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Earnings Surprises, Investor Sentiments and Contrarian Strategies

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ABSTRACT

This study documents that contrarian investment strategies offer superior returns because these strategies exploit investors' expectation errors. There are two sources of expectation errors, naïve extrapolation of past performance and biased analysts' earnings forecasts. Our results suggest that investors naively extrapolate past performance and overestimate the future growth rates of glamour stocks relative to value stocks. In addition, analysts tend to be excessively pessimistic about value stocks and over optimistic about glamour stocks. We find that both positive earnings surprises and negative earnings surprises significantly affect subsequent returns. However, negative earnings surprises have less impact on value stocks relative to glamour stocks. We also find new evidence that investor sentiments could be an alternative source of superior performances from value stocks. Our results indicate that when the investor sentiment is higher, value stocks earn significant higher returns than glamour stocks.

Keywords: Contrarian Strategy, Value and Glamour Stocks, Earnings Surprise, Investor Sentiments
JEL Classifications: G02, G11, G14

1. INTRODUCTION

It is well documented that investing stocks that are priced lower relative to accounting multiples, such as book value of equity, cash flows and earnings yields higher returns. However, the source of the superior return to these "contrarian strategies" remains a controversial issue. Possible explanations include fundamental risk premiums (Fama and Fench, 1992), naive investor expectations of future growth (Lakonishok et al., 1994) (LSV, 1994 hereafter), and expectation errors (La Porta et al., 1997). LSV (1994) document that contrarian strategies outperform because investors over-extrapolate past performances, leaving stocks having poor past performance undervalued, and stocks having superior past performance overvalued. They also suggest that the past performance and the expected future performance are two distinct and separately measurable features of glamour and value stocks. If the contrarian strategy works well, value stocks that have poor past performances and poor expected future growth should yield higher returns than glamour stocks.

Using a longer sample period from 1985 to 2013, this study investigates further on possible explanations why contrarian strategies outperform others. Our results suggest that a wide range of value stocks produce significant higher returns than glamour stocks at horizons of up to 5 years. Excess returns persist even controlling for firm sizes. The contrarian strategies outperform because investors are able to exploit expectation errors implicit in stocks prices. There are two sources of expectation errors, naïve extrapolation of past performance as suggested by LSV (1994), and biased analysts' earnings forecasts suggested by La Porta et al. (1997). Analysts tend to be excessively pessimistic about value stocks and over optimistic about glamour stocks, thus the announcement of the actual earnings may create a positive surprise for value firms and a negative surprise for glamour firms (or *vice versa*), which can be used to justify the return differences. Our results suggest that positive earnings surprises do have positive impacts on both value and glamour stocks, however, value stocks outperform glamour stocks when there are negative surprises.

Baker and Wurgler (2006) conclude that the investment sentiment affects the cross-section stock returns. Therefore we investigate how the investment sentiment contributes to the outperformance of value stocks. Our results suggest that both value stocks and glamour stocks are positively related to investment sentiment. However, the investment sentiment has a significant greater impact on value stocks. Our results contribute to the existing literatures by linking the investor's sentiment to the outperformance of the contrarian strategies.

This paper is organized as follows. The next section provides a literature review on contrarian investment strategies. Section 3 briefly discusses the data and methodology. Section 4 examines the performance of simple classification and two-dimensional investment strategies. Section 5 tests the contrarian model. Section 6 investigates the role of analysts' earnings forecasts in explaining the superior performance of contrarian strategies. Section 7 investigates the impact of the investment sentiment. Section 8 concludes.

2. LITERATURE REVIEW

Contrarian strategies are investment strategies that buying stocks with low price to earnings, cash flows, or other measures of fundamental values. Contrarian strategies have been one of the most well-established empirical facts in financial research. Many studies conclude that stocks with high earnings-to-price ratios (E/P) usually generate higher returns (Basu, 1977 and 1983, and Jaffe et al., 1989). Book-to-market ratio (B/M) is another variable when making investment decisions. Rosenberg et al. (1985) concludes that stocks with relative lower book-to-market equity ratios outperform the market. Fama and French (1992) also suggest that B/Ms combined with sizes are able to capture the cross-sectional variation in average stock returns. The outperformance of these contrarian strategies are also found across different countries, for example, Chan et al. (1991) in Japan, Brouwer et al. (1997) in a number of European countries, and Xu (2001) in UK.

However, the underlying reason for the success of contrarian investment strategies remains a controversial issue. There are two distinct views towards this, the traditional view and the behavioral view. Fama and French (1992, 1993, 1995, 1996, and 1998) support the traditional view, conclude that stocks with smaller sizes and higher book-to-market equity ratios (value stocks) tend to generate higher returns compared to other stocks because they are fundamentally riskier. Contrary to the traditional view, LSV (1994) suggest that contrarian strategies exploit the suboptimal behavior of a typical investor. Value strategies yield remarkable returns due to contrarian to naïve strategies that are naively extrapolating past earnings and sales growth despite the fact that these growths are mean-reverting. Contrarian investors, on the other hand, go against such naïve investors. They invest disproportionately in firms that are underpriced and underinvested in companies that are overpriced, thus, they over perform (De Bondt and Thaler, 1985). A recent study by Gregory et al. (2001) follows LSV (1994) to undertake simple one-way and two-way classifications of the UK stocks in which value stocks are defined using both past and expected future performance. They find that excess returns to majority of value strategies can be explained by Fama-French three-factor model using the one-way classification. However, for the two-way classification, there are substantial differences in returns between value and glamour portfolios, after controlling for systematic risk.

Results from De Bondt and Thaler (1985, 1987) suggest that the empirical evidence is consistent with the overreaction hypothesis which suggests that people tend to "overreact" to both unexpected and dramatic news events. These results shed new light on the January returns earned by prior "winners" and "losers." Portfolios of previous losers experience exceptionally large January returns up to 5 years after portfolio formation. De Bondt and Thaler (1987) suggest that extreme losers beat the market over the subsequent years. As a consequence, stock prices may also temporarily depart from their fundamental values. Thus, prices are biased by either excessive optimism or pessimism, prior "loser" would be more attractive investments than prior "winners."

