is not priced against the alternative hypothesis that it is priced. Defining all returns in nominal terms, we obtained factor sensitivities b, $b_{D/E}$, b_Z, m, and d from regressing excess monthly portfolio returns on the following multifactor model:

$$\begin{aligned} R(t) - Rf(t) = a + bRMF(t) &+ b_{D/E}R^{D/E}(t) \\ &+ b_Z R^Z(t) + mMOM(t) \\ &+ dDRF(t) + e(t), \end{aligned} \tag{2}$$

where

$R^{D/E}$ = leverage—that is, the simple average return of the two portfolios containing stocks with high debt-to-equity ratios minus the simple average return of the two low-D/E portfolios
R^Z = distress—that is, the simple average return on the three high-*Z* portfolios (where *Z* stands for Altman's *Z*-score, a measure of the likelihood of financial distress) minus the simple average return on the three low-*Z* portfolios

The leverage and distress factors were constructed in the same way Fama and French (1993) created the *SMB* and *HML* factors.[15]

To the extent that Model 2 (the Ferguson–Shockley model) represents a superior way (to that of Model 1) of controlling for financial distress, it can be viewed as a more strenuous test for the uncertainty factor. If our tests produce evidence in support of *DRF*, a reasonable conclusion is that investor disagreement is important in explaining the average return of common stocks in the cross-section.

For regressions run on Model 1, we formed the 25 size and BV/MV portfolios as the overlaps of stocks belonging to independently sorted size and BV/MV quintiles. Excess returns of these portfolios were regressed on *RMF*, *SMB*, *HML*, *MOM*, and *DRF*. The empirical results (not reported here) were, in general, consistent with the evidence of Fama and French (1993).[16] The intercepts were statistically significant in 6 of the 25 portfolios at the 5 percent (7 at the 10 percent) level of significance.

To determine whether Model 1 adequately explains stock returns, we used seemingly unrelated regression (SUR) procedures to test the hypothesis that the intercepts are jointly equal to zero for all 25 portfolios. Although the χ^2-test result indicated that the null hypothesis (that the regression intercept coefficients are jointly equal to zero) was rejected at the 1 percent level, the high R^2 values indicated that the model that included *DRF* explained a large fraction of the variability in stock returns. The coefficients on *DRF*, in agreement with the results from Table 1 and the prediction of the asset-pricing model of Williams (1977), showed a consistent positive relationship between disagreement risk and the returns of the portfolios in the highest BV/MV quintile and smallest size quintiles. The coefficients on *DRF* for the largest size quintile and lowest BV/MV quintile were mostly negative and significant.

Moreover, in every size quintile, the slopes on *DRF* were higher for the value stocks than for the growth stocks. In other words, we found a strong association between disagreement risk and returns to the extreme value portfolio even after we controlled for size effects. The results also demonstrate that a strong positive relationship exists between the smallest-cap stock returns and investor disagreement after we controlled for the BV/MV effect. In every BV/MV quintile, the slopes on *DRF* were highest for the smallest size quintiles.

Adding *DRF* to the three-factor model had an interesting effect on the slope of the market factor, *RMF*. The coefficient on *RMF* remained close to 1.0, which implies that the returns of the different portfolios are not distinctly exposed to overall market movements when the other four factors are included. This result suggests that a considerable part of the variation in average stock returns is explained by the *SMB*, *HML*, *MOM*, and *DRF* factors.

The systematic relationship of excess portfolio returns and *DRF* is consistent with earlier studies showing that investors do not systematically ignore analysts' forecasts. The loadings on *DRF* for the two extreme (highest-BV/MV and smallest-cap) portfolios confirm that the value and small-cap stock excess returns command a disagreement premium as well as size and distress risk premiums. The negative coefficient on *DRF* for the large-cap–low-BV/MV portfolio indicates that growth and large-cap stocks are not perceived by investors as being subject to the same degree of investor disagreement as are value and small-cap stocks.

Finally, the adjusted R^2 values range between 0.80 and 0.95, indicating that the five-factor Model 1 captures most of the variation in average portfolio returns.

