Identifying Expectation Errors in Value/Glamour Strategies: A Fundamental Analysis Approach

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It is well established that value stocks outperform glamour stocks, yet considerable debate exists about whether the return differential reflects compensation for risk or mispricing. Under mispricing explanations, prices of glamour (value) firms reflect systematically optimistic (pessimistic) expectations; thus, the value/glamour effect should be concentrated (absent) among firms with (without) ex ante identifiable expectation errors. Classifying firms based upon whether expectations implied by current pricing multiples are congruent with the strength of their fundamentals, we document that value/glamour returns and ex post revisions to market expectations are predictably concentrated (absent) among firms with ex ante biased (unbiased) market expectations. (*JEL* G14, M41)

A rich and extensive literature documents that various measures of relative value, such as book-to-market ratios, earnings-to-price ratios, dividend yields, and cash-flow-to-price ratios, predict future stock returns (e.g., Basu 1977; Rosenberg, Reid, and Lanstein 1985; Chan, Hamao, and Lakonishok 1991; Fama and French 1992; among others). The collective evidence from this literature highlights the tendency of "value" stocks to outperform "glamour" firms. However, the source of this return differential remains a subject of considerable debate. While some argue that the returns reflect compensation for risk, others argue that the value/glamour effect is an artifact of mispricing.

In their seminal work, Fama and French (1992) document that the book-to-market ratio subsumes the predictive power of other valuation ratios, and suggest that the book-to-market factor reflects compensation for financial

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distress risk. Consistent with this risk-based interpretation, Fama and French (1995) and Penman (1996) document an inverse relation between book-to-market portfolios, future earnings, and future growth rates, while Chan, Petkova, and Zhang (2008) empirically estimate a stable and persistent difference in realized returns across value and growth stocks over the last half century. A related literature offers evidence that value and growth stocks possess differential sensitivities to time-varying macroeconomic risks (e.g., Vassalou 2003; Petkova and Zhang 2005; Zhang 2005; Lettau and Wachter 2007; Cohen, Polk, and Vuolteenaho 2009; Da and Warachka 2009; Campbell, Polk, and Vuolteenaho 2010; Santos and Veronesi 2010). Taken together, these articles suggest that some, if not all, of the documented return performance is an artifact of risk factor exposures that vary across value and glamour firms.

Mispricing-based explanations for the value/glamour effect contend that measures of relative value, such as book-to-market ratios, reflect systematically optimistic and pessimistic performance expectations for glamour and value firms, respectively. Under this view, the value/glamour effect captures price corrections arising from the reversal of these expectation errors. For example, Lakonishok, Shleifer, and Vishny (1994) argue that because the financial conditions of value and glamour firms are fundamentally different, a fixation on firms' historical fundamentals can cause investors to underweight new financial data that contradict past performance trends and to overlook the mean-reverting tendencies of financial ratios and economic performance. These biased expectations systematically unravel in response to the arrival of new information, giving rise to the value/glamour return pattern. Consistent with these arguments, Lakonishok, Shleifer, and Vishny (1994) document that book-to-market ratios are positively related to future changes in earnings, changes in cash flows, and revenue growth, while LaPorta et al. (1997) document that one-year-ahead earnings announcement period returns to value (glamour) firms are positive (negative). Similarly, LaPorta (1996) and Dechow and Sloan (1997) conclude that returns to value/glamour and contrarian investment strategies, respectively, are (at least partially) attributable to systematic errors in market expectations about long-term earnings growth.

The mispricing-based explanation for the value/glamour effect yields two testable hypotheses, which we explore in this article. First, if the prices of glamour (value) firms reflect overly optimistic (pessimistic) expectations, the value/glamour return effect should be concentrated among firms with ex ante identifiable expectation errors and absent among firms without these expectation errors. Second, both return- and non-return-based measures of ex post expectation revisions and errors should be distributed across value/glamour portfolios in a manner that complements the concentration of the value/glamour return effect. These hypotheses represent important departures from risk-based explanations for the value/glamour effect and, thus, our tests serve to adjudicate the two competing explanations.

We identify potential ex ante biases by comparing expectations implied by pricing multiples against the strength of firms' fundamentals. Such a comparison is the central premise behind security analysis, as discussed by Graham and Dodd (1934), where sophisticated investors use historical financial information to select profitable investment opportunities. The success of these investment strategies requires that prices do not accurately reflect the future cash flow implications of historical information in a timely manner, resulting in equity prices that temporarily drift away from fundamental value for subsets of firms. Assuming no impediments to trade or arbitrage, long-term investors profit through the capture of subsequent revisions of biased expectations and related price corrections. In the value/glamour context, price corrections reflecting the reversal of biased expectations are likely to be most pronounced when strong (weak) expectations implied by glamour (value) classifications are incongruent with contrarian information implied by firms' recent financial performance. More importantly, portfolios of value and glamour firms lacking this ex ante incongruence should not display predictable patterns of value/glamour returns and expectation adjustments. We design our empirical tests with the goal of documenting cross-sectional variation in the value/glamour return effect and ex post revisions to market expectations consistent with these predictions. In doing so, we provide compelling evidence in favor of mispricing-based explanations for the source and nature of the traditional value/glamour return pattern.

Our empirical tests yield four primary findings. First, we document that among firms where expectations implied by their current value/glamour classification are congruent with the strength of their fundamentals, the value/glamour effect in realized returns is statistically and economically indistinguishable from zero. Second, we find that the returns to traditional value/glamour strategies are concentrated among those firms where expectations implied by their current value/glamour classification are ex ante incongruent with the strength of their fundamentals. Returns to this "incongruent value/glamour strategy" are robust across our sample period, and are significantly larger than the average return generated by an unconditional value/glamour strategy alone.

Third, we document that ex post expectation errors and revisions display patterns mirroring the concentration of the long-window value/glamour return effect. Using both short-window return and non-return-based measures (i.e., future earnings announcement period returns, analyst earnings forecast errors, and analyst forecast revisions), we document that future expectation adjustments are significantly larger for value firms than for glamour firms when expectations implied by value/glamour classifications are incongruent with the strength of recent fundamentals. In contrast, expectation errors and revisions do not vary positively across value/glamour classifications among firms where expectations are congruent with fundamentals.

Finally, we exploit inter-temporal variation in investor sentiment as a proxy for the influence of speculative demand on prices. As argued in Baker and

Wurgler (2006), periods of high investor sentiment can produce market prices where implied performance expectations deviate further and more frequently from firm fundamentals. As such, trading strategies that exploit these expectation errors should produce larger portfolio returns during periods of high sentiment. Consistent with these systematic mispricing arguments, we find that the returns to the incongruent value/glamour strategy are largest (smallest) in periods of high (low) investor sentiment, while a congruent value/glamour strategy displays no significant difference in returns across these periods.

Together, the mosaic of results suggests that the returns to traditional value/glamour strategies are an artifact of predictable expectation errors correlated with past financial data among a subset of contrarian value/glamour firms. Although alternative explanations for these patterns could exist, the observed return patterns are consistent with the ex ante expectation biases traditionally attributed to value and glamour securities, and cast considerable doubt on solely risk-based explanations for the value/glamour effect.

This article is organized as follows. Section 1 presents our research design and empirical predictions. Sections 2 and 3 present the main empirical analyses. Section 4 presents our robustness tests. Section 5 presents evidence conditional upon the prevailing level of investor sentiment. Section 6 concludes.

1. Research Design and Empirical Predictions

This article examines the extent to which the value/glamour effect is an artifact of market mispricing driven by predictable expectation errors. Our methodology annually sorts firm-year observations over the period 1972–2010 into value/glamour portfolios based on current book-to-market (BM) ratios and into portfolios based on the strength of their financial performance trends (FSCORE), and searches for predictable variation in future returns, expectation errors, and expectation adjustments conditional upon the relative, ex ante congruence of market-based and fundamentals-based performance expectations within and across these portfolios. The following sections outline our research design, sample, primary empirical predictions, and tests.

1.1 Measurement of value/glamour and the strength of financial performance

We classify and allocate firm-year observations into value and glamour portfolios on the basis of each firm's BM ratio. We measure a firm's BM ratio as the book value of equity scaled by the market value of equity at fiscal year-end, and annually rank sample firms to identify the empirical distribution of BM realizations. We sort firm-year observations into BM portfolios on the basis of the prior year's distribution of BM ratios. Following Fama and French (1993), we classify firm-year observations with BM ratios below the 30th

percentile, between the 30th and 70th percentiles, and above the 70th percentile as "Glamour," "Middle," and "Value" firm-years, respectively.[1]

We classify the strength of firms' recent financial performance trends utilizing the aggregate statistic FSCORE, as defined in Piotroski (2000). This aggregate statistic is based on nine financial signals designed to measure three different dimensions of firms' financial condition: profitability, change in financial leverage/liquidity, and change in operational efficiency. Each signal realization is classified as either "good" or "bad," depending on the signal's implication for future profitability and cash flows. An indicator variable for each signal is set equal to one (zero) if the signal's realization is good (bad). The aggregate measure, FSCORE, is defined as the sum of the nine binary signals, and is designed to measure the overall improvement, or deterioration, in firms' financial condition. Firms with the poorest signals (FSCORE less than or equal to three) have the strongest deterioration in fundamentals and are classified as low FSCORE firms, firms receiving the highest score (FSCORE greater than or equal to seven) have the strongest improvement in fundamentals and are classified as high FSCORE firms, and firms with an FSCORE between four and six are classified as Mid FSCORE firms.[2] Appendix 1 outlines the variables and signals used in Piotroski (2000) to construct FSCORE.

Prior research shows that pricing multiples, such as BM ratios, are inversely associated with both expected and realized levels of future profitability and earnings growth (Fama and French 1995; Penman 1996). Specifically, low BM firms (i.e., glamour stocks) are expected to have strong future earnings realizations and growth, while high BM firms (i.e., value stocks) are expected to experience low levels of profitability and deteriorating trends. Because firms' BM ratios reflect the market's expectations about future performance, sorting on the basis of BM ratios is analogous to sorting on the basis of future performance expectations embedded in price. In that spirit, BM ratios serve as an empirical proxy for the relative strength of the market's expectations about future firm performance.

Analogously, prior research shows that historical financial performance measures, such as FSCORE, are leading indicators of future profitability and earnings growth (Piotroski 2000; Fama and French 2006). Specifically, FSCORE is positively correlated with future earnings growth and future profitability levels, with low FSCORE firms experiencing a continued deterioration in future profitability and high FSCORE firms experiencing an overall improvement in profitability. Additionally, low FSCORE firms are more likely to experience a performance-related delisting than high FSCORE firms, again

[1] All results are robust to double-sorting firm-years into book-to-market and FSCORE quintiles.

[2] The definition of high and low FSCORE portfolios includes a broader set of FSCORE realizations than those used in Piotroski (2000). This research design choice increases the number of observations included in these high and low portfolios, in an effort to ameliorate concerns about small portfolio sample sizes and to generate more reliable test statistics across different value/glamour settings. Results restricting FSCORE portfolios to the more restrictive definition utilized in Piotroski (2000) yield similar inferences.

consistent with an overall deterioration in these firms' financial conditional vis-à-vis high FSCORE firms. Given its predictive ability, FSCORE serves as our proxy for the strength of firms' fundamentals and financial trends.