La Porta et al. (1997) document that a substantial portion of the return difference between value and glamour stocks is attributed to earnings surprises that are asymmetrically more positive for value stocks than for other stocks. The evidence is not consistent with a risk-based explanation for the return differential. Bauman and Miller (1997) propose an alternative expectation hypothesis, indicating that forecasters rely too heavily on past trends when formulating their expectations about the future, and this gives an explanation for the differences in the performance between value and glamour stocks. Bauman and Dowen (1994) also conclude that the earnings forecast errors (EFE) play some roles on investors' expectation about future stock performances. The EFE is defined as the difference in reported earnings per share (EPS) and the EPS previously forecasted by security analysts. La Porta (1996) suggest that value strategies that seek to exploit errors in analysts' forecast obtain superior returns. Dechow and Sloan (1997) find that no evidence of naive extrapolation of past trends in earnings and sales growth, instead they find that analysts' forecasts of future earnings growth can explain over half of the abnormal returns of contrarian investment strategies.

Typically, following the excessive pessimism (optimism) of analysts' forecasts, the actual EPS creates a positive surprise for high B/M stocks and a negative surprise for low B/M stocks. Dreman and Berry (1995) conclude that earnings surprise is not necessarily symmetrical across high and low P/E stocks. Positive surprises may have a greater impact on value stocks compared to glamour stocks, while negative surprises may have a greater impact on glamour stocks than value stocks. Levis and Liodakis (2001) find evidence consistent with the view that errors in expectations are more likely to be a result of biases in analysts' earnings forecasts than naïve extrapolation of past. In addition, they find that positive and negative earnings surprises have an asymmetrical effect on the returns of value stocks and glamour stocks.

Baker and Wurgler (2006) investigate how investor sentiment affects the cross-section of stock return. They find that when sentiment is low, subsequent returns are relatively high for small stocks, young stocks, high volatility stocks, unprofitable stocks, non-dividend-paying stocks, extreme growth stocks, and distressed stocks. When sentiment is high, these categories of stock earn relatively low subsequent returns. Therefore, in our paper, Baker and Wurgler (2006) investor sentiment index is applied to investigate if market sentiments help to explain the outperformance of contrarian investment strategies.

3. DATA AND METHODOLOGY

Return data for all stocks traded on New York Stock Exchange and the American Stock Exchange are collected from the Center for Research in Security Prices (CRSP), for the period from 1985 to 2013. Accounting data are collected from COMPUSTAT for the same period. Our portfolio formation strategies require 5 years of past accounting data, thus, portfolios are formed each year from 1990 to 2012, and resulting 23 formation periods. Portfolios are formed at the end of each April to ensure previous year's accounting data are available at the time of formation. Subsequent performances of portfolios are examined up to 5 years after the formation. Our sample does not overlap with the period as in Banz and Breen (1986) and Kothari et al. (1995), thus stock returns do not suffer significant look-ahead or survivorship bias. In addition, the methodology employed in this study differs from those mentioned above in ways that should be able to alleviate this bias.

Portfolios are classified based on various accounting measures, such as, the B/M, the cash flow-to-price ratio (C/P), the E/P, and growth rates on sales (GS). Specifically, one-dimensional portfolios are formed as follows: All stocks in the sample are divided annually into 10 deciles based on B/M, C/P, E/P and GS[1]. Therefore, we define the glamour portfolio as the decile portfolio with stocks ranking lowest on B/M, C/P, E/P, and highest on GS. The value portfolio refers to the decile portfolio containing stocks with highest ranking on B/M, C/P, E/P, and lowest on GS. For these classifications, only stocks with positive ratios of C/P and E/P are included[2].

For two-dimensional portfolios, all stocks are independently sorted in ascending order into three groups, and in each group sorted into three subgroups: Top 30%, middle 40%, and bottom 30%, based on the following five combinations: C/P and GS, E/P and GS, B/M and GS, E/P and B/M, B/M and C/P. For example, with the C/P and GS combination, stocks are sorted with C/P into 3 groups. Then, with each group of C/P, stocks are further divided into 3 sub-groups according to the GS. For all portfolios, annual stock returns are calculated using a buy-and-hold strategy for subsequent 5 years after formation. At the end of each year, portfolios are rebalanced and each surviving stock weights equally. If a stock is deleted from CRSP during a year, its return is replaced until the end of the year with the return on a corresponding size decile portfolio as suggested by LSV (1994).

We also calculate the size adjusted portfolio returns. First, the market capitalization for all stocks at the end of the previous year is defined. Then, a size benchmark portfolio is constructed as the following. The return for each stock in the portfolio is replaced each year with an annual buy-and-hold return on an equally weighted portfolio of all stocks in its size decile for that year. The annual size-adjusted return on the original portfolio is then calculated as the return on the original portfolio minus the return on that year's size benchmark portfolio.

To investigate the role of earnings surprises and investor sentiments in explaining the outperformance of contrarian strategies, two additional data sets are applied. One is the analysts' earnings forecasts from I/B/E/S for the same sample period. Earnings forecasts up to 12 months prior to the announcement for all companies are available in the I/B/E/S database, for 2962 firms from 1990 to 2013. The actual announcement dates are used to match the EPS forecasts with the accounting and return data of individual stocks. The second data set is the Annual Investor Sentiment Index for the same period, developed by Baker and Wurgler (2006)[3].

4. PORTFOLIO FORMATION AND CONTRARIAN STRATEGIES

4.1. One-dimensional Portfolio Strategies

Table 1 presents the portfolio returns based on one-dimensional classifications. All stocks are sorted into 10 portfolios based on B/M (Panel A), C/P (Panel B), E/P (Panel C) and GS (Panel D), in an ascending order. Annual buy-and-hold portfolio average returns up to 5 years after formation (R_1 through R_5) are calculated. The average annual 5-year return (AR), the cumulative 5-year return (CR_5), and the size-adjusted average annual 5-year return (SAAR) are also presented.

Results from Panel A are consistent with those in LSV (1994). On average, the glamour stocks (with lowest B/M ratios) have an average annual return of 13.5% and the value stocks have an average return of 15.3%, for a difference of 1.8%. Value stocks outperform glamour stocks by 15.6% (1.041-0.885) over 5 years. The size-adjusted average annual return is 1.2% for glamour stocks and 5.5% for value stocks, a difference of 4.3%. Similar results are observed in Panels B, C and D, when C/P, E/P, and GS are used to form the portfolio. We find that value stocks outperform glamour stocks in every aspect, i.e., the 5-year average return, the 5-year cumulative return, and the size-adjusted return.