We also ran time-series regressions in which Model 2 was used for the 25 portfolio returns. This five-factor model included *RMF*, $R^{D/E}$, and R^Z (as in Ferguson and Shockley) plus *MOM* and *DRF*. The regression results for the leverage and distress factors (not reported here) were in agreement with the findings of Ferguson and Shockley.[17] Consistent with the evidence found for the Model 1 regressions, *DRF* had the expected sign and was mostly (in 22 out of 25 regressions) statistically significant. The intercepts were significant in 11 of 25 regressions, and the χ^2-test result indicated that the null hypothesis (that the regression intercept coefficients are jointly equal to zero) was rejected at the 1 percent level, as was the case for Model 1.

Overall, these results are in harmony with our prior evidence indicating that *DRF* plays an important role in explaining average stock returns. The results thus suggest that the explanatory power of *DRF* is not limited to a specific asset-pricing model. Notwithstanding the differences between the Fama–French and the Ferguson–Shockley return-generating specifications, this supplemental evidence supports the view that the investor disagreement factor plays an important role in explaining the returns of value and growth stocks.

Table 3 presents the results of time-series regressions from the use of Model 1 of monthly equal-weighted portfolio returns for the subsamples of high-BV/MV, low-BV/MV, small, and big companies. The regressions were run first without the disagreement risk factor. We also report regression results for the value-minus-growth and small-minus-big arbitrage portfolios.

The coefficients on *DRF* in Table 3 show that there is a positive relationship between the returns of value stocks and investor disagreement risk. The coefficient on *DRF* for the value portfolio (Panel A) is 0.368 (with a *t*-value of 7.82), indicating that disagreement covaries with high-BV/MV portfolio returns. These results are consistent with our previous findings and provide additional evidence in support of the view that value stocks command a premium because investors hold more diverse beliefs about their future growth prospects.

The results in Panel C demonstrate that a positive and similar relationship exists between small-cap stock returns and the disagreement risk factor.

As previously, the coefficient on the market risk factor is close to 1.0 for all the regressions, which suggests that the *SMB*, *HML*, *MOM*, and *DRF* factors explain a large portion of the variation in average stock returns. The adjusted R^2 values for the model with *DRF* included range from 0.8890 to 0.9684, significantly higher than those of the four-factor version (not including *DRF*) of Model 1. This result indicates that (1) *DRF* adds significant explanatory power and (2) this five-factor model explains most of the variation in average portfolio returns.

The regression results based on the arbitrage portfolio returns provide interesting insights into the importance of *DRF*. The returns of the value-minus-growth (Panel E) and the small-minus-big (Panel F) arbitrage portfolios are positively and significantly associated with the divergence of opinion among investors about future growth in earnings. Furthermore, the R^2 values for the arbitrage portfolio regressions are greatly improved by the addition of *DRF* in the model.

Table 4 repeats the tests presented in Table 3 but with the Ferguson–Shockley $R^{D/E}$ and R^Z factors instead of the Fama–French *HML* and *SMB* factors. The coefficient on *DRF* in Table 4 for the value portfolio (Panel A) is 0.581 (with a *t*-value of 13.26), confirming that disagreement covaries with high-BV/MV portfolio returns. Other results are also similar to those presented in Table 3; thus, the explanatory power of *DRF* is not affected by the choice of asset-pricing model.

Table 3. Model 1 Results: High-BV/MV, Low-BV/MV, Small, and Big Subsamples
(*t*-statistics in parentheses)