1.2 Central empirical predictions and tests

Evidence that market participants underreact to information about future cash flows abounds in the literature. First, market participants underreact to corporate transactions that signal shifts in expected future cash flows, such as seasoned equity offerings (Loughran and Ritter 1995; Spiess and Affleck-Graves 1995), convertible and straight debt issues (Lee and Loughran 1998; Dichev and Piotroski 1999; Spiess and Affleck-Graves 1999), share repurchases (Ikenberry, Lakonishok, and Vermaelen 1995), and stock splits (Ikenberry, Rankine, and Stice 1996; Desai and Jain 1997). Second, market participants underreact to explicit, externally produced signals of changes in financial condition, such as bond ratings downgrades (Dichev and Piotroski 2001), changes in analyst forecasts (Givoly and Lakonishok 1979; Stickel 1990; Chan, Jegadeesh, and Lakonishok 1996; Gleason and Lee 2003), and changes in analyst recommendations (Womack 1996; Barber et al. 2001; Jegadeesh et al. 2004). Third, the market underreacts to the future cash flow implications of newly released financial accounting information. Examples include a systematic underreaction to the autocorrelation structure of quarterly earnings innovations (i.e., post-earnings announcement drift, Bernard and Thomas 1989, 1990), extreme earnings and revenue innovations (Doyle, Lundholm, and Soliman 2006; Jegadeesh and Livnat 2006; Balakrishnan, Bartov, and Faurel 2010), the reversing nature of extreme accrual realizations (Sloan 1996), net financing activities (Bradshaw, Richardson, and Sloan 2006), and a host of different financial statement analysis-based ratios and summary statistics (Ou and Penman 1989; Abarbanell and Bushee 1998; Piotroski 2000; Beneish, Lee, and Tarpley 2001; Doyle, Lundholm, and Soliman 2003).

Such underreaction is an artifact of many factors, including behavioral forces, such as optimism, anchoring, representativeness, and confirmation biases, which can induce market participants to underweight or ignore contrarian information.[3] For example, investors in glamour stocks are likely to under-react to information that contradicts their beliefs about firms' growth prospects or reflects the effects of mean reversion in performance. Similarly, value stocks, being inherently more distressed than glamour stocks, tend to be neglected by investors; as a result, performance expectations for value firms may be too pessimistic and reflect improvements in fundamentals too slowly.

To the extent that the value/glamour effect is solely an artifact of mispricing and expectation errors, and these errors are associated with an underreaction to recent financial information, the value/glamour effect should be concentrated

[3] Underreaction to information could also be a response to market frictions, such as costly arbitrage and information acquisition and processing costs, in certain settings.

among the subset of firms where expectations implied by BM ratios are incongruent with the strength of firms' fundamentals (FSCORE). More importantly, under the mispricing explanation, the value/glamour effect should be non-existent among firms where expectations in price are congruent with the strength of the firm's recent fundamentals (barring differences in the firms' risk profiles). In each case, under the mispricing hypothesis, realized return patterns should be associated with a corroborating pattern of ex post expectation revisions and errors that are consistent with the ex ante biases in price. These arguments guide our research design and central predictions.

Clarifying our central predictions, we denote earnings expectations implied by current BM ratios and fundamentals as **E**[E|BM] and **E**[E|FSCORE], respectively. The preceding arguments suggest the following distribution of earnings expectations and related valuation errors conditional on firms' value/glamour classification and the strength of their fundamentals:

	Value/Glamour Portfolios		
	Low BM Firms "Glamour" (Strong Expectations)	Middle BM Firms	High BM Firms "Value" (Weak Expectations)
Low FSCORE (Weak Fundamentals)	**E**[E|BM] > **E**[E|FSCORE] Overvalued Firms	Potential for overvalued firms	**E**[E|BM] ≈ **E**[E|FSCORE]
Middle FSCORE	Potential for overvalued firms	**E**[E|BM] ≈ E[E|FSCORE]	Potential for undervalued firms
High FSCORE (Strong Fundamentals)	**E**[E|BM] ≈ **E**[E|FSCORE]	Potential for undervalued firms	**E**[E|BM] < **E**[E|FSCORE] Undervalued firms

In this framework, expectation errors should be concentrated in the contrarian portfolios (i.e., upper-left and bottom-right cells of the matrix), where market prices do not fully reflect the contrarian information conveyed by firms' fundamentals. Under the mispricing hypothesis, the largest value/glamour return effect will exist between these incongruent value/glamour portfolios, where expectations implied by current valuation ratios are incongruent with expectations implied by FSCORE.

To the extent that these returns are driven by the reversal of mispricing errors, ex post expectation errors and revisions should be strongest in these extreme portfolios, as market expectations adjust toward prevailing fundamentals, with revisions to value firms' expectations significantly larger than glamour firms. As such, the incongruent value/glamour strategy, defined as being

long in high FSCORE value firms and short in low FSCORE glamour firms, should generate large positive value/glamour returns and positive differences in expectation errors and revisions, and these differences should be larger in magnitude than realizations under the unconditional value/glamour strategy alone. In contrast, value/glamour portfolios along the off-diagonal, where expectations implied by firms' value/glamour classification are congruent with expectations implied by FSCORE, should not generate a value/glamour return effect, and ex post expectation errors and revisions should not be positively correlated with these firms' BM ratios. In other words, a congruent value/glamour strategy, defined as being long in low FSCORE firms and short in high FSCORE glamour firms, should not generate positive value/glamour returns or positive differences in expectation errors and revisions. Our empirical tests directly examine these predictions.

1.3 Portfolio formation and the measurement of portfolio returns

To reduce the cost of implementation associated with portfolio rebalancing, each firm is allocated to its respective value/glamour and FSCORE portfolio once a year, four months after the release of the most recent annual report; this approach is implemented regardless of whether returns are measured on a monthly or annual basis. We impose a four-month lag between the fiscal year-end and portfolio formation dates to ensure that all portfolios are formed using publicly available financial information. We measure firm-specific one- and two-year-ahead buy-and-hold size-adjusted returns from the beginning of the fifth month following firms' most recent fiscal year-end through the earliest subsequent date: one or two years after return compounding began, respectively, or the last day of CRSP-reported returns. If a firm delists, we incorporate delisting returns following Shumway and Warther (1999). We define size-adjusted returns as the firm-specific return less the corresponding CRSP-matched size decile portfolio return. Similarly, firm-specific monthly returns are measured as the one-month buy-and-hold raw return minus the corresponding size-adjusted return, with monthly return observations matched against the most recently available annual financial statements.

1.4 Sample selection criteria and descriptive statistics

Each year between 1972 and 2010, we identify firms with sufficient stock price and financial statement data on CRSP and Compustat, respectively. For each firm, we measure the market value of equity, BM ratios, and financial performance signals at fiscal year-end, and the preceding six-month buy-and-hold market-adjusted return to measure price momentum (MM) prior to portfolio formation. Any firm-year observation lacking sufficient data to estimate the firm's financial characteristics or the firm's preceding six-month return is deleted from the sample. This selection procedure yields the final

sample of 137,304 firm-year observations (see Appendix 2 for details). Panel A in Table 1 presents descriptive evidence on the financial attributes of our sample.

A key component of our research design involves the comparison of performance expectations implied by valuation multiples against performance expectations implied by FSCORE, under the assumption that both valuation multiples and FSCORE are leading indicators of future firm performance. Panels B and C of Table 1 provide supporting evidence for these assumptions by presenting one-year-ahead standardized unexpected quarterly earnings (SUEs) and return on assets (ROA) realizations across value/glamour and FSCORE portfolios. Following Bernard and Thomas (1989, 1990), SUEs measure quarterly innovations in earnings and are calculated as realized earnings-per-share (EPS) minus EPS from four quarters prior, divided by the standard deviation over the prior eight quarters. We report the average SUE calculated over the four quarters immediately following portfolio formation. ROA equals one-year-ahead net income scaled by current total assets. We find strong evidence that both BM ratios (Panel B) and FSCORE (Panel C) predict

Table 1
Descriptive statistics

Panel A: Descriptive Statistics

Variable	Mean	Std. Dev.	25th Pctl.	Median	75th Pctl.	Proportion with Positive Signal
MVE	1385.241	8650.420	22.770	98.579	490.875	n/a
BM	0.811	0.870	0.329	0.591	1.013	n/a
MM	0.029	0.480	−0.208	−0.025	0.173	n/a
SUE	−0.074	1.975	−0.576	0.054	0.647	n/a
ROA_{t+1}	−0.011	0.206	−0.028	0.039	0.084	n/a
ROA	−0.018	0.298	−0.022	0.041	0.088	0.706
Δ*ROA*	−0.001	0.551	−0.043	−0.001	0.031	0.494
CFO	0.000	3.794	0.002	0.076	0.137	0.755
ACCRUAL	−0.064	2.528	−0.102	−0.048	0.003	0.260
Δ*TURN*	−0.002	0.373	−0.114	0.000	0.102	0.499
Δ*MARGIN*	0.035	1.958	−0.022	0.000	0.021	0.500
Δ*LEVER*	−0.037	0.571	−0.043	−0.002	0.024	0.354
Δ*LIQUID*	0.000	2.356	−0.361	−0.010	0.340	0.490
ISSUANCE	0.275	0.446	0.000	0.000	1.000	0.275

Panel B: Future Returns, Standardized Unexplained Earnings (SUEs) and ROA by Value/Glamour

	One-Year Ahead Size-Adjusted Returns	One-Year Ahead Average SUE	One-Year Ahead ROA	N
All Firms	0.0050	−0.055	−0.011	137, 304
Value/Glamour:				
Glamour	−0.0549	0.009	−0.031	42, 663
Middle	0.0143	−0.052	0.011	60, 326
Value	0.0632	−0.135	−0.027	34, 315
Value-Glamour	0.1181	−0.144	0.004	
(*t*-statistic)	(9.813)	(−43.568)	(1.176)	

(*Continued*)

Table 1
(Continued)

Panel C: Future Returns, Standardized Unexplained Earnings (SUEs) and ROA by FSCORE

	One-Year Ahead Size-Adjusted Returns	One-Year Ahead Average SUE	One-Year Ahead ROA	N
All Firms	0.0050	−0.055	−0.011	137, 304
FSCORE:				
0	−0.2210	−0.150	−0.137	194
1	−0.1009	−0.132	−0.193	1, 852
2	−0.0711	−0.084	−0.171	6, 993
3	−0.0412	−0.076	−0.121	15, 148
4	−0.0159	−0.093	−0.052	24, 745
5	0.0070	−0.079	0.001	30, 590
6	0.0319	−0.041	0.042	28, 039
7	0.0398	−0.014	0.059	19, 710
8	0.0520	0.057	0.064	8, 607
9	0.0622	0.064	0.060	1, 426
Low FSCORE (0–3)	−0.0559	−0.083	−0.141	24, 187
Mid FSCORE (4–6)	0.0086	−0.070	−0.001	83, 374
High FSCORE (7–9)	0.0444	0.010	0.061	29, 743
High-Low	0.1003	0.093	0.202	
(t-statistic)	(8.549)	(3.646)	(55.489)	