4.2. Two-dimensional Portfolio Strategies

We now use the two-dimensional portfolio formation to examine the performance of the contrarian strategies. Panel A in Table 2 presents the results for strategy that sort stocks using combination of C/P and GS. The glamour portfolio contains stocks that fall into the bottom 30% of C/P and the top 30% of GS. The value portfolio contains stocks that fall into the top 30% of C/P and the bottom 30% of GS. On average, over the 5 post-formation years, the glamour portfolio has an annual return of 12.3%, while the value portfolio has an annual return of 18.1%, a difference of 5.7%. The 5-year cumulative return

1 GS is the average growth rate of sales over the 5-year period prior to the portfolio formation.

2 We follow LSV (1994) when form portfolios so that stocks with negative ratios are eliminated. However, in the regression analysis (see Table III), stocks with negative ratios are included, dummy variables are used for negative earnings and cash flows.

3 The data set is downloaded from Baker and Wurlger website.

Table 1: Portfolio returns based on one-dimensional classifications

	Panel A: B/M									
	Glamour									Value
	0	1	2	3	4	5	6	7	8	9
R1	0.162	0.127	0.130	0.124	0.111	0.113	0.119	0.147	0.172	0.152
R2	0.130	0.115	0.125	0.136	0.123	0.132	0.142	0.152	0.177	0.150
R3	0.130	0.104	0.125	0.123	0.134	0.124	0.137	0.159	0.175	0.150
R4	0.137	0.115	0.108	0.112	0.133	0.127	0.128	0.142	0.171	0.162
R5	0.117	0.121	0.130	0.126	0.121	0.133	0.126	0.131	0.183	0.152
AR	0.135	0.116	0.124	0.124	0.125	0.126	0.130	0.146	0.176	0.153
CR5	0.885	0.733	0.791	0.797	0.799	0.807	0.845	0.978	1.245	1.041
SAAR	0.012	0.030	0.032	0.037	0.029	0.015	0.025	0.029	0.052	0.055
	Panel B: C/P									
	Glamour									Value
	0	1	2	3	4	5	6	7	8	9
R1	0.021	0.080	0.110	0.130	0.132	0.170	0.164	0.203	0.263	0.208
R2	0.108	0.108	0.115	0.134	0.122	0.141	0.138	0.151	0.188	0.152
R3	0.121	0.091	0.115	0.132	0.131	0.140	0.138	0.147	0.181	0.156
R4	0.120	0.119	0.121	0.136	0.109	0.129	0.136	0.138	0.164	0.171
R5	0.137	0.128	0.104	0.125	0.113	0.132	0.130	0.132	0.167	0.143
AR	0.101	0.105	0.113	0.132	0.121	0.142	0.141	0.154	0.193	0.166
CR5	0.615	0.649	0.707	0.856	0.773	0.945	0.934	1.046	1.408	1.153
SAAR	−0.032	0.008	0.016	0.036	0.023	0.037	0.041	0.051	0.088	0.080
	Panel C: E/P									
	Glamour									Value
	0	1	2	3	4	5	6	7	8	9
R1	0.038	0.073	0.117	0.131	0.118	0.139	0.169	0.209	0.266	0.219
R2	0.114	0.156	0.107	0.111	0.114	0.113	0.141	0.137	0.151	0.148
R3	0.132	0.129	0.120	0.119	0.124	0.112	0.126	0.130	0.154	0.146
R4	0.147	0.114	0.109	0.116	0.123	0.121	0.129	0.138	0.146	0.145
R5	0.140	0.129	0.112	0.121	0.123	0.126	0.120	0.141	0.143	0.133
AR	0.114	0.120	0.113	0.120	0.121	0.122	0.137	0.151	0.172	0.158
CR5	0.713	0.762	0.708	0.759	0.768	0.780	0.899	1.018	1.207	1.081
SAAR	−0.020	0.023	0.016	0.024	0.022	0.017	0.037	0.048	0.068	0.072
	Panel D: GS									
	Glamour									Value
	0	1	2	3	4	5	6	7	8	9
R1	0.125	0.126	0.106	0.122	0.125	0.155	0.135	0.154	0.163	0.157
R2	0.155	0.137	0.137	0.130	0.130	0.135	0.124	0.133	0.160	0.134
R3	0.173	0.127	0.114	0.117	0.135	0.134	0.127	0.121	0.136	0.152
R4	0.157	0.114	0.126	0.116	0.115	0.113	0.141	0.133	0.152	0.145
R5	0.163	0.126	0.120	0.126	0.119	0.116	0.117	0.137	0.148	0.138
AR	0.154	0.126	0.121	0.122	0.125	0.131	0.129	0.136	0.152	0.145
CR5	1.050	0.811	0.766	0.780	0.801	0.847	0.833	0.888	1.028	0.971
SAAR	0.068	0.021	0.017	0.022	0.020	0.032	0.033	0.039	0.054	0.011

10-decile portfolios are formed in ascending order based on B/M, C/P, E/P, and GS. B/M is the ratio of book to market value of equity; C/P is the ratio of cash flow to market value of equity; E/P is the ratio of book earnings to market value of equity, and GS is defined as preformation 5-year average growth rate of sales. R_t is the average annual return for year t after formation, t = 1, 2,3,4,5. AR is the average annual return over 5 post-formation years. CR_5 is the compounded 5-year return assuming annual rebalancing at the end of the year. SAAR is the average annual size-adjusted return computed over the 5 post-formation years. The glamour portfolio is defined as the decile portfolio with stocks ranked lowest on B/M, C/P, E/P, and highest on GS. The value portfolio refers to the decile portfolio with stocks ranked highest on B/M, C/P, E/P, and lowest on GS

is 78.6% for glamour stocks and 128.1% for value stocks, respectively, a difference of 49.5%. On a size-adjusted basis, the glamour stocks yield a 2.1% return and the value stocks yield 7.5% return, a difference of 5.4%.

We find similar outperformances from value stocks in Panels B, C, D, and E. For example, Panel B suggests that the 5-year cumulative return from value stocks is 26.4% higher than that for glamour stocks. Panel C uses the B/M and the GS to sort stocks, results indicate that value stocks outperform the glamour stocks by 34.1% (1.256-0.915), on a 5-year cumulative basis. Using E/P with B/M to sort stocks, Panel D reports a 41.7% difference in 5-year cumulative return between value stocks and glamour stocks. The number increases to 50.8% in Panel E when using B/M with C/P to sort stocks. Our results in the two-dimensional value strategies, in which firms are independently sorted into nine subgroups based on the combination of two variables, generate greater returns than those in the one-dimensional strategies. This suggests that value strategies based jointly on past growth and expected future growth produce higher returns than ad hoc strategies, such as based solely on B/M ratio.