Subsample	*a*	*bRMF*	*sSMB*	*hHML*	*mMOM*	*dDRF*	Adjusted R^2
A. High-BV/MV companies							
	0.003	1.113	0.804	0.716	–0.257		0.9098
	(2.25)	(39.12)	(21.54)	(16.95)	(–9.95)		
	0.003	1.068	0.603	0.584	–0.202	0.368	0.9294
	(3.06)	(41.36)	(14.45)	(14.23)	(–8.45)	(7.82)	
B. Low-BV/MV companies							
	0.002	1.106	0.574	–0.480	–0.326		0.9549
	(1.84)	(41.43)	(16.40)	(–12.11)	(–13.46)		
	0.002	1.118	0.624	–0.447	–0.339	–0.092	0.9554
	(1.81)	(41.02)	(14.17)	(–10.32)	(–13.48)	(–1.86)	
C. Small companies							
	0.004	1.043	1.204	0.149	–0.421		0.8574
	(2.02)	(21.84)	(19.21)	(2.11)	(–9.73)		
	0.004	0.967	0.865	–0.075	–0.328	0.624	0.8890
	(2.47)	(22.34)	(12.36)	(1.08)	(–8.21)	(7.90)	
D. Big companies							
	0.001	1.074	–0.091	0.068	–0.162		0.9667
	(2.29)	(68.13)	(–4.38)	(2.88)	(–11.32)		
	0.001	1.087	–0.036	0.104	–0.177	–0.100	0.9684
	(2.27)	(68.87)	(–1.42)	(4.13)	(–12.13)	(–3.49)	
E. Value minus growth							
	0.001	0.007	0.229	1.196	0.069		0.8455
	(0.83)	(0.24)	(6.19)	(28.52)	(2.70)		
	0.001	–0.049	–0.021	1.031	0.137	0.461	0.8994
	(1.27)	(–2.13)	(–0.55)	(27.47)	(6.37)	(10.80)	
F. Small minus big							
	0.002	–0.031	1.294	0.082	–0.260		0.6885
	(1.22)	(–0.61)	(19.83)	(1.11)	(–5.76)		
	0.003	–0.120	0.901	–0.178	–0.152	0.724	0.7746
	(1.63)	(–2.76)	(12.83)	(–2.58)	(–3.78)	(9.14)	

Notes: Model for subsamples A, B, C, and D: $R_i - R_f = a_i + b_i RMF + s_i SMB + m_i MOM + d_i DRF$. The left-hand column return is the equal-weighted return in excess of the risk-free rate for the extreme-quintile portfolio. In the fifth and sixth pairs of regressions (Panels E and F), the dependent variables are, respectively, the difference between the high-BV/MV and the low-BV/MV equal-weighted portfolio returns and the difference between the small and big equal-weighted portfolio returns.

Table 4. Model 2 Results: High-BV/MV, Low-BV/MV, Small, and Big Subsamples
(*t*-statistics in parentheses)

Subsample	a	$bRMF$	$b_{D/E}R^{D/E}$	b_ZR^Z	$mMOM$	$dDRF$	Adjusted R^2
A. High-BV/MV companies							
	0.001	1.009	0.509	–0.122	–0.077		0.8188
	(1.00)	(27.28)	(9.93)	(–1.55)	(–1.82)		
	0.002	0.959	0.405	–0.094	–0.065	0.581	0.9027
	(2.12)	(34.98)	(10.42)	(–1.62)	(–2.11)	(13.26)	
B. Low-BV/MV companies							
	–0.006	1.180	–0.218	0.696	0.000		0.8474
	(–3.62)	(26.46)	(–3.50)	(7.30)	(0.00)		
	–0.006	1.158	–0.265	0.708	0.005	0.260	0.8564
	(–3.52)	(26.52)	(–4.28)	(7.65)	(0.10)	(3.73)	
C. Small companies							
	–0.004	1.027	0.061	0.633	–0.046		0.6489
	(–1.84)	(15.42)	(0.66)	(4.45)	(–0.60)		
	–0.003	0.940	–0.123	0.683	–0.026	1.026	0.8041
	(–1.72)	(18.70)	(–1.73)	(6.41)	(–0.45)	(12.78)	
D. Big companies							
	0.002	1.060	0.129	–0.126	–0.136		0.9614
	(2.46)	(66.71)	(5.78)	(–3.70)	(–7.56)		
	0.001	1.076	0.162	–0.135	–0.140	–0.187	0.9713
	(2.36)	(77.78)	(8.28)	(–4.59)	(–8.99)	(–8.46)	
E. Value minus growth							
	0.008	–0.171	0.728	–0.818	–0.077		0.5706
	(4.54)	(–3.91)	(11.87)	(–8.75)	(–1.54)		
	0.008	–0.198	0.670	–0.802	–0.070	0.321	0.6121
	(5.04)	(–4.73)	(11.26)	(–9.02)	(–1.48)	(4.79)	
F. Small minus big							
	–0.006	–0.032	–0.067	0.759	0.091		0.1074
	(–2.13)	(–0.43)	(–0.64)	(4.69)	(1.05)		
	–0.005	–0.136	–0.285	0.818	0.114	1.212	0.5355
	(–2.16)	(–2.47)	(–3.66)	(7.00)	(1.84)	(13.78)	