Panel A presents descriptive statistics for our sample of 137,304 firm-year observations from 1972 to 2010. Firm size is measured as the market value of equity (MVE). The firm's BM ratio is measured as the book value of equity scaled by the market value of equity. Momentum (MM) is measured as the preceding six-month market-adjusted return. The remaining descriptive statistics pertain to the nine financial signals used to measure FSCORE, a financial statement analysis-based scoring metric that captures the strength of the firm's fundamentals; see Appendix 1 for more details on the calculation of FSCORE and the measurement of these nine signals. All variables, except MM, are measured at the fiscal year-end prior to portfolio formation; MM is measured over the six-month period preceding portfolio formation. Panels B and C present annual buy-and-hold size-adjusted returns, average future standardized unexplained earnings (SUEs), and average return on assets (ROA) across BM and FSCORE portfolios, respectively. Raw returns are defined as the firm's twelve-month buy-and-hold stock return, and size-adjusted returns are measured as raw returns minus the corresponding twelve-month CRSP-matched size decile portfolio return. Return compounding starts four months after the most recent fiscal year-end. If the firm delists prior to the end of the twelve-month compounding period, the delisting return is incorporated following Shumway and Warther (1999). SUE is calculated as realized EPS minus EPS from four quarters prior, divided by its standard deviation over the prior eight quarters. We report the average SUE calculated over the four quarters immediately following the portfolio formation date. ROA is calculated as one-year-ahead net income scaled by current total assets. Firm-year observations are sorted in BM portfolios based on the preceding year's distribution of BM realizations. A firm-year observation is allocated into the Glamour, Middle, or Value portfolio if the firm's BM ratio is below the 30th percentile, between the 30th and 70th percentiles, or above the 70th percentile, respectively, of the preceding year's distribution. A firm-year observation is allocated to the low FSCORE, mid FSCORE, or low FSCORE portfolio if the firm's FSCORE is less than or equal to three, between four to seven, or greater than or equal to seven, respectively. *T*-statistics (in parentheses) are from *t*-tests of means.

future earnings and quarterly earnings innovations. Specifically, firms with low BM ratios (i.e., glamour firms) have both future SUEs and ROA realizations that are significantly larger than firms with high BM ratios.[4] Similarly, firms in the high FSCORE portfolio have both future SUEs and ROA realizations that are significantly larger than the low FSCORE portfolio in the year subsequent

[4] The negative mean ROA for glamour firms (−0.031) is influenced by the presence of a few large, negative realizations. An analysis of median ROA realizations reveals a strong negative relation across BM portfolios (median ROA of 0.068, 0.045, and 0.022 for glamour, middle, and value firms, respectively).

to measuring FSCORE.[5] Together, our evidence confirms that both BM ratios and FSCORE are leading indicators of future firm performance.[6]

2. Empirical Results: Value/Glamour Returns Conditional on Ex Ante Expectation Errors

Early studies documenting the value premium implicitly assume homogeneity among the firms composing a specific value/glamour portfolio. However, Piotroski (2000), Griffin and Lemmon (2002), and Mohanram (2005), among others, provide evidence that the set of firms included in a typical value/glamour portfolio can exhibit considerable heterogeneity. We extend these studies by examining future returns across value/glamour portfolios, conditional upon whether expectations implied by price are congruent with expectations implied by firms' fundamentals.

Table 2 presents one- and two-year-ahead size-adjusted returns after double-sorting firm-year observations into value/glamour and FSCORE portfolios; four central results emerge. First, the value/glamour effect exists after conditioning on the strength of firms' recent financial performance, with all value/glamour return differences significant at the 1% level. Interestingly, the value/glamour effect is strongest among the low and mid FSCORE portfolios of firms, with one-year-ahead long-short returns of 16.59% and 12.04%, respectively, while firms with high FSCORE realizations yield a value/glamour effect of 6.19% over the next twelve months.[7]

Second, FSCORE systematically distinguishes subsequent winners from losers across all three value/glamour portfolios. This result is consistent with the contextual evidence presented in Piotroski (2000) and Mohanram (2005) for value and glamour stocks, respectively. Moreover, the effectiveness of the FSCORE strategy among Middle value/glamour firms (one-year-ahead long-short return of 7.10%) highlights that the predictive ability of firm fundamentals is not solely concentrated in the tails of the value/glamour distribution.

Third, the value/glamour effect in realized returns is strongest among firms with ex ante incongruence between firms' fundamental strength and performance expectations embedded in price. For firms where fundamentals are

[5] These results confirm the contextual relation found in Piotroski (2000) for value firms, and the general relations documented in Fama and French (2006).

[6] Finally, Panels B and C in Table 1 document one-year-ahead buy-and-hold size-adjusted returns to both BM and FSCORE-based investment strategies. Consistent with prior research, value firms outperform glamour firms during our sample period (Panel B), while high FSCORE firms outperform low FSCORE firms (Panel C). Similar patterns are observed and inferences gleaned from the use of raw returns and market-adjusted returns. Only size-adjusted returns are tabulated for parsimony.

[7] This pattern is consistent with the evidence in Griffin and Lemmon (2002) and Penman, Richardson, and Tuna (2007), who document that the BM effect is larger among firms with the greatest level of financial risk (as measured by bankruptcy risk and leverage, respectively).

Table 2
Returns to value/glamour strategy conditional upon firm fundamentals

	Panel A: 12-Month Returns					Panel B: 24-Month Returns				
	Glamour	Middle	Value	V-G Diff.	(*t*-statistic)	Glamour	Middle	Value	V-G Diff.	(*t*-statistic)
Unconditional	−0.0549	0.0143	0.0632	0.1181	(9.813)	−0.0894	0.0248	0.1036	0.1930	(16.081)
Low FSCORE (0–3)	−0.1438	−0.0328	0.0221	0.1659	(13.799)	−0.2230	−0.0652	0.0047	0.2277	(18.943)
Mid FSCORE (4–6)	−0.0511	0.0172	0.0693	0.1204	(17.562)	−0.0847	0.0285	0.1172	0.2019	(29.428)
High FSCORE (7–9)	0.0207	0.0382	0.0826	0.0619	(5.107)	0.0276	0.0753	0.1536	0.1260	(10.471)
High-Low	0.1644	0.0710	0.0604			0.2506	0.1405	0.1489		
(t-statistic)	(14.010)	(7.348)	(5.398)			(61.987)	(15.696)	(21.398)		
Congruent V/G Strategy				0.0014	(0.128)				−0.0229	(−1.213)
Incongruent V/G Strategy				0.2264	(18.727)				0.3766	(19.842)

N	Glamour	Middle	Value
Low FSCORE (0–3)	8,293	9,301	6,593
Mid FSCORE (4–6)	25,952	37,224	20,198
High FSCORE (7–9)	8,418	13,801	7,524

This table presents one-year and two-year-ahead annual size-adjusted buy-and-hold returns to a BM investment strategy, conditional upon the strength of the firm's historical fundamentals (FSCORE) for 137,304 firm-years spanning 1972 to 2010. Firm-year observations are sorted in BM portfolios based on the preceding year's distribution of BM realizations. A firm-year observation is allocated into the Glamour, Middle, or Value portfolio if the firm's BM ratio is below the 30th percentile, between the 30th and 70th percentiles, or above the 70th percentile, respectively, of the preceding year's distribution. A firm-year observation is allocated to the low FSCORE, mid FSCORE, or high FSCORE portfolio if the firm's FSCORE is less than or equal to three, between four to seven, or greater than or equal to seven, respectively. Raw returns are defined as the firm's twelve- or twenty-four-month buy-and-hold stock return, and size-adjusted returns are measured as raw returns minus the corresponding CRSP-matched size decile portfolio return. Return compounding starts four months after the most recent fiscal year-end. If the firm delists prior to the end of the respective twelve- or twenty-four-month compounding period, the delisting return is incorporated following Shumway and Warther (1999). The *Congruent V/G Strategy* consists of a long position in value firms with low FSCORE and a short position in glamour firms with high FSCORE. The *Incongruent V/G Strategy* consists of a long position in value firms with high FSCORE and a short position in glamour firms with low FSCORE. *T*-statistics are shown in parentheses. Significance tests are derived using empirically derived bootstrap distributions, using 1,000 pseudo portfolios matching the distribution of sample observations.

incongruent with market expectations (i.e., growth firms with poor fundamentals and value stocks with strong fundamentals), average buy-and-hold returns reflect the unraveling of systematic pricing biases, with glamour firms generating significant negative returns and value firms generating significant positive returns (−14.38% and 8.26%, respectively).[8] In contrast, for firms where fundamentals are congruent with market expectations (i.e., glamour firms with strong fundamentals and value firms with weak fundamentals), the average buy-and-hold return to each portfolio is economically indistinguishable from zero (strong glamour firms have a size-adjusted return of 2.07%, while weak value stocks have a size-adjusted return of 2.21%).

Finally, we calculate the long-short portfolio returns and *t*-statistics associated with congruent and incongruent value/glamour strategies. The incongruent value/glamour strategy generates one-year-ahead and two-year-ahead buy-and-hold size-adjusted returns that are both economically and statistically significant (22.64% and 37.66%, respectively). Conversely, the congruent value/glamour strategy yields no excess returns (one-year and two-year-ahead size-adjusted returns of 0.14% and −2.29%, respectively; neither are significant at conventional levels of significance).[9] The lack of a value/glamour effect across these congruent value/glamour portfolios is consistent with the unconditional value/glamour effect being driven by the systematic expectation errors identified among our set of incongruent value/glamour firms.

To better understand the nature of these portfolio returns, Figure 1 documents one-year-ahead returns to the unconditional value/glamour investment strategy (shown in black bars), our congruent value/glamour strategy (shown with a dashed line), and our incongruent value/glamour strategy (shown as a black line) for each year during the 1972–2010 sample period; three key findings emerge. First, both the traditional value/glamour strategy and the incongruent value/glamour strategy produce consistently positive annual returns; however, the frequency of positive returns is higher for the incongruent value/glamour strategy, which generated positive returns in 35 out of 39 years over the sample period (versus 27 out of 39 years for the traditional value/glamour strategy). Second, annual returns to the incongruent value/glamour strategy are larger than the traditional value/glamour strategy in all but six years, with a time-series average annual portfolio return of

[8] The returns to the high or low FSCORE strategy within a given BM portfolio are not driven by the extreme performance of a few winners or losers, but instead tend to reflect the shifting of the entire distribution of portfolio returns, as evidenced by the increasing proportion of firms with positive size-adjusted returns across these portfolios (results not tabulated).

