Internet Appendix for "A Better Three-factor Model That Explains More Anomalies"*

This Internet Appendix documents: (i) the unabridged versions of Tables I to VI and Table VIII (the abridged tables are in the main text); (ii) the performance of the q-theory factor model using additional testing portfolios; (iii) the new three-factor regressions of the 25 size and momentum portfolios but with the investment factor constructed on quarterly investment data; (iv) additional evidence on the cross-sectional variation of investment-to-assets and ROA across additional testing portfolios; (v) the evidence that the industry effect on the investment and ROA factors is relatively small; (vi) the evidence that the annually rebalanced SUE, short-term prior returns, and distress portfolios fail to produce significant average returns for zero-investment strategies; and (vii) the results of the covariances vs. characteristics tests following the design of Daniel and Titman (1997).

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I. Unabridged Tables I to VI and Table VIII

Tables IA.I to IA.VI report the unabridged versions of Tables I to VI in the main text. Table IA.VII reports the unabridged version of Table VIII in the main text. The unabridged Table IA.I reports additional details of the six size-I/A portfolios and the six size-ROA portfolios. And the unabridged Tables IA.II to IA.VII report the results for every decile or quintile of the testing portfolios. In contrast, the abridged tables only report the results for deciles 1, 5, and 10 and quintiles 1, 3, and 5 to save space in the main text.

II. Additional Testing Portfolios

A. The 25 I/A and ROA Portfolios

We sort all NYSE, Amex, and NASDAQ stocks into five ROA quintiles each month based on quarterly ROA from at least four months ago, and we sort all stocks independently in June of each year into five quintiles based on I/A at the last fiscal year-end. Taking intersections yields 25 I/A and ROA portfolios. Their value-weighted returns are calculated for the current month, and the portfolios are rebalanced monthly. Table IA.VIII reports that high ROA stocks earn higher average returns than low ROA stocks, especially among high investment firms, and that high investment stocks earn lower average returns than low investment stocks, especially among low ROA firms. The average high-minus-low ROA portfolio return varies from 0.80% per month ($t = 2.20$) in the lowest I/A quintile to 1.65% ($t = 4.97$) in the highest I/A quintile. The average low-minus-high I/A portfolio return varies from an insignificant 0.26% per month ($t = 1.23$) in the highest ROA quintile to 1.11% ($t = 3.41$) in the lowest ROA quintile.

Traditional factor models cannot explain the 25 I/A and ROA portfolio returns. Ten out of 25 portfolios have significant CAPM alphas. The alpha for the high-minus-low ROA portfolio ranges from 0.58% to 1.82% per month and is mostly significant across the five I/A quintiles. The CAPM alpha for the low-minus-high I/A portfolio ranges from 0.34% to 1.25% per month and is mostly significant across the five ROA quintiles. Despite their higher average returns, high ROA firms have mostly lower SMB and HML loadings than low ROA firms. As a result, 11 out of 25 portfolios have significant Fama-French (1993) alphas. In particular, the alpha for the high-minus-low ROA portfolio ranges from 0.63% to 2.04% per month and is all significant across the five I/A quintiles.

The new factor model does a much better job explaining the average returns of these portfolios. From Panel B of Table IA.VIII, although the model is rejected overall with a GRS statistic of 2.42 ($p = 0$), only three out of 25 alphas are significant. Two out of five high-minus-low ROA portfolios have significant alphas, whereas four out of five alphas are significant in the CAPM, and all five of them are significant in the Fama-French (1993) model. More important, the average magnitude of the high-minus-low ROA alphas is lower in our model: 0.39% per month versus 1.15% in the CAPM and 1.27% in the Fama-French model. Further, only one out of the five low-minus-high I/A alphas is significant, whereas four out of five are significant in both the CAPM and the Fama-French model. The average magnitude of the low-minus-high I/A alphas is also lower in our model: 0.26% per month versus 0.79% in the CAPM and 0.59% in the Fama-French model.

As expected, high ROA firms have significantly higher r_{ROA} loadings than low ROA firms, and low-investment firms have significantly higher r_{INV} loadings than high-investment firms. The systematic variation in the loadings across the portfolios in the same direction as their average returns explains the better performance of our model than the CAPM and the Fama-French (1993) model.

B. The 25 Size and 11/1/1-Momentum Portfolios

Table IA.IX shows that using the 11/1/1 convention of momentum yields largely similar results as those with the 6/1/6 convention reported in the paper.