Notes: Model for subsamples A, B, C, and D: $R_i - R_f = a_i + b_iRMF + b_{D/E,i}R^{D/E} + b_{Z,i}R^Z + m_iMOM + d_iDRF$. The left-hand column return is the equal-weighted return in excess of the risk-free rate for the extreme-quintile portfolio. In the fifth and sixth pairs of regressions (Panels E and F), the dependent variables are, respectively, the difference between the high-BV/MV and the low-BV/MV equal-weighted portfolio returns and the difference between the small and big equal-weighted portfolio returns.

We conclude that value investment strategies yield higher returns because value stocks are riskier, in the sense that investor disagreement about their future growth in earnings is greater than it is about growth stocks. The greater disagreement about the future payoffs of value stocks can be attributed to the limited and lower quality of information available about the stocks to investors.

Conclusions

We investigated whether divergence of opinion among investors plays an important role in asset pricing. Specifically, we tested whether differences in opinion among investors (manifested in the divergence of analysts' earnings forecasts) can explain the cross-sectional return difference between value and growth stocks in the U.S. market over the 1983–2001 period.

We found dispersion in analysts' earnings forecasts to be considerably higher for high-BV/MV (value) than for low-BV/MV (growth) portfolios, which indicates that the cash flows of growth stocks are perceived by investors as less uncertain and, therefore, less risky than the cash flows of value stocks. Similar results were obtained when we compared quintile portfolios sorted on extreme size: Small companies exhibited greater forecast dispersion than large companies.

Our findings suggest that the return advantage of value strategies reflects, at least in part, compensation for bearing risk associated with higher dispersion in analysts' earnings forecasts, which confirms the conjecture of Williams (1977) that dispersion of opinion represents risk. Hence, the superior return of value stocks should be viewed as a reward for the greater investor disagreement about the stocks' future growth in earnings.

Finally, our tests show that the explanatory power of a disagreement risk factor is not limited to a specific asset-pricing model.

We benefited from discussions with Martin Gruber and comments from Burton Malkiel. We are grateful to I/B/E/S International for providing the EPS forecast data.

Notes

1. Lakonishok et al. also argued that value strategies yield higher returns because the strategies exploit the suboptimal behavior of the typical investor.
2. Doukas et al. discussed extensively the limitations of the previous empirical studies.
3. See, for example, Williams (1938), Mayshar (1983), and Epstein and Wang (1994). In a different context, Kim and Verrechia (1991), among others, recognized a positive and direct relationship between dispersion of beliefs and both trading volume and price volatility. Harris and Raviv (1993) developed empirical implications about volume, volatility, and price dynamics arising from investors' heterogeneous interpretations of news.
4. Kraus and Smith (1989) argued that even in the absence of new information, a change in opinions may result in price changes. Because investors have imperfect information about one another, changes in opinions generate and reinforce uncertainty and preserve heterogeneity of beliefs at equilibrium.
5. This argument is analogous to Knight's (1921) concept of uncertainty, in which the investor (owner) does not have enough information to form a confident assessment of the probability distribution.
6. This difficulty varies among investors; therefore, their beliefs about the future outcomes of an investment are widely dispersed.
7. Venture capital is a good example. A common practice among venture capitalists is to require rates of return of 50 percent or higher to invest in a project.
8. Williams (1938) argued that heterogeneity of investors gives rise to higher returns because the key issue for investors is not how much to invest but which asset to invest in. That is, the market price of equity is determined by the marginal, not the average, investor opinion. Williams implicitly assumed that short selling is not feasible.
9. The use of the Detail History I/B/E/S data allowed us to overcome the issue of stale forecasts raised in Diether, Malloy, and Scherbina (2002).
10. The logic of Berk's (1995, 1997) criticism on company size as a risk factor can apply also to our disagreement factor. Therefore, we examined the sensitivity of our results by scaling DISP by four alternative deflators: sales, book value of total assets, absolute value of EPS, and absolute value of the median forecast. Moreover, we examined the unadjusted dispersion of analysts' forecasts for portfolios of all stocks traded on the NYSE, Amex, NASDAQ, and regional exchanges. We also repeated the tests with each year of the full period as the sample period to examine whether our results are sensitive to calendar time. Based on these findings, we conclude that our results are insensitive to the choice of the scaling variable, the specific year, or the market conditions. The results based on alternative deflators are available on request.
11. Malkiel (1982) also elaborated on the usefulness of and rationale for divergence of opinion among security analysts as an *ex ante* measure of risk and showed that divergence has a closer empirical relationship to expected return than do beta and other measures of risk. In addition, Harris (1986) found a positive relationship between risk premiums and dispersion in analysts' forecasts for the stocks in the S&P 500 Index and a set of 150 regulated companies' stocks in the 1982–84 period. Olsen and Troughton (2000) showed that professional money managers regard analysts' disagreement as a more important risk metric than conventional measures of risk, such as beta or standard deviation.