[9] Significance tests are derived from bootstrap distributions, using 1,000 pseudo portfolios matching the observed sample distribution shown at the bottom of Table 2. For example, using the realized sample distribution at the bottom of Table 2, we randomly draw 1,000 samples of 8,293 observations to simulate the Glamour/low FSCORE distribution and 1,000 samples of 7,524 observations to simulate the Value/high FSCORE distribution.

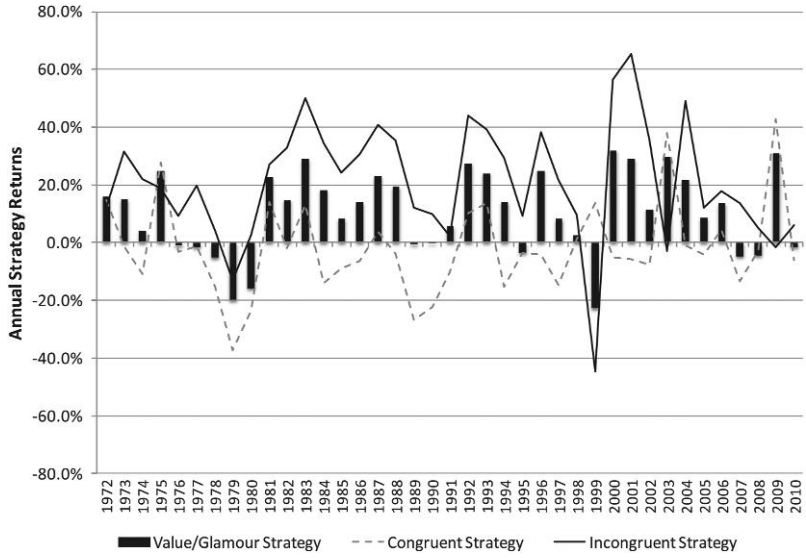

Figure 1
Annual returns to various book-to-market strategies
This figure presents annual size-adjusted buy-and-hold returns to three investment strategies for each year of our sample from 1972 to 2010. Firm-year observations are sorted in BM portfolios based on the preceding year's distribution of BM realizations. A firm-year observation is allocated into the Glamour, Middle, or Value portfolio if the firm's BM ratio is below the 30th percentile, between the 30th and 70th percentiles, or above the 70th percentile, respectively, of the preceding year's distribution. A firm-year observation is allocated to the low FSCORE, mid FSCORE, or high FSCORE portfolio if the firm's FSCORE is less than or equal to three, between four to seven, or greater than or equal to seven, respectively. Raw returns are defined as the firm's twelve-month buy-and-hold stock return, and size-adjusted returns are measured as raw returns minus the corresponding twelve-month CRSP-matched size decile portfolio return. Return compounding starts four months after the most recent fiscal year-end. If the firm delists prior to the end of the twelve-month compounding period, the delisting return is incorporated following Shumway and Warther (1999). The *Value/Glamour* strategy consists of a long position in high BM firms and a short position in low BM firms. The *Congruent BM Strategy* consists of a long position in value firms with low FSCORE and a short position in glamour firms with high FSCORE. The *Incongruent BM Strategy* consists of a long position in value firms with high FSCORE and a short position in glamour firms with low FSCORE.

20.76%, versus 10.54% for the traditional value/glamour strategy. Third, the congruent value/glamour strategy fails to yield consistently positive one-year-ahead returns; instead, annual realizations exhibit significant intertemporal variation around zero, with a time-series average annual return of −1.92% and positive returns being generated in only 12 of 39 years of the sample.

Although the portfolio approach used in the preceding analyses documents significantly different return patterns across congruent and incongruent value/glamour portfolios, the methodology is also subject to concerns that such predictability is attributable to omitted firm characteristics. To mitigate these concerns, we estimate the following cross-sectional model that controls for firm size, momentum, and recent quarterly earnings changes (i.e.,

post-earnings announcement drift):

$$\begin{aligned} R_{it+1} = {} & \beta_1 Glamour_{it} + \beta_2 Glamour^*_{it} LowScore_{it} \\ & + \beta_3 Glamour^*_{it} MidScore_{it} + \beta_4 Middle_{it} \\ & + \beta_5 Middle^*_{it} LowScore_{it} + \beta_6 Middle^*_{it} HighScore_{it} \\ & + \beta_7 Value_{it} + \beta_8 Value^*_{it} MidScore_{it} + \beta_9 Value^*_{it} HighScore_{it} \\ & + \beta_{10} SIZE_{it} + \beta_{11} MM_{it} + \beta_{12} SUE_{it} + \varepsilon_{it}. \end{aligned} \tag{1}$$

In these estimations, the intercept term is suppressed to ensure non-collinearity among value/glamour classifications. *SIZE* equals the log of market capitalization, and *MM* and *SUE* are momentum and standardized unexpected quarterly earnings, respectively, as previously defined in Table 1.[10] All standard errors are Newey-West adjusted to control for time-series autocorrelation.

Table 3 presents coefficients from two sets of estimations of the model. Panel A presents average coefficients, average R^2s, and Fama-MacBeth t-statistics from 39 annual cross-sectional estimations of Equation (1), where R_{it} equals firm i's cumulative one-year-ahead raw return in year t. Because long-run cumulative returns display significant skewness, and as a result, standard regression tests may be improperly specified (e.g., Barber and Lyon 1997; Kothari and Warner 1997), Panel B presents average coefficients, average R^2s, and Fama-MacBeth t-statistics from 468 monthly estimations, where R_{it} equals firm i's raw return (multiplied by 100) in month t.

In both specifications, we match return realizations to the most recently available annual financial statement information at portfolio formation, after allowing for a four-month information lag. The indicator variables *Value*, *Middle*, and *Glamour* equal one if the firm's BM ratio is in the bottom 30%, middle 40%, and top 30% of the prior year's distribution of BM realizations, respectively. The indicator variables *LowScore*, *MidScore*, and *HighScore* are equal to one if the firm's FSCORE is less than or equal to three, between four and six, or greater than or equal to seven, respectively. We interact these indicator variables with FSCORE to capture the incongruence between prices and fundamentals.

In this cross-sectional specification, the coefficients on *Value*, *Middle*, and *Glamour* capture the fixed return effect accruing to a specific value/glamour portfolio when expectations implied by firms' BM ratios are congruent with the strength of their fundamentals. The interaction terms capture the differential return effects of those firms that are hypothesized to suffer from expectation-based valuation errors within a given value/glamour portfolio. Consistent with

[10] We annually assign *SIZE*, *MM*, and *SUE*s to deciles ranging from 1 to 10 to mitigate the impact of intertemporal distribution changes in these variables and ease the interpretation of the regression coefficients.

Table 3
Returns to value/glamour strategy conditional on firm fundamentals: Multivariate analysis

	Panel A: Annual Cross Sectional Estimations				Panel B: Monthly Cross Sectional Estimations (%)			
	(1)	(2)	(3)	(4)	(1)	(2)	(3)	(4)
Glamour	0.075**	0.135***	0.191***	0.173***	0.789**	1.209***	1.874***	1.653***
	(2.37)	(4.85)	(3.64)	(3.69)	(2.19)	(3.94)	(3.77)	(3.10)
*Glamour*LowScore*	–	−0.121***	−0.136***	−0.115	–	−0.770***	−0.958***	−0.812***
	–	(−5.63)	(−7.60)	(−7.42)	–	(−3.54)	(−5.64)	(−4.93)
*Glamour*MidScore*	–	−0.059***	−0.062***	−0.047***	–	−0.433***	−0.477***	−0.373***
	–	(−4.50)	(−5.17)	(−4.81)	–	(−4.52)	(−5.70)	(−4.62)
Middle	0.150***	0.150***	0.195***	0.176***	1.306***	1.286***	1.834***	1.609***
	(5.26)	(5.36)	(4.00)	(3.83)	(4.21)	(4.23)	(3.95)	(3.15)
*Middle*LowScore*	–	−0.042***	−0.050***	−0.043***	–	−0.226	−0.333***	−0.314***
	–	(−3.03)	(−4.11)	(−3.08)	–	(−1.59)	(−2.88)	(−2.71)
*Middle*HighScore*	–	0.023**	0.021**	0.015	–	0.189**	0.178**	0.116*
	–	(2.34)	(2.16)	(1.64)	–	(2.45)	(2.30)	(1.69)
Value	0.213***	0.154***	0.180***	0.164***	1.793***	1.390***	1.698***	1.468**
	(5.93)	(3.82)	(3.27)	(2.78)	(5.10)	(3.19)	(3.15)	(2.48)
*Value*MidScore*	–	0.061***	0.063***	0.049***	–	0.446***	0.478***	0.388***
	–	(3.01)	(3.28)	(2.83)	–	(3.19)	(3.72)	(3.03)
*Value*HighScore*	–	0.097***	0.098***	0.076***	–	0.571***	0.584***	0.476***
	–	(3.37)	(3.53)	(2.93)	–	(2.99)	(3.24)	(2.69)
Decile(SIZE)	–	–	−0.008	−0.011***	–	–	−0.090**	−0.110***
	–	–	(−1.63)	(−2.71)	–	–	(−2.46)	(−3.01)
Decile(MM)	–	–	–	0.004	–	–	–	0.042***
	–	–	–	(1.32)	–	–	–	(4.60)
Decile(SUE)	–	–	–	0.007***	–	–	–	0.038
	–	–	–	(3.62)	–	–	–	(1.63)
Adj. R^2	0.131	0.137	0.146	0.153	0.112	0.115	0.124	0.138

(*Continued*)

Table 3
(Continued)

	Panel A: Annual Cross Sectional Estimations				Panel B: Monthly Cross Sectional Estimations (%)			
	(1)	(2)	(3)	(4)	(1)	(2)	(3)	(4)
V/G Strategy	0.138	–	–	–	1.104	–	–	–
(t-statistic)	(5.376)	–	–	–	(6.070)	–	–	–
Congruent Strategy	–	0.019	−0.011	−0.01	–	0.181	−0.176	−0.185
(t-statistic)	–	(0.545)	(−0.438)	(−0.384)	–	(0.771)	(−0.959)	(−1.043)

This table presents average coefficients from annual and monthly estimations of the following cross-sectional model for a sample of 137,307 firm-year observations from 1972 to 2010:

$$R_{it+1} = \beta_1 Glamour_{it} + \beta_2 Glamour^*_{it} LowScore_{it} + \beta_3 Glamour^*_{it} MidScore_{it} + \beta_4 Middle_{it} + \beta_5 Middle^*_{it} LowScore_{it} + \beta_6 Middle^*_{it} HighScore_{it} + \beta_7 Value_{it} + \beta_8 Value^*_{it} MidScore_{it} + \beta_9 Value^*_{it} HighScore_{it} + \beta_{10} SIZE_{it} + \beta_{11} MM_{it} + \beta_{12} SUE_{it} + \varepsilon_{it}.$$