C. Testing Portfolios Motivated by Fama and French (1996)

Fama and French (1996) show that, except for momentum, their three-factor model well captures average return variations across portfolios sorted on earnings-to-price (E/P), cash flow-to-assets (C/P), dividend-to-price (D/P), past sales growth, and long-term prior returns. Table IA.X shows that our model's performance in explaining these average return variations is largely comparable to that of the Fama-French model. For ease of comparison with Fama and French (1996), we use portfolio data from Kenneth French's Web site whenever possible. French provides portfolio data for the one-way deciles sorted on $E/P, C/P, D/P$, and prior 13- to 60-month returns. We form the deciles on past five-year sales growth (5-Yr SR) and market leverage (A/ME).

C.1. $E/P, C/P$, and D/P Deciles

From Panel A of Table IA.X, the high-minus-low E/P portfolio is profitable from January 1972 to December 2006. This portfolio generates an average return of 0.68% per month ($t = 2.81$) and a CAPM alpha of 0.81% ($t = 3.42$). The alpha disappears in the Fama-French (1993) three-factor regression, which produces an insignificant intercept of -0.11% per month. The reason is that high E/P stocks have higher loadings on HML than low

E/P stocks. Although its magnitude is higher than that from the Fama-French model, our model also delivers an insignificant alpha of 0.31% per month ($t = 1.31$). The main driving force is the pattern that high E/P stocks have higher loadings on r_{INV} than low E/P stocks, with the spread of 0.56 significant at the 1% level.

The C/P and D/P results are largely similar to those on the E/P portfolios. The high-minus-low C/P and D/P average returns are lower, at 0.50% and 0.10% per month, respectively, and the latter is insignificant. But both strategies generate significant positive CAPM alphas (0.64% and 0.45% per month). The Fama-French (1993) model reduces these alphas to insignificant levels because high C/P and D/P portfolios have significantly higher loadings on HML than low C/P and D/P loadings. Our model generates an insignificant alpha of 0.18% per month for the high-minus-low D/P portfolio ($t = 0.76$), but a marginally significant alpha of 0.48% for the high-minus-low C/P portfolio ($t = 2.09$). The driving force is the pattern that high C/P and D/P stocks have significantly higher loadings on r_{INV} than low C/P and D/P stocks.

C.2. Long-term Prior Returns and 5-Yr SR Deciles

Consistent with DeBondt and Thaler (1985), stocks with high prior 13- to 60-month returns (long-term winner) earn lower average returns than stocks with low prior 13- to 60-month returns (long-term losers). From Panel D of Table IA.X, the average-return spread is −0.41% per month, and the long-term winner-minus-loser portfolio has a marginally significant alpha of −0.45%. The Fama and French (1993) model reduces the magnitude of the intercept to 0.24%. The long-term winners load negatively and long-term losers load positively on $_{INV}$. As a result, the long-term winner-minus-loser has a negative r_{INV} loading of -0.74, which moves in the right direction to explain its low average return. But the zero-investment portfolio has a significantly positive r_{ROA} loading of 0.44, which moves in the wrong direction to explain its low average return. Overall, the new factor model produces an alpha of -0.41% per month ($t = -1.58$) for the zero-investment portfolio.

Consistent with Lakonishok, Shleifer, and Vishny (1994), stocks with high past five-year sales growth (5-Yr SR) earn lower average returns than stocks with low past five-year sales growth. The CAPM alpha of the high-minus-low 5-Yr SR portfolio is -0.55% per month ($t = -2.53$), although its average return of -0.35% is insignificant at the 5% level. The Fama-French (1993) model performs extremely well: the alpha of the zero-investment portfolio is only six basis points per month because of its large negative loading on HML. The zero-investment portfolio has an insignificant positive alpha of 0.28% per month in our three-factor model. The driving force is a large negative r_{INV} loading of -1.17 and a small negative r_{ROA} loading of -0.27.

C.3. Market Leverage Deciles

Bhandari (1988) and Fama and French (1992) report that stocks with high market leverage earn higher average returns than stocks with low market leverage. Following Fama and French, we measure market leverage, A/ME, as the ratio of year-end book assets (Compustat annual item 6) to year-end market equity. (We also have constructed portfolios based on book leverage, the ratio of year-end book assets to year-end book equity. But the high-minus-low book leverage portfolio has an insignificant average return and an insignificant CAPM alpha.)