12. Following Fama and French (1993, 1996), we determined the breakpoints for small-cap and big-cap companies by allocating NYSE, Amex, and NASDAQ stocks into one of two groups based on whether their June (of each year) market equity value was below (small) or above (big) the median of market equity value for NYSE stocks.
13. In our study, as in Fama and French (1996), the high-BV/MV portfolio consisted of the top 30 percent of all companies in Compustat; the low-BV/MV portfolio contained the bottom 30 percent.
14. In the regressions, *MOM* is the UMD (up minus down) factor from Kenneth French's website (mba.tuck.dartmouth.edu/pages/faculty/ken.french/), computed as the average return on the two high-prior-return portfolios minus the average return on the two low-prior-return portfolios.
15. See Ferguson and Shockley for a detailed description of the construction of the leverage and distress factors. The time series of the leverage and distress factors were provided by Ferguson and Shockley and cover the period July 1983 through December 2000.
16. Tabulated results are available together with this article at www.cfapubs.org/faj/issues/v60n6/toc.html.
17. Tabulated results are available together with this article at www.cfapubs.org/faj/issues/v60n6/toc.html.

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Supplemental Tables for "Divergent Opinions and the Performance of Value Stocks"

John A. Doukas, Chansog (Francis) Kim, and Christos Pantzalis

The empirical results for regressions of the 25 size–BV/MV portfolios on *RMF*, *SMB*, *HML*, *MOM*, and *DRF* are given in **Table X**, and the results for the regressions of the portfolios on *RMF*, $R^{D/E}$, R^Z, *MOM*, and *DRF* are provided in **Table Y**.

Table X. Model 1 Results: Full Sample
(Model: $R_i - R_f = a_i + b_i RMF + s_i SMB + h_i HML + m_i MOM + d_i DRF$)