Panel A (B) presents average coefficients and Fama-MacBeth Newey-West-adjusted t-statistics from 39 annual (468 monthly) cross-sectional regressions. For annual estimations, R_{it+1} is the firm's cumulative one-year-ahead raw return, with return compounding starting four months after the most recent fiscal year-end. For monthly estimations, monthly raw returns ($R_{i,t+1}$) are matched to financial statement information available at portfolio formation, allowing for at least four months between fiscal year-end and portfolio formation. If the firm delists prior to the end of the respective compounding period, the delisting return is incorporated following Shumway and Warther (1999). Firm-year observations are sorted in BM portfolios based on the preceding year's distribution of BM realizations. A firm-year observation is allocated into the Glamour, Middle, or Value portfolio if the firm's BM ratio is below the 30th percentile, between the 30th and 70th percentiles, or above the 70th percentile, respectively, of the preceding year's distribution; the indicator variables Glamour, Middle, and Value are equal to one if the firm-year corresponds to that particular BM portfolio, zero otherwise. The indicator variables LowScore, MidScore, and HighScore are equal to one if the firm's FSCORE is less than or equal to three, between four and six, or greater than or equal to seven, respectively. SIZE is the log of market capitalization, and MM is the firm's market-adjusted return over the prior six months. SUE is the firm's most recent standardized unexplained earnings, calculated as realized EPS minus EPS from four quarters prior scaled by its standard deviation over the prior eight quarters. Each year, *SIZE*, *MM*, and *SUE* are assigned to deciles ranging from zero (lowest) to ten (highest). The intercept term is suppressed in these estimations to ensure non-collinearity among value/glamour classifications. *,**,*** denote that reported coefficients are statistically different from zero at the 10%, 5%, and 1% level of significance (two-tailed), respectively.

the portfolio return results in Table 2, glamour firms with weak fundamentals systematically underperform glamour firms with strong fundamentals (as denoted by the significant negative average coefficient on *LowScore*Glamour* across specifications), and value firms with stronger fundamental trends systematically outperform value firms with declining fundamentals (as denoted by the significant positive average coefficient on *HighScore*Value*). Moreover, the annual returns for those value/glamour portfolios where expectations implied by firms' value/glamour classification are congruent with the strength of their fundamentals implied by FSCORE are economically and statistically equivalent (annual raw returns of 13.5%, 15.0%, and 15.4%, respectively; differences and hedge returns to the congruent value/glamour strategy are insignificant at conventional levels). As highlighted in columns (3) and (4), all inferences are robust to controlling for firm size, momentum, and post-earnings announcement drift. The monthly cross-sectional regressions produce qualitatively similar results to our annual return tests, suggesting that the portfolio and pooled annual regression results capture a general return pattern that is not isolated among a small handful of extreme firm-months or induced by skewness in annual returns.

To summarize the results up to this point, our evidence suggests that historical financial signals congruent with expectations already embedded in value/glamour proxies appear to be quickly assimilated into prices, while incongruent signals are (generally) discounted until future confirmatory news is received. The observed value/glamour return patterns are consistent with market participants pricing extreme value/glamour portfolios as a bundle of similar securities and ignoring differences in the strength of the fundamentals of firms composing each portfolio. This underreaction to contrarian information leads to predictable pricing revisions among the firms embedded in the incongruent value/glamour portfolios. The next section provides direct evidence on the role of expectation errors and adjustments across these value/glamour portfolios.

3. Empirical Results: Evidence on Expectations Errors Across Value/Glamour Portfolios

To further test the mispricing explanation for the value/glamour effect, we measure expectation errors and revisions using three empirical proxies: earnings announcement period returns, analyst earnings forecast errors, and forecast revisions. Each of these measures captures different dimensions of the market's expectation-related adjustments following portfolio formation, while offering varying advantages and disadvantages from a research design perspective. Corroborating and consistent evidence across these three different expectation adjustment proxies provides compelling evidence in favor of a mispricing-based component to the value/glamour effect in realized returns.

3.1 Earnings announcement period returns

One approach to inferring biased expectations is to measure the market's response to earnings news. LaPorta et al. (1997) examine earnings announcement period returns conditional on firms' BM ratio. They find that glamour (value) firms have negative (positive) earnings announcement returns in the one-year period following portfolio formation, consistent with these portfolios containing systematically biased expectations of future profitability. We extend their analysis to examine earnings announcement period returns across value/glamour portfolios conditional upon the strength of firms' fundamentals (FSCORE). We measure earnings announcement returns as the three-day, buy-and-hold, size-adjusted return $(-1,+1)$ surrounding firms' first annual earnings announcement following portfolio formation.

Table 4 presents this evidence. Unconditionally, the mean size-adjusted earnings announcement return to value stocks exceeds the mean return for glamour stocks, consistent with the evidence in LaPorta et al. (1997). After conditioning value/glamour portfolios on FSCORE, earnings announcement returns display a pattern of ex post adjustments consistent with systematic ex ante valuation errors across our contrarian value and glamour portfolios.

Table 4
Annual earnings announcement returns to the value/glamour strategy conditional upon firm fundamentals

	Glamour	Middle	Value	V-G Diff.	(*t*-statistic)
Unconditional:	−0.0018	0.0043	0.0100	0.0118	(6.750)
Low FSCORE (0–3)	−0.0073	0.0023	0.0057	0.0130	(6.700)
Mid FSCORE (4–6)	−0.0016	0.0044	0.0101	0.0117	(6.704)
High FSCORE (7–9)	0.0019	0.0054	0.0130	0.0111	(6.347)
High-Low	0.0092	0.0031	0.0073		
(t-statistic)	(4.801)	(2.175)	(4.184)		
Congruent V/G Strategy				0.0038	(2.109)
Incongruent V/G Strategy				0.0203	(11.346)

N	Glamour	Middle	Value
Low FSCORE (0–3)	8,293	9,301	6,593
Mid FSCORE (4–6)	25,952	37,224	20,198
High FSCORE (7–9)	8,418	13,801	7,524

This table presents three-day annual earnings announcement window size-adjusted buy-and-hold returns to a BM investment strategy, conditional upon the strength of the firm's historical fundamentals (FSCORE) for 137,304 firm-years from 1972 to 2010. Firm-year observations are sorted in BM portfolios based on the preceding year's distribution of BM realizations. A firm-year observation is allocated into the Glamour, Middle, or Value portfolio if the firm's BM ratio is below the 30th percentile, between the 30th and 70th percentiles, or above the 70th percentile, respectively, of the preceding year's distribution. A firm-year observation is allocated to the low FSCORE, mid FSCORE, or high FSCORE portfolio if the firm's FSCORE is less than or equal to three, between four to seven, or greater than or equal to seven, respectively. Earnings announcement returns are measured over the three-day annual earnings announcement window immediately following portfolio formation. Size-adjusted returns are measured as raw returns minus the corresponding return on the CRSP-matched size decile portfolio. The *Congruent V/G Strategy* consists of a long position in value firms with low FSCORE and a short position in glamour firms with high FSCORE. The *Incongruent V/G Strategy* consists of a long position in value firms with high FSCORE and a short position in glamour firms with low FSCORE. Significance tests are derived using empirically derived bootstrap distributions, using 1,000 pseudo portfolios matching the distribution of sample observations.

Specifically, glamour firms with low FSCORE generate the smallest mean size-adjusted announcement returns (−0.73%), while value firms with high FSCORE yield the largest announcement period returns (1.30%). The long-short return to the incongruent value/glamour strategy over these three days is 2.03%, which is nearly double the corresponding return to the unconditional value/glamour strategy, and represents approximately 9% of the total annual hedge return of 22.64% available from the incongruent value/glamour strategy.[11] In contrast, the congruent value/glamour strategy yields an economically and statistically marginal return of only 38 basis points over these three days, consistent with the prices of these firms possessing minimal ex ante valuation errors relative to the firm's fundamentals.[12]

3.2 Analyst forecast errors and revisions

To further understand the role of expectation errors and revisions in explaining the value/glamour effect, we also examine two non-return-based measures, analyst earnings forecast errors (FE) and forecast revisions (REV), similar to the analysis performed in Doukas, Kim, and Pantzalis (2002). The benefit of this analysis is that we can directly examine expectation errors and adjustments for a set of sophisticated investors, allowing us to overcome potential weaknesses associated with inferring expectation errors and revisions indirectly from short-window stock price changes.[13] The limitation is that not all firms have analyst coverage, and the resultant sample will be biased toward larger, more profitable firms with better information environments (e.g., Lang and Lundholm 1996).

This analysis requires the creation of a new sample at the intersection of our main sample and the Unadjusted IBES Summary Estimates file.[14] We measure the prevailing consensus EPS forecasts in the month preceding portfolio formation such that the consensus forecast is known prior to portfolio formation. We next create two measures of expectation errors embedded in the consensus forecasts: the consensus forecast error (FE) and the future revision

[11] Under the null hypothesis that returns are evenly distributed across trading days, we would expect to observe approximately 1.2% (3/252 trading days) of the annual return to accrue during the three-day annual earnings announcement window.

[12] The use of cumulative returns around firms' four subsequent three-day quarterly earnings announcement windows to measure post-portfolio formation expectation adjustments produces similar results. The cumulative return to the incongruent strategy is 4%, compared to 2.65% for the unconditional value/glamour strategy, and 1.1% for the congruent strategy.

[13] Earnings announcement returns can be noisy measures of expectation adjustments. For example, both undervalued firms and firms with bad earnings news have an incentive to voluntarily release value-relevant information before the formal earnings announcement date; similarly, sophisticated investors continuously update beliefs in response to firm, industry, and market-level news. These factors can create event date uncertainty and lower the power of the tests.

[14] We use the unadjusted consensus file because the adjusted file contains earnings forecasts retroactively adjusted for stock splits (Baber and Kang 2002; Payne and Thomas 2003). Because stock splits tend to follow strong firm performance, use of the adjusted file can result in a spurious correlation between analyst errors and future returns.

in the analysts' earnings forecasts (REV). Consensus forecast errors (FE) are defined as firms' actual earnings next year minus the consensus forecast and scaled by total assets per share at the start of the portfolio formation period. Revisions in analysts' earnings forecast (REV) are defined as the total revision in the consensus forecasts from the initial forecast measurement date up until the firms' next annual earnings announcement date, also scaled by total assets per share.[15]

Table 5 presents mean analyst earnings forecast errors (FE) and forecast revisions (REV) conditional upon firms' value/glamour and FSCORE classifications. As noted earlier, there is significant sample attrition when requiring analyst earnings forecasts, with the sample dropping from 137,304 to 56,727 firm-year observations. In terms of these forecast characteristics, we find that in both the full analyst sample and across most portfolios, the mean values of FE and REV are negative, consistent with analysts' forecasts being optimistically biased; however, the magnitude of this optimism is inversely correlated with the firm's recent financial performance within each value/glamour portfolio.