From Panel F of Table IA.X, high A/ME stocks earn higher average returns than low A/ME stocks, and the average return spread of 0.57% per month is significant at the 5%

level. The zero-cost high-minus-low A/M strategy generates a CAPM alpha of 0.65% (t = 2.62). The Fama-French (1993) model produces a negative alpha of −0.32% ($t = -1.95$). In our model, high A/ME stocks have higher r_{INV} loadings but slightly lower r_{ROA} loadings than low A/ME stocks. As a result, the zero-cost portfolio has an insignificantly positive alpha of 0.35% per month.

C.4. Book-to-Market Deciles

From Panel G of IA.X, the results are largely similar to those for the 25 size and book-to-market portfolios reported in the main text.

III. Quarterly Investment Factor

To verify that the annual rebalancing of r_{INV} is indeed the driving force of the r_{INV} loading patterns across momentum portfolios, we experiment with an alternative investment factor, denoted r_{INV}^{Q}, which is constructed on quarterly investment data. We measure quarterly I/A as the change in gross property, plant, and equipment (Compustat quarterly item 42) plus the change in inventory (item 38) divided by lagged total assets (item 44). This definition is the exact quarterly counterpart of our definition based on annual data.

Each month from January 1975 to December 2006, we categorize NYSE, Amex, and NASDAQ stocks into three groups based on the breakpoints for the low 30%, middle 40%, and high 30% of the ranked values of quarterly I/A from four months ago. (The starting point of the sample is restricted by the availability of quarterly investment data.) We also use NYSE median market equity each month to split all stocks into two size groups. We form six portfolios from the intersections of the two size and three I/A portfolios and calculate monthly value-weighted returns on the six portfolios for the current month. The term r^Q_{INV} is the difference (low-minus-high), each month, between the simple average of the returns on the two low-I/A portfolios and the simple average of the returns on the two high-I/A portfolios.

We find that r^Q_{INV} earns an average return of 0.49% per month ($t = 3.77$). More important, Table IA.XI shows that once we replace r_{INV} with r^Q_{INV} in our three-factor regression, the W-L portfolios have insignificantly negative r^Q_{INV} loadings. This evidence is in contrast to the significantly positive r_{INV} loadings from Table II in the main text. (The r_{ROA} loadings are not materially affected.) As a result, the magnitude of α_E is in general higher.

IV. The Cross-sectional Variation of Economic Fundamentals (I/A and ROA)

Figure 2 in the main text illustrates the cross-sectional variation of I/A and ROA across the 25 size and momentum. Using an updated sample through 2006, Figure IA.1 in this Internet Appendix documents that, indeed, growth firms have persistently higher ROAs than value firms in the big-size quintile both in event time (Panel A) and in calendar time (Panel C). In the small-size quintile, however, growth firms have higher ROAs than value firms before, but lower ROAs after, portfolio formation (Panel A). In calendar time, a dramatic downward spike in ROA appears for the small-growth portfolio over the past decade (Panel B). This downward spike explains the abnormally low r_{ROA} loadings.

Table IA.XII furnishes the evidence for other testing portfolios. Specifically, the table shows that ROA varies across the deciles sorted on distress measures, and that I/A varies across various deciles formed on valuation ratios. Portfolio ROA and I/A are value-weighted across all stocks in the portfolio, where the weights are given by their market equity to be consistent with the calculations of portfolio returns. From Panel A, ROA decreases monotonically from the less distressed firms to more distressed firms. The ROA of the high F-Prob decile is lower than the ROA of the low F-Prob decile by 5.88% per quarter ($t = 14.72$). Similarly, the ROA of the high O-score decile is lower than the ROA of the low O-score decile by 7.54% per quarter ($t = 13.89$). This evidence on ROA explains the higher r_{ROA} loadings and thus higher average returns of less distressed firms than those of more distressed firms. Panel A also shows that the ROA spread between the two extreme SUE deciles is only 1.22% per quarter, albeit highly significant ($t = 11.86$). This low ROA spread explains why our model is only partially successful in explaining the post-earnings announcement drift. The rest of Table IA.XII shows that I/A decreases with various valuation ratios including E/P, C/P, D/P, and A/ME, and increases with prior 13- to 60-month returns and past five-year sales growth, meaning again that value firms invest less and load more on r_{INV} than growth firms.