	BV/MV Quintiles									
	Low	2	3	4	High	Low	2	3	4	High
Size Quintile	Coefficient					t-Statistic				
	a					$t(a)$				
Small	0.004	0.005	0.005	0.003	0.006	1.49	2.30	2.57	1.46	3.06
2	0.001	0.002	0.003	0.001	0.000	0.68	1.46	2.30	1.03	0.18
3	0.002	–0.000	0.000	0.001	0.001	1.75	–0.11	0.09	1.24	1.03
4	0.004	–0.001	–0.001	–0.001	0.001	3.19	–0.62	–0.57	–0.61	1.03
Big	0.004	–0.000	–0.000	–0.002	0.000	4.29	–0.26	–0.05	–1.57	0.13
	b					$t(b)$				
Small	0.968	1.005	0.928	0.937	0.953	13.44	17.53	17.35	18.78	18.84
2	1.149	1.140	1.091	1.108	1.206	26.92	30.19	33.76	34.76	32.98
3	1.157	1.182	1.118	1.121	1.167	31.71	32.74	34.70	36.80	31.02
4	1.108	1.202	1.199	1.127	1.117	33.16	33.88	35.47	37.36	30.89
Big	1.056	1.155	1.135	1.069	1.051	46.79	38.66	36.81	36.51	31.77
	h					$t(h)$				
Small	–0.865	–0.394	0.118	0.301	0.323	–7.56	–4.33	3.80	2.96	4.02
2	–0.513	0.103	0.394	0.663	0.703	–7.57	1.72	13.09	4.72	12.10
3	–0.444	0.324	0.621	0.801	0.765	–7.66	12.14	16.53	8.72	12.81
4	–0.444	0.458	0.678	0.719	0.733	–8.36	12.63	14.99	7.58	12.75
Big	–0.371	0.343	0.505	0.731	0.814	–10.34	10.31	15.71	7.70	15.48
	s					$t(s)$				
Small	0.844	0.884	0.986	0.810	0.803	7.25	9.54	11.39	10.01	9.81
2	0.986	0.930	0.850	0.891	0.778	14.28	15.25	16.27	17.28	13.14
3	0.917	0.763	0.722	0.712	0.625	15.55	13.07	13.86	14.45	10.27
4	0.485	0.355	0.356	0.290	0.275	8.97	6.19	6.52	5.94	4.70
Big	–0.053	–0.035	–0.023	0.038	–0.001	–1.45	–0.72	–0.47	0.81	–0.02
	m					$t(m)$				
Small	–0.528	–0.335	–0.300	–0.179	–0.260	–7.93	–6.33	–6.07	–3.88	–5.57
2	–0.350	–0.241	–0.164	–0.198	–0.217	–8.87	–6.91	–5.49	–6.72	–6.41
3	–0.402	–0.210	–0.223	–0.196	–0.240	–11.93	–6.29	–7.50	–6.94	–6.90
4	–0.318	–0.192	–0.200	–0.122	–0.184	–10.30	–5.84	–6.40	–4.37	–5.51
Big	–0.204	–0.118	–0.089	–0.141	–0.089	–9.77	–4.26	–3.11	–5.22	–1.37
	d					$t(d)$				
Small	0.790	0.620	0.436	0.502	0.849	6.02	5.93	4.47	5.52	9.20
2	–0.024	0.046	0.014	–0.062	0.231	–0.31	0.68	0.24	–1.07	3.47
3	–0.185	–0.167	–0.222	–0.242	0.035	–2.77	–2.53	–3.78	–4.35	0.51
4	–0.271	–0.234	–0.188	–0.232	–0.056	–4.45	–3.61	–3.05	–4.21	–0.86
Big	–0.158	–0.072	–0.103	–0.132	–0.089	–3.83	–1.32	–1.83	–2.47	–1.48
	R^2					Standard Error				
Small	0.83	0.85	0.82	0.80	0.83	3.88	3.09	2.88	2.69	2.72
2	0.92	0.90	0.90	0.90	0.89	2.30	2.03	1.74	1.72	1.97
3	0.93	0.89	0.88	0.88	0.86	1.97	1.95	1.74	1.64	2.03
4	0.93	0.87	0.87	0.87	0.83	1.80	1.91	1.82	1.63	1.95
Big	0.95	0.89	0.87	0.87	0.83	1.22	1.61	1.66	1.58	1.78

Note: Asset-pricing test: χ^2-test of the joint hypothesis that the regression intercepts for the set of 25 portfolios are all simultaneously equal to zero when SUR estimation procedures are used. Results: χ^2-statistic = 79.61; p-value = 0.000.

Table Y. Model 2 Results: Full Sample
(Model: $R_i - R_f = a_i + b_i RMF + b_{D/E,i} R^{D/E} + b_{Z,i} R^Z + m_i MOM + d_i DRF$)