The remainder of Table 5 documents average analyst forecast errors and revisions across value/glamour portfolios. Focusing on forecast errors (Panel A), we find that the unconditional mean forecast error for value companies marginally exceeds those for glamour companies, but the difference is not statistically significant, consistent with the evidence reported in Doukas, Kim, and Pantzalis (2002). However, after conditioning on FSCORE, analyst forecast errors display the same pattern of ex post expectation revisions across our incongruent and congruent value/glamour portfolios, as observed using annual and earnings announcement-window returns. Specifically, glamour firms with low FSCORE generate the largest negative forecast errors (−0.0641), while value firms with high FSCORE have forecast errors that are less optimistic (−0.0118); as a result, the incongruent value/glamour strategy is associated with a significant positive difference in forecast errors between value and glamour stocks (difference of 0.0523, significant at the 1% level).

Similarly, in terms of forecast revisions (Panel B in Table 5), we find that analysts are marginally more likely to revise their forecasts downward for glamour firms than for value firms (difference of 0.0042, significant at the 5% level). After conditioning on FSCORE, analyst forecast revisions also display a pattern of expectation adjustments consistent with the value/glamour return effect. Glamour firms with low FSCORE have the most negative revisions, while value firms with high FSCORE have significantly smaller forecast revisions. Thus, similar to the preceding analyst forecast error and earnings announcement return evidence, the incongruent value/glamour strategy is also

[15] We scale forecast errors and revisions by assets per share to develop measures of expectation errors that are not reliant on firms' share price (Ball 2011; Cheong and Thomas 2011). Scaling forecast errors and revisions by share prices produces qualitatively similar results.

Table 5
Analyst forecast errors and revisions across value/glamour portfolios conditional upon firm fundamentals

	Panel A: Forecast Errors (FE)					Panel B: Forecast Revisions (REV)				
	Glamour	Middle	Value	V-G Diff.	(*t*-statistic)	Glamour	Middle	Value	V-G Diff.	(*t*-statistic)
All firms:	−0.0221	−0.0162	−0.0204	0.0017	(0.800)	−0.0174	−0.0126	−0.0132	0.0042	(2.690)
Low FSCORE (0–3)	−0.0641	−0.0368	−0.0364	0.0276	(11.719)	−0.0479	−0.0273	−0.0215	0.0265	(16.168)
Mid FSCORE (4–6)	−0.0210	−0.0155	−0.0178	0.0031	(2.601)	−0.0166	−0.0121	−0.0121	0.0045	(5.454)
High FSCORE (7–9)	−0.0027	−0.0065	−0.0118	−0.0091	(−4.241)	−0.0027	−0.0057	−0.0078	−0.0051	(−3.303)
High-Low	0.0614	0.0303	0.0246			0.0452	0.0216	0.0137		
(t-statistic)	(26.280)	(19.209)	(12.627)			(26.516)	(19.140)	(9.940)		
Congruent V/G Strategy				−0.0337	(−16.519)				−0.0188	(−12.754)
Incongruent V/G Strategy				0.0523	(21.958)				0.0401	(24.396)

N	Glamour	Middle	Value
Low FSCORE (0–3)	2,434	3,644	2,012
Mid FSCORE (4–6)	11,973	17,980	6,203
High FSCORE (7–9)	4,421	6,278	1,782

This table presents consensus analyst forecast errors (FE) and revisions (REV) across a BM investment strategy, conditional upon the strength of the firm's historical fundamentals (FSCORE) for 56,727 firm-years from 1972 to 2010. Analyst forecast errors and revisions are calculated six months following the preceding fiscal year-end. Forecast Error (FE) is defined as (Actual EPS-Consensus Forecast)/(total assets per share), and Forecast Revision (REV) is defined as the final consensus estimate minus the consensus at portfolio formation scaled by total assets per share. Firm-year observations are sorted in BM portfolios based on the preceding year's distribution of BM realizations. A firm-year observation is allocated into the Glamour, Middle, or Value portfolio if the firm's BM ratio is below the 30th percentile, between the 30th and 70th percentiles, or above the 70th percentile, respectively, of the preceding year's distribution. A firm-year observation is allocated to the low FSCORE, mid FSCORE, or high FSCORE portfolio if the firm's FSCORE is less than or equal to three, between four to seven, or greater than or equal to seven, respectively. The *Congruent V/G Strategy* consists of a long position in value firms with low FSCORE and a short position in glamour firms with high FSCORE. The *Incongruent V/G Strategy* consists of a long position in value firms with high FSCORE and a short position in glamour firms with low FSCORE. *T*-statistics are presented in parentheses. Significance tests are derived using empirically derived bootstrap distributions, using 1,000 pseudo portfolios matching the distribution of sample observations.

associated with a significant positive difference in forecast revisions between value and glamour firms.

In contrast, congruent value/glamour portfolios do not display similar, positive differences in forecast errors and forecast revisions between value and glamour stocks. Instead, the congruent value/glamour strategy is associated with a significant non-positive difference in forecast errors, and economically and statistically similar forecast revisions, between value and glamour stocks. Together, the lack of a systematic positive relation between value/glamour classifications and these expectation adjustment measures among the subsample of congruent value/glamour firms strengthens our interpretation that the returns to the incongruent value/glamour strategy are an artifact of systematic and predictable expectation-related pricing errors.

3.3 Multivariate analysis of expectation errors and revisions

The preceding analyses are subject to concerns that the predictability of earnings announcement returns ($EAR_{it_{+1}}$), analyst forecast errors (FE_{it}), and forecast revisions (REV_{it}) is attributable to omitted firm characteristics. To mitigate these concerns, we estimate cross-sectional models that control for firm size, momentum, and the most recent quarterly earnings surprise. Specifically, Table 6 presents average coefficients from three sets of estimations of the following cross-sectional model:

$$\begin{aligned}\{EAR_{it+1}, FE_{it}, REV_{it},\} &= \beta_1 Glamour_{it} + \beta_2 Glamour^*_{it} LowScore_{it} + \beta_3 Glamour^*_{it} MidScore_{it} \\ &+ \beta_4 Middle_{it} + \beta_5 Middle^*_{it} LowScore_{it} + \beta_6 Middle^*_{it} HighScore_{it} \\ &+ \beta_7 Value_{it} + \beta_8 Value^*_{it} MidScore_{it} + \beta_9 Value^*_{it} HighScore_{it} \\ &+ \beta_{10} SIZE_{it} + \beta_{11} MM_{it} + \beta_{12} SUE_{it} + \varepsilon_{it}. \end{aligned} \quad (2)$$

In these estimations, the intercept term is suppressed to ensure non-collinearity among value/glamour classifications. The first, second, and third set of columns in Table 6 present average coefficients, average R^2s, and Newey-West-adjusted Fama-MacBeth t-statistics from 39 annual cross-sectional estimations of Equation (2). The dependent variable equals firms' corresponding three-day earnings announcement period stock return, analyst forecast error, and analyst forecast revision, respectively. All independent variables are as defined in Section 2.

These estimations confirm the interaction effects documented in our portfolio-based tests. Specifically, glamour firms with weak fundamentals are more likely to report earnings that fall short of analyst expectations, experience downward earnings forecast revisions, and generate negative earnings announcement returns, while value firms with strong financial trends are more likely to exceed analyst expectations, experience upward earnings forecast revisions, and generate positive earnings announcement returns. These

Table 6
Earnings announcement returns, analyst forecast errors, and forecast revisions across value/glamour portfolios conditional upon firm fundamentals: Multivariate evidence

Dep. Variable:	*EA Returns*		*FE*		*REV*	
	(1)	(2)	(3)	(4)	(5)	(6)
Glamour	0.003***	0.006*	−0.004*	−0.105***	−0.004**	−0.074***
	(3.04)	(1.93)	(−1.68)	(−12.47)	(−2.58)	(−16.56)
*Glamour*LowScore*	−0.008***	−0.009***	−0.052***	−0.035***	−0.042***	−0.029***
	(−2.77)	(−2.87)	(−6.43)	(−5.60)	(−7.43)	(−6.10)
*Glamour*MedScore*	−0.003***	−0.002*	−0.015***	−0.008***	−0.013***	−0.008***
	(−2.77)	(−1.67)	(−5.63)	(−3.96)	(−7.30)	(−5.30)
Middle	0.006***	0.007**	−0.016***	−0.105***	−0.012***	−0.074***
	(5.09)	(2.49)	(−6.93)	(−12.89)	(−7.30)	(−16.08)
*Middle*LowScore*	−0.001	−0.001	0.009***	0.003**	0.006***	0.002**
	(−0.79)	(−0.76)	(5.01)	(2.42)	(6.07)	(2.24)
*Middle*HighScore*	0.002	0.001	−0.020***	−0.010***	−0.014***	−0.007***
	(1.45)	(1.13)	(−6.03)	(−3.45)	(−10.53)	(−6.16)
Value	0.006*	0.006	−0.038***	−0.111***	−0.024***	−0.073***
	(1.66)	(1.37)	(−10.06)	(−15.26)	(−8.87)	(−15.36)
*Value*MedScore*	0.005	0.004	0.026***	0.015***	0.017***	0.005**
	(1.57)	(1.17)	(6.98)	(3.33)	(7.04)	(1.97)
*Value*HighScore*	0.009***	0.008***	0.020***	0.013***	0.011***	0.005**
	(3.21)	(2.74)	(5.41)	(2.98)	(5.80)	(2.38)
Decile(SIZE)	–	−0.001***	–	0.006***	–	0.004***
	–	(−3.63)	–	(9.18)	–	(10.16)
Decile(MM)	–	0.001***	–	0.006***	–	0.004***
	–	(2.81)	–	(15.02)	–	(17.96)
Decile(SUE)	–	0.000	–	0.003***	–	0.002***
	–	(0.45)	–	(11.21)	–	(12.27)
Congruent V/G Strategy	0.002	0.001	−0.034	−0.006	−0.020	0.001
(*t*-statistic)	(0.694)	(0.160)	(−7.578)	(−1.331)	(−10.438)	(0.237)
Adj. R^2	0.010	0.014	0.116	0.246	0.122	0.242
N	137,304	137,304	56,727	56,727	56,727	56,727

This table presents average coefficients from annual estimations of the following cross-sectional models of three-day annual earnings announcement returns, analyst forecast errors, and analyst forecast revisions:

$$\begin{aligned}\{EARi_{i,t+1}, FE_{it}, REV_{it}\} = {} & \beta_1 Glamourit + \beta_2 Glamour_{it} * LowScore_{it} \\ & + \beta_3 Glamour_{it} * MidScore_{it} + \beta_4 Middle_{it} + \beta_5 Middle_{it} * LowScore_{it} \\ & + \beta_6 Middle_{it} * HighScore_{it} + \beta_7 Value_{it} + \beta_8 Value_{it} * MidScore_{it} \\ & + \beta_9 Value_{it} * HighScore_{it} + \beta_{10} SIZE_{it} + \beta_{11} MM_{it} + \beta_{12} SUE_{it} + \varepsilon_{it}.\end{aligned}$$

Firm-year observations are sorted in BM portfolios based on the preceding year's distribution of BM realizations. A firm-year observation is allocated into the Glamour, Middle, or Value portfolio if the firm's BM ratio is below the 30th percentile, between the 30th and 70th percentiles, or above the 70th percentile, respectively, of the preceding year's distribution; the indicator variables Glamour, Middle, and Value are equal to one if the firm-year corresponds to that particular BM portfolio, zero otherwise. The indicator variables LowScore, MidScore, and HighScore are equal to one if the firm's FSCORE is less than or equal to three, between four and six, or greater than or equal to seven, respectively. Earnings announcement returns ($EAR_{i,t+1}$) are measured over the three-day annual earnings announcement window immediately following portfolio formation. Size-adjusted returns are measured as raw returns minus the corresponding return on the CRSP-matched size decile portfolio. Analyst forecast errors and revisions are calculated six months following the preceding fiscal year-end. Forecast Error (FE) is defined as (Actual EPS-Consensus Forecast)/(total assets per share), and Forecast Revision (REV) is defined as the final consensus estimate minus the consensus at portfolio formation scaled by total assets per share. All other variables are as defined in Table 3. The *Congruent V/G Strategy* consists of a long position in value firms with low FSCORE and a short position in glamour firms with high FSCORE. Fama-MacBeth Newey-West adjusted *t*-statistics are based on the empirical distribution of the estimated coefficients from 39 annual estimations. *,**,*** denote that reported coefficients are statistically different from zero at the 10%, 5%, and 1% level of significance (two-tailed), respectively.

inferences are robust to controlling for firm size, momentum, and the serial correlation in quarterly earnings surprises. Moreover, after controlling for these firm characteristics, our congruent value/glamour portfolios are associated with insignificant differences in analyst forecast errors, forecast revisions, and earnings announcement returns across value and glamour firms, mirroring the return evidence presented in Tables 3 and 4.