V. The Industry Effect on the Investment and ROA Factors

The main text reports that the six size-I/A and the six size-ROA portfolios draw their firm-month observations from a wide range of portfolios. In what follows we report the detailed evidence. Specifically, we use Fama and French's (1997) classification of 10 industries. For each of the six size-I/A portfolios Figure IA.2 reports the percentage of firm-month observations that belong to a given industry. The figure shows that the industry distributions of the firm-month observations are not drastically different across the six size-I/A portfolios. Manufacturing firms account for about 15% to 25% of the observations for most portfolios. Overall, each portfolio seems to draw observations from a wide range of industries.

Using Fama and French's (1997) classification of 10 industries, in Figure IA.3 we plot the percentage of firm-month observations belonging to a given industry for each of the six size-ROA portfolios. The evidence is largely similar to that of the size-I/A portfolios. Each portfolio again draws observations from a wide range of industries. Manufacturing and high tech industries each account for around 15% to 20% of the firm-month observations for most portfolios.

VI. Annually Rebalanced Earnings Surprises, Short-term Prior Returns, and Distress Portfolios

This section shows that the original earnings surprise, short-term prior return, and distress effects do not exist once we change the rebalancing frequency of the underlying testing portfolios from the monthly to the annual frequency. Because these effects only exist at the monthly frequency, it seems reasonable to construct the explanatory ROA factor at the same frequency. Specifically, in June of each year t we sort all NYSE, Amex, and NASDAQ stocks into 10 deciles based on, separately,

- the Standardized Unexpected Earnings (SUE, defined in the same way as in Chan, Jegadeesh, and Lakonishok (1996)) measured at the fiscal year-end of $t-1$ (using the average SUE across the four quarters in the fiscal year of $t-1$ yields quantitatively similar results);
- the 12-month prior return from June of year $t-1$ to May of year t (note that we skip one month in June before calculating returns from July of year t)
- the Campbell, Hilscher, and Szilagyi's (2008) failure probability measured at the fiscal year-end of $t-1$; and

- the Ohlson's (1980) O-score measured at the fiscal year-end of $t-1$.

We calculate monthly value-weighted returns from July of year t to June of $t+1$ and rebalance the portfolios in June.

Table IA.XIII shows that none of the zero-investment annually rebalanced portfolios earns significant average returns or CAPM alphas. The zero-cost portfolios' average returns are all within one standard error of zero and the CAPM alphas are all within 1.6 standard errors of zero. The CAPM is rejected by the GRS test using 10 annually rebalanced SUE portfolios, but is not rejected by the three other sets of annualized rebalanced portfolios.

VII. Covariances vs. Characteristics

Table IA.XIV reports the horse races between covariances and characteristics following the research design of Daniel and Titman (1997, Table III). In Panel A we first rank all NYSE firms by their market capitalization at the end of June of year t and independently rank all NYSE, Amex, and NASDAQ stocks by I/A at the end of fiscal year $t-1$. We sort all stocks into three size groups based on the 20%, 30%, and 50% NYSE breakpoints (per Fama and French's (2008) categorization of microcaps, small stocks, and big stocks). We also sort all stocks into three I/A groups based on the 30%, 40%, and 30% breakpoints. Taking interactions forms nine size and I/A portfolios. The firms remain in these portfolios from July of year t to June of year $t+1$. The individual firms in each of these nine portfolios are further divided into one of five equal-numbered subgroups based on their r_{INV} loadings, β^j_{INV}, from the new three-factor regression. The regression is run with 36 months of returns (at least 24 months) prior to the formation date in June of year t. We report the mean excess monthly value-weighted returns in percentage for all 45 portfolios, the nine high-minus-low β_{INV} portfolios, and the averages across the nine size and I/A portfolios.

Panel A shows that after we control for the I/A characteristic, β_{INV} is not related to average returns. None of the nine high-minus-low β_{INV} portfolios earns significant average returns. In fact, their average returns are often negative. Averaging across the nine size and I/A portfolios, we see that the high-minus-low β_{INV} portfolio earns an average return of −0.15% per month ($t = -1.05$). In contrast, controlling for β_{INV} does not affect the predictive power of the I/A characteristic. The test design in Panel B is similar to that of Panel A, except that we first conduct independent sorts on size and β_{INV} and then subdivide each of the nine resulting portfolios into five equal-numbered I/A subgroups. Panel B shows that the high-minus-low I/A portfolios earn large negative returns on average, which are mostly significant. Averaging across the nine size and β_{INV} portfolios, we observe that the high-minus-low I/A portfolio earns an average return of −0.62% per month, which is more than 6.5 standard errors from zero. Panels C and D document similar results, confirming that the ROA characteristic dominates the ROA factor loading in predicting future returns.