	BV/MV Quintile									
	Low	2	3	4	High	Low	2	3	4	High
Size Quintile	Coefficient					*t*-Statistic				
	a					$t(a)$				
Small	–0.012	–0.004	–0.001	–0.000	0.002	–4.07	–1.47	–0.58	–0.12	0.90
2	–0.010	–0.004	0.001	0.000	0.000	–3.71	–2.02	0.38	0.31	0.15
3	–0.007	–0.002	0.000	0.003	0.002	–3.05	–1.13	0.00	2.49	1.56
4	–0.003	–0.000	0.002	0.002	0.004	–1.91	–0.10	1.60	1.71	3.52
Big	0.000	0.001	0.003	0.003	0.005	0.19	1.26	2.64	2.83	3.47
	b					$t(b)$				
Small	1.040	1.013	0.876	0.855	0.859	14.09	15.10	14.70	15.96	16.79
2	1.202	1.128	1.030	1.000	1.059	18.58	23.48	24.92	25.16	25.25
3	1.207	1.111	1.005	0.992	1.041	20.42	26.85	28.65	29.78	26.23
4	1.158	1.152	1.109	1.038	1.017	26.35	34.42	35.27	38.15	32.53
Big	1.078	1.138	1.113	0.976	0.973	50.47	42.26	38.02	35.41	27.47
	$b_{D/E}$					$t(b_{D/E})$				
Small	–0.520	–0.441	0.009	0.120	0.166	–4.89	–4.64	0.11	1.59	2.30
2	–0.357	0.072	0.247	0.387	0.391	–3.89	1.06	4.22	6.87	6.58
3	–0.267	0.191	0.412	0.523	0.527	–3.18	3.25	8.30	11.07	9.37
4	–0.208	0.329	0.435	0.542	0.600	–3.34	6.94	9.76	14.06	13.54
Big	–0.172	0.302	0.369	0.556	0.639	–5.69	7.92	8.89	14.23	12.72
	b_Z					$t(b_Z)$				
Small	1.108	0.871	0.677	0.483	0.366	6.89	6.13	5.36	4.25	3.38
2	0.968	0.465	0.205	0.002	0.026	7.07	4.57	2.34	0.02	0.30
3	0.791	0.326	0.020	–0.222	–0.232	6.31	0.27	13.86	–3.16	–2.76
4	0.516	–0.104	–0.228	–0.481	–0.545	5.55	–3.42	6.52	–8.34	–8.23
Big	0.348	–0.174	–0.408	–0.561	–0.778	7.70	–3.04	–6.58	–9.61	–10.36
	m					$t(m)$				
Small	0.104	0.030	–0.034	–0.031	–0.046	1.25	0.40	–0.51	–0.51	–0.80
2	0.099	0.048	–0.008	–0.086	–0.116	1.36	0.88	–0.17	–1.92	–2.46
3	0.045	–0.062	–0.114	–0.223	–0.145	0.67	–1.34	–2.88	–3.16	–3.24
4	0.044	–0.203	–0.254	–0.120	–0.151	0.90	–5.37	–7.18	–3.91	–4.30
Big	–0.059	–0.212	–0.256	–0.251	–0.153	–2.43	–7.00	–7.76	–8.09	–3.84
	d					$t(d)$				
Small	1.153	1.091	0.883	0.918	1.168	9.79	10.19	9.28	10.73	14.29
2	0.493	0.504	0.440	0.374	0.613	4.77	6.58	6.66	5.89	9.16
3	0.328	0.251	0.110	0.127	0.285	3.47	3.80	1.97	2.39	4.50
4	0.020	–0.131	–0.015	–0.142	–0.069	0.29	–2.45	–0.31	–3.28	–1.39
Big	–0.226	–0.238	–0.250	–0.240	–0.227	–6.62	–5.54	–5.35	–5.45	–4.02
	R^2					Standard Error				
Small	0.73	0.74	0.72	0.74	0.78	4.08	3.71	3.30	2.96	2.83
2	0.77	0.82	0.82	0.81	0.83	3.58	2.66	2.29	2.20	2.32
3	0.79	0.84	0.84	0.84	0.81	3.27	2.29	1.94	1.84	2.20
4	0.84	0.87	0.88	0.88	0.85	2.43	1.85	1.74	1.51	1.73
Big	0.95	0.91	0.88	0.87	0.79	1.18	1.49	1.62	1.53	1.96

Note: Asset-pricing test: χ^2-test of the joint hypothesis that the regression intercepts for the set of 25 portfolios are all simultaneously equal to zero when SUR estimation procedures are used. Results: χ^2-statistic = 89.54; *p*-value = 0.000.