4.3. Do these Results Apply to Large Stocks?

It is commonly believed that larger firms are closely monitored as they are of greater interests to institutional investors. Thus,

Table 2: Portfolio returns based on two-dimensional classifications

	Panel A: C/P and GS								
			Glamour				**Value**		
C/P	1	1	1	2	2	2	3	3	3
GS	1	2	3	1	2	3	1	2	3
R1	0.025	0.084	0.092	0.132	0.143	0.170	0.220	0.213	0.256
R2	0.090	0.107	0.128	0.130	0.131	0.140	0.158	0.150	0.202
R3	0.101	0.105	0.130	0.113	0.137	0.155	0.176	0.145	0.158
R4	0.109	0.103	0.142	0.111	0.122	0.141	0.185	0.147	0.130
R5	0.123	0.114	0.123	0.109	0.112	0.159	0.159	0.129	0.161
AR	0.090	0.102	0.123	0.119	0.129	0.153	0.180	0.157	0.181
CR5	0.532	0.628	0.786	0.753	0.834	1.038	1.281	1.067	1.294
SAAR	−0.010	0.001	0.021	0.019	0.027	0.039	0.075	0.053	0.067
	Panel B: E/P and GS								
			Glamour				**Value**		
E/P	1	1	1	2	2	2	3	3	3
GS	1	2	3	1	2	3	1	2	3
R1	0.059	0.075	0.089	0.121	0.136	0.169	0.221	0.225	0.253
R2	0.119	0.123	0.141	0.120	0.124	0.113	0.140	0.134	0.174
R3	0.126	0.126	0.144	0.105	0.117	0.131	0.152	0.140	0.139
R4	0.129	0.105	0.140	0.113	0.116	0.140	0.146	0.138	0.147
R5	0.132	0.110	0.124	0.113	0.112	0.158	0.135	0.126	0.176
AR	0.113	0.108	0.128	0.114	0.121	0.142	0.159	0.153	0.178
CR5	0.703	0.666	0.821	0.719	0.770	0.942	1.085	1.029	1.259
SAAR	0.012	0.006	0.020	0.015	0.019	0.029	0.057	0.049	0.063
	Panel C: B/M and GS								
			Glamour				**Value**		
B/M	1	1	1	2	2	2	3	3	3
GS	1	2	3	1	2	3	1	2	3
R1	0.103	0.138	0.160	0.088	0.120	0.141	0.164	0.161	0.172
R2	0.119	0.128	0.124	0.121	0.124	0.153	0.182	0.149	0.162
R3	0.110	0.117	0.136	0.110	0.127	0.139	0.190	0.160	0.138
R4	0.109	0.110	0.131	0.109	0.119	0.157	0.177	0.153	0.140
R5	0.126	0.110	0.143	0.118	0.108	0.156	0.171	0.147	0.160
AR	0.113	0.121	0.139	0.109	0.119	0.149	0.177	0.154	0.154
CR5	0.710	0.767	0.915	0.679	0.757	1.004	1.256	1.044	1.048
SAAR	0.013	0.019	0.031	0.010	0.018	0.035	0.071	0.049	0.041
	Panel D: E/P and B/M								
	Glamour								**Value**
E/P	1	1	1	2	2	2	3	3	3
B/M	1	2	3	1	2	3	1	2	3
R1	0.087	0.047	0.127	0.163	0.126	0.142	0.307	0.240	0.203
R2	0.102	0.133	0.170	0.125	0.112	0.144	0.168	0.150	0.137
R3	0.104	0.127	0.198	0.120	0.113	0.144	0.131	0.135	0.148
R4	0.107	0.129	0.183	0.125	0.113	0.141	0.133	0.139	0.144
R5	0.117	0.133	0.156	0.127	0.113	0.140	0.156	0.131	0.140
AR	0.103	0.114	0.167	0.132	0.116	0.142	0.179	0.159	0.155
CR5	0.633	0.712	1.160	0.858	0.728	0.945	1.262	1.084	1.050
SAAR	−0.002	0.011	0.062	0.026	0.014	0.040	0.071	0.055	0.052
	Panel E: B/M and C/P								
	Glamour								**Value**
B/M	1	1	1	2	2	2	3	3	3
C/P	1	2	3	1	2	3	1	2	3
R1	0.092	0.190	0.328	0.027	0.134	0.222	0.060	0.145	0.206
R2	0.105	0.130	0.208	0.116	0.127	0.161	0.117	0.160	0.152
R3	0.108	0.130	0.156	0.106	0.126	0.147	0.135	0.170	0.164
R4	0.110	0.129	0.161	0.131	0.121	0.147	0.179	0.148	0.159
R5	0.111	0.130	0.180	0.137	0.121	0.126	0.158	0.138	0.151
AR	0.105	0.142	0.207	0.104	0.126	0.161	0.130	0.152	0.166
CR5	0.648	0.939	1.540	0.631	0.808	1.102	0.835	1.031	1.156
SAAR	0.000	0.039	0.102	−0.003	0.023	0.059	0.021	0.048	0.063

Stocks are sorted in ascending order into 3 groups (30%, 40% and 30%) based on each of the variables (B/M, C/P, E/P, and GS), then in each group stocks are furthered divided into 3 subgroups based on a different variable. The combinations of variables are: C/P and GS, E/P and GS, B/M and GS, E/P and B/M, and B/M and C/P. In Panel A, glamour portfolio contains stocks with lower C/P and higher GS, the value portfolio includes stocks with higher C/P but lower GS. Similar logic applies to Panels B, C, D, and E. Rt is the average return in year t after formation, t = 1, 2, 3, 4, 5. AR is the average annual return over 5 post-formation years. CR_5 is the cumulative 5-year return assuming annual rebalancing at the end of the year. SAAR is the average annual size-adjusted return computed over 5 post-formation years.

larger stocks are more likely to be fairly priced, and our previous results may be driven by small firm effects. We therefore apply the top 50% of our sample firms to do the same portfolio sorting as in Table 2. Results[4] are consistent with our findings in Table 2, indicating our results are not driven by small firms.