Taken together, the results of this section demonstrate a consistent and systematic pattern of expectation errors and corrections across and within value/glamour portfolios. Whereas the prior literature (i.e., Dechow and Sloan 1997) shows that errors in growth expectations are correlated with V/G classifications and can predict returns (on average), our methodology allows us to identify, ex ante, which value and glamour firms are most and least likely to generate performance-related expectation errors and subsequent price reversals, within the misvaluation framework. The presence of systemically positive differences in expectation errors and adjustments between value and glamour stocks with contrarian fundamental information, and the lack of these systematic errors and adjustments among congruent value/glamour firms, is compelling evidence in favor of a mispricing interpretation for the value/glamour effect.

4. Robustness Tests

4.1 Asset pricing models and factor loadings

An alternative approach to testing our central hypothesis is to examine congruent and incongruent strategy returns that are orthogonalized to traditional risk factor proxies. To implement this approach, we implement three long-short strategies. The first two strategies are the congruent and incongruent value/glamour strategies defined in Section 1. The third is the neutral value/glamour strategy, which consists of a long position in value firms and a short position in glamour firms that are not allocated to either the congruent or incongruent value/glamour strategy. Neutral value/glamour firms are expected to have less severe mispricing than incongruent value/glamour firms, yet possess a greater likelihood of ex ante pricing errors relative to congruent firms; as such, we expect that risk-adjusted returns will be monotonically increasing across the congruent, neutral, and incongruent value/glamour strategies. We estimate the following empirical asset-pricing model for each of the three strategies:

$$R_{s,t} - rft = \alpha + \beta_1 MKTRF_t + \beta_2 SMB_t + \beta_3 HML_t + \beta_4 UMD_t + \varepsilon_{i,t}, \quad (3)$$

where $R_{s,t}$ is the monthly return of a given strategy in month t, rf_t is the risk-free rate, and $MKTRF_t$ is the market return minus the risk-free rate. SMB_t, HML_t, and UMD_t are the returns associated with high-minus-low size, BM, and momentum strategies, respectively. We obtain data on the risk factor premiums from Ken French's data library via WRDS.

These estimations reveal two key findings (results not tabulated for parsimony). First, the incongruent and congruent value/glamour portfolios have very different factor loadings; loadings on the BM and momentum factors are increasing in incongruence, while loadings on the size factors are decreasing in incongruence. Second, after controlling for these differences in factor loadings, the alphas to these strategies are monotonically increasing in the degree of incongruence in the value/glamour portfolios. For the incongruent sample, the intercept is 0.980 (t-statistic $= 5.37$), implying a 1.0% monthly excess return to that strategy. For the "neutral" sample of firms, where incongruence between prices and fundamentals is less pronounced (e.g., glamour and value firms with Mid-FSCOREs), the intercept is 0.603. This term is also significant at the 1% level (t-statistic $= 5.77$), yet implies a smaller monthly excess return commensurate with the less severe pricing bias among these firms. In contrast, estimations utilizing our sample of congruent firms yield an intercept of -0.078, which is statistically indistinguishable from zero (t-statistic $= -0.40$). Together, these patterns confirm the inferences gleaned from our earlier portfolio and cross-sectional regression analyses.

4.2 Alternative measures of firm fundamentals

Following the evidence in Piotroski (2000) and Fama and French (2006), this article classifies the strength of firm fundamentals using FSCORE; however, alternative measures of firm performance and financial strength are available. To demonstrate the robustness of our results, we replicate the analysis after conditioning value/glamour firms on the basis of each firm's most recent quarterly earnings innovation, SUE. As an alternative proxy for the strength of firms' fundamentals, SUE has the benefit of focusing on an observable and widely disseminated measure of aggregate performance; the weakness is that it only reflects one dimension of firms' financial condition (i.e., profitability).

Inferences using SUE as our measure of firm fundamentals are consistent with the results reported using FSCORE (results not tabulated for parsimony). Specifically, partitions on the basis of SUE and value/glamour yield a one-year-ahead incongruent value/glamour strategy return of 16.4%, while the congruent value/glamour strategy only yields a 2.6% return. Moreover, partitioning on the basis of SUE and value/glamour yields a distribution of expectation errors and adjustments across congruent and incongruent value/glamour portfolios similar to those observed using FSCORE.

4.3 Impact of information horizon on value/glamour investment strategies

Our methodology requires that there exist a four-month lag between firms' fiscal year-end and portfolio formation date. One concern with the use of a four-month lag is that the information required to form portfolios is potentially not available, due to late filings by listed firms. This concern is especially

relevant in earlier years of our sample, when firms had more time to file [e.g., annual filings (Form 10-K) were due 90 days after fiscal year-end], and it took longer for investors to gather and receive this information (Green, Hand, and Soliman 2011). To eliminate this potential concern, we reestimate our primary results after allowing both a five-month and six-month lag, as well as an approach that forms all portfolios on June 30 (and requires a six-month information horizon). As expected, lengthening the lag between fiscal year-end and portfolio formation reduces the returns generated under the incongruent value/glamour strategy.[16] This reduction in predictability is consistent with the marginal gains to an information-based anomaly eroding over time as the market begins unraveling the pricing bias. In contrast, the returns to the congruent value/glamour strategy remain statistically equivalent to zero regardless of the information lag horizon chosen.

4.4 Evidence from alternative value/glamour investment strategies

We define value/glamour portfolios on the basis of firms' BM ratio; however, alternative approaches to measuring value/glamour exist. To examine the robustness of our inferences to these other classifications, we also examine future returns and expectation revisions and error conditional upon using four alternative value/glamour proxies, earnings-to-price (EP), cash-flow-to-price (CP), sales growth (SG), and equity share turnover (TO), as well as two composite measures of value/glamour. Results using these alternative measures of value/glamour yield similar inferences to those presented for BM ratios (results not tabulated for parsimony).

5. Expectation Errors and Investor Sentiment

Our final set of analyses exploits inter-temporal variation in investor sentiment as a proxy for the influence of speculative demand on market prices. As argued in Baker and Wurgler (2006), periods of high investor sentiment can produce market prices where implied performance expectations deviate farther and more frequently from firm fundamentals; as such, we predict that trading strategies that exploit these differences will produce larger portfolio returns during periods of high investor sentiment. Following Baker and Wurgler (2006), we classify our portfolios into periods of high, medium, and low investor sentiment and examine variation in returns to our congruent and incongruent value/glamour strategies.[17] We measure investor sentiment at the

[16] The returns to the incongruent BM strategy, after allowing a four-, five-, and six-month information lag, are 22.6%, 22.5%, and 21.4%, respectively; the returns if compounding starts on the subsequent June 30 are 18.8%. The 3.8% difference in returns between the four-month lag and June 30 portfolio formation period is significant at the 1% level (t-statistic = 3.15).

[17] We obtain data on annual investor sentiment from Jeffrey Wurgler's website: http://pages.stern.nyu.edu/~jwurgler/. We use the Baker and Wurgler investor sentiment index orthogonalized to macroeconomic factors for our main tests, although the results are robust across alternative measures of sentiment.

Table 7
Returns to various value/glamour strategies conditional on level of investor sentiment

	Annual Returns			Monthly Returns		
	Value-Glamour	Congruent V/G Strategy	Incongruent V/G Strategy	Value-Glamour	Congruent V/G Strategy	Incongruent V/G Strategy
Investor Sentiment:						
Low	0.0795	0.0025	0.1217	0.0102	−0.0041	0.0110
Medium	0.1157	0.0108	0.2302	0.0091	−0.0024	0.0171
High	0.1209	0.0444	0.2709	0.0146	0.0024	0.0312
High – Low	0.0415	0.0419	0.1492	0.0044	0.0065	0.0201
(*t*-statistic)	(0.650)	(0.550)	(1.750)	(2.070)	(1.310)	(4.310)

This table presents annual and monthly size-adjusted buy-and-hold returns to various BM investment strategies, conditional on the level of investor sentiment in the market, over the period 1972 to 2010. Investor sentiment reflects the index used in Baker and Wurgler (2006), orthogonalized to macro factors. Investor sentiment is measured in the month preceding portfolio formation. For annual estimations, R_{it+1} is the firm's cumulative one-year-ahead raw return, with return compounding starting four months after the most recent fiscal year-end. For monthly estimations, monthly raw returns ($R_{i,t+1}$) are matched to financial statement information available at portfolio formation, allowing for at least four months between the fiscal year-end and portfolio formation. The *Congruent V/G Strategy* consists of a long position in value firms with low FSCORE and a short position in glamour firms with high FSCORE. The *Incongruent V/G Strategy* consists of a long position in value firms with high FSCORE and a short position in glamour firms with low FSCORE. *T*-statistics are shown in parentheses and are based on the 39-year time series.

time each respective portfolio is formed. Table 7 presents this time-series evidence using both monthly and annual investor sentiment indices from 1972 to 2010.

As expected, the traditional value/glamour strategy performs marginally better during periods of high investor sentiment (when measured at the monthly level). More importantly, consistent with our systematic mispricing arguments, we find that the returns to the value/glamour strategy, when conditioned upon historical financial information that identifies likely deviations between market beliefs and firm fundamentals (i.e., incongruent value/glamour strategy), are significantly larger in periods of high investor sentiment. In contrast, returns to the congruent value/glamour strategy display no relation with the level of investor sentiment.