4.4. Regression Analysis

We now perform the Fama-Macbeth regression to examine the relationship between cross-section stock return and the various accounting measures used in the previous sections. We report results for nine models to reflect different combination of independent variables. In Table 3, results indicate that taken separately, coefficients on C/P, E/P and GS are all positive and statistically significant. Positive coefficients on C/P and E/P suggest that returns on value stocks are higher than for glamour stocks. A positive coefficient on GS may be due to the fact that the superior return for the stocks classified as lower GS (value stocks) may not have been experienced mean-reverting immediately after the formation period. In the multiple regression settings, the coefficient for SIZE is negative and statistically significant. This indicates that small firms outperform large firms. The coefficient for B/M is also negative and statistically significant. This is consistent with our results in Table 1 Panel A that value stocks (classified by B/M) underperform 1 year after the formation, but it turns out to perform better for longer period of time after formation. In addition, the magnitude of the coefficients on C/P and E/P ratios are greater in the multiple regression settings, indicating that positive C/P and E/P regarded as expected growth rate have evident predictive power for returns. The results for the dummy variables of C/P (and E/P) suggest that stocks with negative C/P and E/P underperform stocks with positive C/P (and E/P).

5. A TEST OF THE EXTRAPOLATION

In previous sections, we conclude that contrarian strategies deliver better returns. We now try to provide evidence that excessive extrapolation and expectation errors are virtually what characterize the glamour and value stocks. Specifically, the essence of extrapolation is that investors are extremely optimistic about glamour stocks and excessively pessimistic about value stocks, because they closely link future growth with past growth. Thus, if investors make mistakes, these mistakes can be detected in the data. A direct test of extrapolation is to compare the actual growth rate to the past growth rate and the expected growth rates implied by the accounting multiples.

Table 4 presents summary statistics for glamour and value stocks, including various multiples, past growth rate, and future growth rate. Panel 1 sort stocks using one-dimensional B/M classification, Panel 2 applies two-dimensional classification with C/P and GS. Three groups of variables are presented under each Panel: Fundamental variables in A, past growth rate in B, future growth rate in C. Results in A indicates that value stocks had substantial higher ratios of fundamentals to price, suggesting that value stocks had lower expected growth rates. The firm size of value stocks is evidently smaller than that of glamour stocks. Using several measures of past growth rates, namely earnings abnormal earnings growth (AEG), cash flows (ACG), sales (ASG), and previous returns (RETURN), results in B suggest that past growth rate for glamour stocks are much greater than for value stocks over the 5-year period prior to portfolio formation. Results in C conclude that the future growth rate for glamour stocks was less impressive over the 5-year post-formation period. The deterioration of the future growth rate of glamour stocks is discussed more systematically below.

According to Gordon's formula (Gordon and Shapiro, 1956), $\rho \times C1/P = r - g$, where C1 is next period's cash flow, P is the current share price, r is discount rate, g is the expected growth rate of cash flow, and ρ is the constant pay-out ratio of cash flow received as dividends. The formula is applicable to earnings, under the assumption that dividends are the constant fraction of earnings. This formula implies that, if the discount rate and the pay-out ratio are constant, we can compute differences in expected growth based on differences in C/P and E/P ratios. Therefore, the differences in C/P and E/P ratios between glamour and value stocks can be used to explain differences in future growth rates.

We first analyse the data for portfolios classified by C/P and GS in Table 4 B. Results suggest that the past growth rates of glamour stocks outperform value stocks by all measures. For example, the past 5-year growth rate of cash flow for glamour stocks was 22.9% compared to 3.6% for the value stocks. In A, the C/P ratios are 0.059 and 0.445 for glamour and value stocks, respectively. Assume the required rate of return is the same for both glamour and value stocks, the significant differences in C/P may indicate either a large difference in pay-out ratio or expected growth rate. The pay-out ratio is calculated as D/P divided by C/P; it is 0.167 for glamour stocks and 0.051 for value stocks. Gordon (1963) and Lintner (1962) argue that risk declines as dividends increase. Therefore, value stocks are riskier than glamour stocks, so returns should be higher for value stocks. Under the assumption that discount rates and pay-out ratios are constant over time, expected cash flows are going to be greater for glamour stocks. We are able to estimate that it would approximately 12 years for the C/P ratios of glamour stocks (0.059) equal to the C/P ratios of value stocks (0.445), under the assumption that the past cash growth rates for both persist (i.e., 0.229 vs. 0.036). If we use the D/P ratios it takes approximately 5 years for dividends invested in glamour stocks (0.01) to catch up value stocks (0.023), assuming past growth rate differences persists.

Next, we examine the expected growth rate in C. As mentioned earlier, the future growth rate for glamour stocks was less impressive over the 5-year post-formation period, compared to pre-formation period. In addition, the post-formation growth of glamour stocks maybe driven by the higher growth in the first 2 post-formation years. For example, the annual growth rate of cash flow is 9.2% for glamour from year 2 to 5, compared to 11.7% from year 0 to 5. However, we find that there is a mean-reverting phenomenal for value stocks, result a relatively greater growth rate of cash flow from year 2 to 5. These results confirm that investors expect higher future growth rate, but the persistence of these higher

4 Results are presented in Appendix.

Table 3: Fama-Macbeth regression

	Intercept	GS	B/M	SIZE	E/P+	DE/P	C/P+	DC/P
Mean	0.130***	0.046**						
t-statisitc	3.074	2.321						
Mean	0.124***		0.011					
t-statisitc	3.237		0.893					
Mean	0.105			−0.001				
t-statisitc	0.826			−0.206				
Mean	0.128***				0.060***			
t-statisitc	2.921				2.983			
Mean	0.128***						0.043***	
t-statisitc	2.951						3.968	
Mean	0.107***	0.041	−0.019				0.270***	−0.123***
t-statisitc	3.090	1.586	−1.348				4.441	−3.211
Mean	0.490***		−0.046***	−0.017**			0.273***	−0.134***
t-statisitc	2.999		−3.443	−2.533			5.802	−3.838
Mean	0.455***	0.044*	−0.034***	−0.016**			0.260***	−0.147***
t-statisitc	2.839	1.721	−2.669	−2.411			4.438	−4.179
Mean	0.403***	0.031	−0.022*	−0.014**	0.490***	−0.088**		
t-statisitc	2.737	1.261	−1.817	−2.271	3.095	−3.387		

1-year holding-period return are calculated for our sample firms. We run Fama-Macbeth regressions with these returns for each formation period as dependent variables. The independent variables are: GS, the preformation 5-year average growth rate of sales; B/M, the ratio of book value of equity to market value of equity; SIZE, the natural logarithm of market value of equity; E/P+, equals to the ratio of earnings to market value of equity, if E/P is positive, otherwise 0 if E/P is negative; DE/P, equals to 1 if E/P is negative, and 0 if E/P is positive; C/P+, the ratio of cash flow to market value of equity, if C/P is positive, otherwise 0 if C/P is negative; DC/P, equals to 1 if C/P is negative, and 0 if C/P is positive. The reported coefficients are the average over the 23 formation periods. The reported t-statistics are based on the time-series variation of the 23 coefficients. "*," "**," and "***" indicate significant at the 10%, 5%, and 1% level, respectively.

Table 4: Fundamental variables, past and future growth rate of glamour and value stocks

	Panel 1		Panel 2	
	Glamour	Value	Glamour	Value
	B/M1	B/M10	C/P1, GS3	C/P3, GS1
	A: Fundamental variables			
E/P	0.028	0.413	0.029	0.200
C/P	0.073	0.999	0.059	0.445
S/P	1.127	8.345	0.939	4.180
D/P	0.020	0.022	0.010	0.023
B/M	−0.001	5.447	0.350	1.838
Size	11177	1087	8787	2864
	B: Past growth rate			
AEG (−5,0)	0.119	0.070	0.231	0.096
ACG (−5,0)	0.090	0.075	0.229	0.036
ASG (−5,0)	0.052	0.074	0.235	−0.009
Return (−3,0)	0.752	0.174	0.884	0.244
	C: Future growth rate			
AEG (0,5)	0.095	0.041	0.123	0.007
ACG (0,5)	0.094	0.038	0.117	0.008
ASG (0,5)	0.103	0.028	0.127	0.020
AEG (2,5)	0.097	0.033	0.101	0.060
ACG (2,5)	0.096	0.023	0.092	0.033
ASG (2,5)	0.111	0.010	0.131	0.018

This table presents summary statistics for glamour and value stocks. Stocks are classified using one-dimensional classification as in Panel 1, and two-dimensional classification as in Panel 2. Three groups of variables are presented under each Panel: Fundamental variables in A, past growth rate in B, future growth rate in C. The growth rate of earnings (AEG), cash flows (ACG), sales (ASG), and previous returns (RETURN), are used to represent past growth rate as well as the future growth rate.

growth has been optimistically overestimated, suggesting that investors are too optimistic about the future growth of glamour stocks over value stocks.

An analysis of earnings leads to a similar conclusion. Over the 5-year prior formation period, the growth rate of earnings for glamour stocks is 23.1%, and 9.6% for value stocks. The E/P ratio for glamour stocks was 0.029 versus 0.2 for values stocks at formation. The pay-out ratios were also higher for glamour stocks (0.167 vs. 0.051). We then examine the post-formation growth rates to see if higher post-formation growth for glamour stocks could justify its lower initial E/P ratio. Over the 5 post-formation years, the earnings grew from 0.029 initially to 0.052 at the end of year 5 for glamour stocks. For value stocks, earnings grew from 0.20 to 0.206, still leaving a large gap in earnings between the two portfolios in year 5. More importantly, similar to cash flow growth, the post-formation growth of earnings is also driven almost entirely by higher growth in the first 2 post-formation years for glamour stocks. However, the market expected the superior growth of glamour stocks to persist (as implied by the differences in E/P ratios). Thus, our results confirm the extrapolation model suggested by LSV (1994), confirming that investors are excessively optimistic about the future growth of glamour stocks and too pessimistic about the expected growth of value stocks.

6. IMPACT OF EARNINGS SURPRISES

Levis and Liodakis (2001) documented that expectation errors may also arise from analysts' earnings forecasts. Based on errors-in-expectations hypothesis, analysts may be too pessimistic about value stocks and too optimistic about glamour stocks. The announcement of the actual earnings for both stocks thus potentially creates a positive surprise for value stocks and a negative surprise for glamour stocks, and these surprises can be applied to justify stocks' subsequent return differences. We define earnings surprises as the difference between the actual value of a company's EPS and the median forecasted value scaled by the absolute value of the actual EPS:

$$\text{SUR} = \frac{\text{Actual EPS} - \text{Median forecasted EPS}}{|\text{Actual EPS}|} \quad (1)$$

Positive earnings surprises occur when the actual EPS is greater than the median forecasted EPS, while negative earnings surprises occurs when the actual EPS is less than the median forecasted EPS. Earnings forecasts made at the end of April are used to estimate surprises, provided that the announcement of the actual earnings was released within the following 12 months. In order to explore whether forecast errors can explain the excess returns on value stocks immediately after portfolio formation, 1-year buy-and-hold returns are examined for the portfolios that experience either positive earnings surprises or negative earnings surprises. Specifically, stocks are sorted into three groups based on B/M, E/P, C/P or GS, then in each group, stocks are furthered divided into two subgroups, according to earnings surprises. Results in Table 5 suggest that value stocks with positive earnings surprises outperform glamour stocks with positive surprises, except for the GS[5] classification. For example, for the E/P and positive earnings surprises category, 1-year return for value stocks is 29.6%, 10.9% higher than that of glamour stocks. For negative earnings surprises, the high C/P stocks (value stocks) earn 10.2% return 1-year after formation period, whereas low C/P stocks (glamour stocks) experience a negative 0.4% return.

Stocks are sorted in ascending order into 3 groups (bottom 30%, middle 40%, and top 30%) based on each of the variables (B/M, C/P, E/P, and GS), and then are independently sorted in ascending order into 2 subgroups, based on positive earnings surprises and negative earnings surprises. The glamour stocks are defined as stocks ranking lowest on B/M, C/P, E/P or highest on GS. In contrast, the value stocks refer to stocks ranking highest on B/M, C/P, E/P or lowest on GS.

We now examine the results in Table 5 in a regression setting using Fama-Macbeth (1973) regression. Panel A in Table 6 reports results for positive earnings surprises, and Panel B reports results for negative earnings surprises. All coefficients on positive earnings surprises (except for glamour stocks under C/P classification) are positive and statistically significant, indicating that positive earnings surprise do affect stock returns. On the other hand, in Panel B, coefficients on negative earnings surprises are insignificant for all value stocks, but significant for glamour stocks, indicating that negative earnings surprises have greater impacts on glamour stocks than on value stocks. This is due to the fact that negative surprises are not regarded as bad news for value stocks as investors already perceive these stocks as underperformers. A negative earnings surprise, however, can have a relatively greater impact on glamour stocks, because it conflicts with investors' expectation.