6. Conclusion

Existing research hypothesizes that at least one component of the return difference attributable to the value/glamour effect is the result of transitory pricing errors. Under this explanation, misvaluation is attributed to overly optimistic performance expectations for glamour firms and overly pessimistic expectations for value firms. Consistent with the presence of these expectation biases, LaPorta et al. (1997) document systematic price adjustments around the arrival of new earnings information among value and glamour firms, while LaPorta (1996) shows that the market does not unravel biases in analyst forecasts of long-term growth. Building upon LaPorta's findings, Dechow

and Sloan (1997) find that stock prices reflect a naïve reliance on analysts' biased growth forecasts, and that these biases are capable of explaining over half of the value/glamour return effect. However, a corresponding analysis of analyst earnings forecasts by Doukas, Kim, and Pantzalis (2002) fails to detect significant differences in expectation errors across value/glamour portfolios.

This article exploits cross-sectional variation in the ex ante likelihood of biased expectations to highlight the role of expectation errors in the value/glamour context. We build upon the premise that high or low pricing multiples need to be judged contextually; firms with high or low pricing multiples are only mispriced if the pricing is not warranted given the strength of the firm's fundamentals. If the value/glamour effect is an artifact of a reversal of erroneous expectations, subsequent revisions in both prices and market expectations should be concentrated among firms where expectations in price are incongruent with current trends in firms' fundamentals. More importantly, portfolios of firms lacking this incongruence should not generate a value/glamour effect in realized returns or display systematically biased expectations. Our article contributes to the extant literature by testing these cross-sectional predictions.

Consistent with these predictions, we find that the returns to value/glamour investment strategies are strongest among those firms where expectations implied by current prices are incongruent with the strength of their fundamentals. Moreover, among firms whose fundamental strength is congruent with the expectations likely implied by firms' current value/glamour classification, the value/glamour effect is attenuated toward zero. The observed return patterns are consistent with market participants pricing extreme value/glamour portfolios as a bundle of similar securities and ignoring differences in the underlying financial conditions of the firms composing each portfolio, leading to predictable pricing revisions across value/glamour portfolios conditional on recent fundamentals. Additional tests document a systematic pattern of ex post expectation errors and expectation revisions across and within value/glamour portfolios, as measured by earnings announcement period returns, analyst earnings forecast errors, and analyst earnings forecast revisions, which are consistent with these ex ante expectation biases and mirror the concentration of the long-window value/glamour return effect. Finally, we document that the returns to an incongruent value/glamour strategy are larger during periods of high investor sentiment, while the returns to the congruent value/glamour strategy display no relation with the level of investor sentiment.

Together, the mosaic of results suggests that the returns to the traditional value/glamour investment strategy are an artifact of predictable expectation errors correlated with past financial data. Although alternative explanations for these patterns could exist, the observed return patterns are consistent with systematic expectations errors embedded in prices, and cast considerable doubt on risk-based explanations for the value/glamour effect.

Appendix 1

Construction of Piotroski's (2000) FSCORE Statistic

This article adopts the aggregate statistic, FSCORE, utilized in Piotroski (2000) and Fama and French (2006) to classify firms on the basis of changes in their financial condition. This aggregate statistic is based on nine financial signals designed to measure three different dimensions of the firm's financial condition: profitability, change in financial leverage/liquidity, and change in operational efficiency. The signals used are easy to interpret and implement, and have broad appeal as summary performance statistics. Each signal realization is classified as either "good" or "bad," depending on the signal's implication for future profitability and cash flows. An indicator variable for each signal is set equal to one (zero) if the signal's realization is good (bad). The aggregate measure, FSCORE, is defined as the sum of the nine binary signals, and is designed to measure the overall improvement, or deterioration, in the firm's financial condition. The following sections outline the variables and signals used in Piotroski (2000) to assess the strength of financial performance trends.

A.1 Financial performance signals: Profitability

Current operating profits and cash flow realizations provide information about the firm's ability to internally generate funds, invest in value-creating assets and, ultimately, pay dividends to shareholders. Similarly, a positive earnings trend is suggestive of an improvement in the firm's underlying ability to generate positive future cash flows, while profits associated with current operating cash flow are a signal of strong earnings quality. Piotroski (2000) uses four variables to measure these performance-related factors: *ROA*, *CFO*, ΔNI, and *ACCRUAL*.

Return-on-assets (*ROA*) is defined as net income before extraordinary items for year t scaled by beginning of year total assets. *CFO* is defined as cash flow from operations for year t scaled by beginning-of-year total assets. If the firm's ROA is positive, the indicator variable *F_ROA* equals one, zero otherwise. Similarly, if the firm's CFO is positive, the indicator variable *F_CFO* equals one, zero otherwise. These two variables are used to determine whether the firm meets a minimum level of financial performance, such as the ability of the firm's operations to cover operating costs, financing costs, and necessary investments in productive assets (similar to the ideas discussed in Graham and Dodd 1934).

The overall trend in profitability is measured by the annual change in net income. Change in net income (ΔROA) is defined as current year ROA less the prior year's ROA realization. If ΔROA is greater than zero, the indicator variable *F_*Δ *ROA* equals one, zero otherwise. The various dimensions of firm performance (*ROA*, *CFO*, and ΔROA) are compared against a zero benchmark for ease of implementation and to eliminate measurement errors associated with the use of non-zero benchmarks. Other benchmarks, such as a firm- or industry-specific required rate of return hurdles or industry-level averages, could be employed. Although such benchmarks have the potential to increase predictive power (see Soliman 2004), they also increase the complexity of the evaluating firms and implementing this investment heuristic.

Finally, the relation between the level of earnings and cash flow is also considered. Sloan (1996) shows that earnings driven by positive accrual adjustments are a bad signal about future profitability and returns. To the extent that a firm's profits are not being converted into corresponding cash flow, this earnings innovation should be viewed suspiciously. The variable *ACCRUAL* is defined as current year's net income before extraordinary items less cash flow from operations, scaled by average total assets. The indicator variable, *F_ACCRUAL*, equals one if *ACCRUAL* is less than zero, zero otherwise.

A.2 Financial performance signals: Changes in financial leverage/liquidity

Three of the nine signals are designed to measure changes in the firm's capital structure and ability to meet future debt service obligations: $\Delta LEVER$, $\Delta LIQUID$, and *ISSUANCE*. The variable $\Delta LEVER$ captures changes in the firm's long-term debt levels, and is measured as the change in

the ratio of long-term debt to total assets. Piotroski (2000) views an increase (decrease) in financial leverage as a negative (positive) signal; by raising external capital, the firm may be signaling its inability to generate sufficient internal funds (e.g., Miller and Rock 1985). In addition, an increase in long-term debt is likely to place additional constraints on the firm's overall financial flexibility. The indicator variable *F_ΔLEVER* equals one if the firm's leverage ratio fell in the year preceding portfolio formation or if the firm has no long-term debt at both the beginning and the end of the fiscal year, zero otherwise.

The variable *ΔLIQUID* measures the historical change in the firm's current ratio between the current and prior year, where the current ratio is defined as the ratio of current assets to current liabilities at fiscal year-end. An improvement in liquidity is assumed to be a good signal about the firm's ability to service current debt and working capital obligations. The indicator variable *F_ΔLIQUID* equals one if the firm's liquidity improved, zero otherwise.

Finally, the indicator variable *ISSUANCE* equals one if the firm did not issue common equity in the fiscal year preceding portfolio formation and zero otherwise. Similar to an increase in long-term debt, raising external equity capital could be signaling the firm's inability to generate sufficient internal funds to service future obligations.

Despite these strict classifications, the implications of a shift in financing activities are not as clear-cut, and are ultimately dependent on the firm's current characteristics. For example, falling liquidity ratios could be the result of the better utilization of working capital, while increasing leverage can reduce agency costs (e.g., Harris and Raviv 1990). Similarly, an external debt or equity issuance could be an optimal financing response to a positive NPV investment opportunity. However, absent a more detailed analysis of a given firm's economic attributes/condition, we will rely on prior empirical research that external financing events (i.e., long-term debt and equity issues) convey, *on average*, bad economic news. This evidence is consistent with the interpretations found in Myers and Majluf (1984) and Miller and Rock (1985). Given this "bad news" assumption, an increase in financial leverage, a deterioration of liquidity, or the use of external financing is considered a bad signal about financial risk and future cash flows in this article. The presence of contextual settings where these general assumptions are false will weaken the overall predictive ability of FSCORE.

A.3 Financial performance signals: Operating efficiency The remaining two signals are designed to measure changes in the efficiency of the firm's underlying operations: change in gross margin (*ΔMARGIN*) and asset turnover (*ΔTURN*). These two ratios reflect two key dimensions of performance underlying a traditional decomposition of return on assets.

The variable *ΔMARGIN* is defined as the firm's current gross margin ratio less the prior year's gross margin ratio. An improvement in margin signifies a potential improvement in factor costs, a reduction in inventory costs, a rise in the selling price of the firm's product, or a change in product mix toward more profitable lines, geographic regions, and/or customers. The indicator variable *F_ΔMARGIN* equals one if *ΔMARGIN* is positive, zero otherwise.

The variable *ΔTURN* is defined as the difference between the firm's current and prior year asset turnover ratio, where the asset turnover ratio is measured as total sales scaled by average total assets during the respective fiscal year. An improvement in asset turnover tends to signal greater productivity from the asset base, more efficient operations, or a relative increase in sales volume (which could signify increased demand for the firm's products). The indicator variable *F_ΔTURN* equals one if *ΔTURN* is positive, zero otherwise.

A.4 Aggregate score of recent financial performance The aggregate fundamental score, FSCORE, is defined as the sum of the individual binary signals, or

$$FSCORE = F\_ROA + F\_CFO + F\_\Delta ROA + F\_ACCRUAL + F\_\Delta LEVER + F\_\Delta LIQUID + ISSUANCE + F\_\Delta MARGIN + F\_\Delta TURN. \quad \text{(A1)}$$

Given the nine underlying signals, FSCORE can range from a low of zero to a high of nine, where a low (high) FSCORE represents a firm with very few (mostly) good signals about the firm's financial condition.

Appendix 2
Sample Selection and Data Attrition

Filter	Criterion	# of Firm-Years
1	All firm-years in Compustat Xpressfeed Annual database with non-missing FSCORE between 1972 and 2010.	205, 840
2	Less observations with negative book value of equity and financial firms with Standard Industrial Classification codes between 6000 and 6999.	−18, 647
3	Intersection of CRSP and Compustat using the CRSP/Compustat Merged Link History File (CCMXPF_LINKTABLE) with non-missing market capitalization (price times shares outstanding).	−26, 802
4	Less observations with CRSP share codes other than 10, 11, and 12 and less without at least six months of prior return data to calculate return momentum.	−23, 087
	Final Sample: Return-based tests	**137**, **304**
5	Less observations not found in the Unadjusted IBES Summary Estimates File.	−80, 577
	Final Sample: Analyst forecast error and forecast revision tests	**56**, **727**

This table outlines the attrition in data that occurred due to our sample selection procedures and data requirements.

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