5 The stocks classified by preformation 5-year average growth rate of sales might not have been experienced mean-reverting immediately after formation period. The superior returns usually occur when holding for longer periods, i.e. more than two years.

Table 5: Returns for glamour and value stocks with positive and negative earnings surprises

Portfolio	Positive surprise	Negative surprise	All surprises
A. B/M			
High	0.269	0.079	0.158
Middle	0.210	0.031	0.118
Low	0.240	0.037	0.146
B. E/P			
High	0.296	0.097	0.217
Middle	0.216	0.067	0.147
Low	0.187	0.013	0.085
C. C/P			
High	0.291	0.102	0.205
Middle	0.236	0.066	0.153
Low	0.189	-0.004	0.080
D. GS			
Low	0.200	0.046	0.116
Middle	0.217	0.047	0.134
High	0.270	0.051	0.158

Stocks are sorted in ascending order into 3 groups (bottom 30%, middle 40%, and top 30%) based on each of the variables (B/M, C/P, E/P, and GS), and then are independently sorted in ascending order into 2 subgroups, based on positive earnings surprises and negative earnings surprises. The glamour stocks are defined as stocks ranking lowest on B/M, C/P, E/P or highest on GS. In contrast, the value stocks refer to stocks ranking highest on B/M, C/P, E/P or lowest on GS.

7. DO INVESTMENT SENTIMENTS MATTER?

Baker and Wurgler (2006) documented that investor sentiments affect cross-section stock returns, and suggest that a wave of investment sentiments has large effects on stocks whose value are highly subjective and difficult to arbitrage. They concluded that smaller, unprofitable, non-dividend paying, and distressed firms are likely to be affected by shifts in investment sentiments. Therefore, Baker and Wurgler (2006) investment sentiment index is applied to examine if investor sentiments contribute to the outperformance of value strategies. Table 7 below presents results of the Fama-Macbeth regression analysis on investment sentiment index. All sentiment coefficients are positive and statistically significant at the 1% level, indicating that returns on both value and glamour stocks are positively related to investor sentiments. However, the magnitude for value stocks are much greater than for glamour stocks, suggesting that investor sentiments have stronger impact on value stocks as opposed to glamour stocks. This result suggests that investor sentiments do contribute to the superior performances from value stocks.

8. CONCLUSION

The outperformance of contrarian investment strategy has been one of the dominant themes in the finance literature and continually attracts many attentions from academics and practitioners. This research presents a detailed characterization of value strategies in the U.S. market for the period between 1985 and 2013. Consistent with results from LSV (1994), we concluded that value stocks outperform glamour stocks, our results are also robust to the largest 50 percent of stocks by market capitalization, and this eliminates small firms' effects.

Table 6: Impact of positive earnings surprises and negative earnings surprises

Portfolio	Panel A		Panel B	
	Intercept	Surprise (+)	Intercept	Surprise (−)
A. B/M				
High				
Mean	0.233***	0.218***	0.083	0.004
t-statisitc	4.826	2.717	1.570	1.126
Middle				
Mean	0.186***	0.184***	0.049	0.036***
t-statisitc	4.347	3.444	1.230	4.464
Low				
Mean	0.183***	0.581***	0.054	0.056*
t-statisitc	5.061	3.569	1.325	1.819
B. E/P				
High				
Mean	0.231***	0.392***	0.096**	−0.008
t-statisitc	5.012	4.006	2.358	−0.599
Middle				
Mean	0.172***	0.437***	0.077**	0.077**
t-statisitc	4.773	4.597	2.167	1.983
Low				
Mean	0.170***	0.197	0.020	0.009***
t-statisitc	4.761	1.464	0.544	2.675
C. C/P				
High				
Mean	0.235***	0.301***	0.106**	0.005
t-statisitc	5.083	3.531	2.234	0.495
Middle				
Mean	0.196***	0.332***	0.069*	0.022
t-statisitc	5.024	3.831	1.892	0.974
Low				
Mean	0.142***	0.744**	0.006	0.019*
t-statisitc	3.664	2.315	0.175	1.794
D. GS				
Low				
Mean	0.175***	0.153***	0.052	0.004
t-statisitc	4.247	2.551	1.057	0.378
Middle				
Mean	0.184***	0.301***	0.058	0.028**
t-statisitc	5.198	3.676	1.559	2.323
High				
Mean	0.224***	0.309***	0.061	0.015
t-statisitc	5.179	2.804	1.366	0.980

We calculate the 1-year holding-period return as the dependent variable in the Fama-Macbeth regression. The independent variables are positive earnings surprises and negative earnings surprises. The reported coefficients are averages over the 23 formation periods. The report t-statistics are based on the time-series variation of the 23 coefficients. "*," "**" and "***" represents significance at the 10%, 5%, and 1% levels, respectively.

It is believed that the contrarian strategies outperform because investors are able to exploit expectation errors implicit in stocks prices. There are two sources of expectation errors, namely naïve extrapolation of past performance as suggested by LSV (1994), and biased analysts' earnings forecasts suggested by La Porta (1996) and La Porta et al. (1997). Our results conclude that the actual future growth rate of cash flows, earnings, and sales for glamour stocks turn out to be much lower than the past growth rates, as well as the rate implied by the fundamental multiples. This indicates that investors naively extrapolate past performance and overestimate the future growth rates of glamour stocks relative to value stocks. On the other hand, analysts tend to be excessively pessimistic about value stocks and over optimistic about glamour stocks, thus the announcement of the actual earnings may create a positive surprise for value firms and a negative surprise for glamour firms

Table 7: Returns on investment sentiment index

			Intercept	Market risk premium	Investment sentiment
Mean	Value	B/M10	0.19***	−0.53***	0.18***
t-statistic			24.75	−7.95	7.86
Mean	Glamour	B/M1	0.18***	−0.41***	0.10***
t-statistic			18.06	−5.30	3.59
Mean	Value	C/P10	0.23***	−0.31***	0.18***
t-statistic			28.95	−4.67	7.03
Mean	Glamour	C/P1	0.04***	−0.38***	0.10***
t-statistic			4.62	−4.49	3.55
Mean	Value	E/P10	0.24***	−0.32***	0.19***
t-statistic			29.76	−4.79	7.56
Mean	Glamour	E/P1	0.06***	−0.40***	0.13***
t-statistic			6.56	−4.47	4.23

We calculate the 1-year holding-period return for all sample firms. Fama-Macbeth regressions are applied. First, the time-series of returns of glamour and value stocks (classified by B/M, C/P and E/P) are used as dependent variables, and the investment sentiment index and the market risk premium are used as independent variables. Secondly, regressions are run on the cross-sectional basis. B/M is the ratio of book value of equity to market value of; E/P is the ratio of current earnings to market value of equity; C/P is the ratio of current cash flow to market value of equity. "***" indicates significance at the 1% level.

(or *vice versa*), which can be used to justify the return differences. Our results suggest that positive earnings surprises do have positive impacts on both value and glamour stocks, however, value stocks outperform glamour stocks when there are negative surprises.

Following Baker and Wurgler (2006), the investment sentiment index is applied to explore if investor sentiments contribute to the outperformance of value strategies. Our results suggest that investment sentiments do play an important role in explaining stock returns. When the investment sentiment is high, the value stocks earn significant higher return than glamour stocks. This result shed extra lights on explaining superior performances from contrarian strategies, using the behavioural approach.

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APPENDIX

Appendix: Returns for portfolios based on two-dimensional classifications for the largest 50% stocks

	Panel A: C/P and GS								
			Glamour				**Value**		
C/P	1	1	1	2	2	2	3	3	3
GS	1	2	3	1	2	3	1	2	3
R1	0.034	0.095	0.100	0.130	0.128	0.178	0.140	0.143	0.190
R2	0.084	0.103	0.120	0.118	0.122	0.118	0.112	0.099	0.158
R3	0.088	0.102	0.117	0.105	0.122	0.145	0.110	0.118	0.111
R4	0.086	0.095	0.162	0.102	0.115	0.134	0.130	0.090	0.077
R5	0.103	0.097	0.124	0.095	0.106	0.146	0.131	0.098	0.125
AR	0.079	0.098	0.124	0.110	0.119	0.144	0.124	0.110	0.132
CR5	0.463	0.598	0.795	0.684	0.753	0.959	0.796	0.681	0.857
SAAR	−0.019	−0.002	0.017	0.011	0.017	0.031	0.024	0.009	0.022
	Panel B: E/P and GS								
			Glamour				**Value**		
E/P	1	1	1	2	2	2	3	3	3
GS	1	2	3	1	2	3	1	2	3
R1	0.070	0.074	0.100	0.107	0.135	0.169	0.180	0.152	0.193
R2	0.097	0.112	0.116	0.113	0.113	0.105	0.107	0.094	0.161
R3	0.103	0.112	0.114	0.095	0.111	0.131	0.105	0.115	0.139
R4	0.086	0.093	0.129	0.119	0.109	0.141	0.108	0.105	0.109
R5	0.087	0.096	0.112	0.112	0.104	0.174	0.130	0.120	0.137
AR	0.088	0.098	0.114	0.109	0.114	0.144	0.126	0.117	0.148
CR5	0.527	0.592	0.719	0.679	0.718	0.956	0.808	0.740	0.988
SAAR	−0.009	−0.003	0.009	0.010	0.013	0.041	0.026	0.016	0.041
	Panel C: B/M and GS								
			Glamour				**Value**		
B/M	1	1	1	2	2	2	3	3	3
GS	1	2	3	1	2	3	1	2	3
R1	0.107	0.125	0.156	0.092	0.112	0.139	0.141	0.110	0.098
R2	0.104	0.115	0.115	0.105	0.112	0.138	0.153	0.121	0.118
R3	0.097	0.109	0.130	0.106	0.116	0.131	0.131	0.140	0.105
R4	0.110	0.103	0.130	0.107	0.103	0.146	0.120	0.113	0.135
R5	0.123	0.105	0.146	0.118	0.099	0.124	0.118	0.126	0.113
AR	0.108	0.111	0.136	0.106	0.108	0.136	0.133	0.122	0.114
CR5	0.671	0.694	0.888	0.652	0.673	0.888	0.864	0.778	0.714
SAAR	0.009	0.010	0.028	0.006	0.008	0.023	0.032	0.020	0.003
	Panel D: E/P and B/M								
	Glamour								**Value**
E/P	1	1	1	2	2	2	3	3	3
B/M	1	2	3	1	2	3	1	2	3
R1	0.098	0.054	0.085	0.155	0.128	0.120	0.193	0.196	0.127
R2	0.097	0.127	0.142	0.123	0.108	0.121	0.134	0.137	0.103
R3	0.090	0.135	0.188	0.126	0.103	0.173	0.072	0.139	0.112
R4	0.105	0.119	0.146	0.126	0.115	0.160	0.109	0.123	0.112
R5	0.113	0.099	0.157	0.137	0.114	0.119	0.119	0.134	0.118
AR	0.101	0.107	0.144	0.134	0.114	0.139	0.125	0.146	0.115
CR5	0.615	0.658	0.952	0.871	0.712	0.912	0.800	0.971	0.720
SAAR	−0.004	0.005	0.040	0.027	0.012	0.037	0.020	0.042	0.015
	Panel E: B/M and C/P								
	Glamour								**Value**
B/M	1	1	1	2	2	2	3	3	3
C/P	1	2	3	1	2	3	1	2	3
R1	0.101	0.169	0.181	0.039	0.128	0.171	0.009	0.114	0.135
R2	0.102	0.121	0.135	0.124	0.123	0.115	0.199	0.120	0.107
R3	0.101	0.125	0.108	0.114	0.123	0.125	0.122	0.176	0.114
R4	0.117	0.121	0.103	0.134	0.115	0.121	0.144	0.159	0.111
R5	0.114	0.141	0.151	0.111	0.106	0.115	0.065	0.133	0.119
AR	0.107	0.136	0.136	0.104	0.119	0.130	0.108	0.140	0.117
CR5	0.662	0.887	0.886	0.638	0.755	0.837	0.653	0.925	0.738
SAAR	0.002	0.033	0.035	−0.002	0.018	0.029	0.002	0.036	0.017

We apply same procedure as in Table 2 to sort stocks into portfolios using two-dimensional classifications for the largest 50% of our sample firms. The table presents the average return for all formation periods. R_t is the average return in year t after formation, t = 1, 2,3,4,5. AR is the average annual return over 5 post-formation years. CR_5 is the compounded 5-year return assuming annual rebalancing at the end of the year. SAAR is the average annual size-adjusted return computed over the 5 post-formation years