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Table IA.I
Properties of the Investment Factor, r_{INV}, and the ROA Factor, r_{ROA}, 1/1972–12/2006 (420 Months)

Investment-to-assets (I/A) is annual change in gross property, plant, and equipment (Compustat annual item 7) plus annual change in inventories (item 3) divided by lagged book assets (item 6). In each June we break NYSE, Amex, and NASDAQ stocks into three I/A groups using the breakpoints for the low 30%, middle 40%, and high 30% of the ranked I/A. We also use median NYSE size to split NYSE, Amex, and NASDAQ stocks into two groups, small and big. Taking intersections, we form six size-I/A portfolios, denoted $SL^I, SM^I, SH^I, BL^I, BM^I$, and BH^I. Monthly value-weighted returns on the six portfolios are calculated from July of year t to June of year t+1, and the portfolios are rebalanced in June of year t+1. r_{INV} is the difference (low-minus-high), each month, between the average returns on the two low-I/A portfolios (SL^I and BL^I) and the average returns on the two high-I/A portfolios (SH^I and BH^I). Return on assets (ROA) is quarterly earnings (Compustat quarterly item 8) divided by one-quarter-lagged assets (item 44). Each month from January 1972 to December 2006, we sort NYSE, Amex, and NASDAQ stocks into three groups based on the breakpoints for the low 30%, middle 40%, and the high 30% of the ranked quarterly ROA from at least four months ago. We also use the NYSE median each month to split NYSE, Amex, and NASDAQ stocks into two size groups. We form six portfolios from the intersections of the two size and the three ROA groups, denoted $SL^P, SM^P, SH^P, BL^P, BM^P$, and BH^P. Monthly value-weighted returns on the six portfolios are calculated for the current month, and the portfolios are rebalanced monthly. r_{ROA} is the difference (high-minus-low), each month, between the simple average of the returns on the two high-ROA portfolios (SH^P and BH^P) and the simple average of the returns on the two low-ROA portfolios (SL^P and BL^P). In Panel A we regress r_{INV} and r_{ROA} on traditional factors including the market factor, SMB, HML, and WML (from Kenneth French's Web site). The t-statistics (in parentheses) are adjusted for heteroskedasticity and autocorrelations. Panel B reports the correlation matrix of the new factors and the traditional factors. The p-values (in parentheses) test the null hypothesis that a given correlation is zero.

Panel A: Means and factor regressions of r_{INV} and r_{ROA}

	Mean	α	β_{MKT}	β_{SMB}	β_{HML}	β_{WML}	R^2
r_{INV}	0.43	0.51	−0.16				0.16
	(4.75)	(6.12)	(−8.83)				
		0.33	−0.09	0.06	0.27		0.31
		(4.23)	(−4.79)	(2.27)	(9.47)		
		0.22	−0.08	0.05	0.29	0.10	0.36
		(2.87)	(−4.11)	(2.29)	(10.65)	(5.89)	
r_{ROA}	0.96	1.05	−0.16				0.04
	(5.10)	(5.61)	(−4.00)				
		1.01	−0.05	−0.40	0.11		0.31
		(5.60)	(−1.23)	(−7.14)	(1.74)		
		0.74	−0.02	−0.41	0.18	0.26	0.24
		(4.16)	(−0.38)	(−7.56)	(2.81)	(6.43)	

Panel B: Correlation matrix (p-value in parentheses)

	r_{ROA}	r_{MKT}	SMB	HML	WML
r_{INV}	0.10	−0.40	−0.09	0.51	0.20
	(0.05)	(0.00)	(0.07)	(0.00)	(0.00)
r_{ROA}		−0.19	−0.38	0.22	0.26
		(0.00)	(0.00)	(0.00)	(0.00)
r_{MKT}			0.26	−0.45	−0.07
			(0.00)	(0.00)	(0.14)
SMB				−0.29	0.02
				(0.00)	(0.62)
HML					−0.11
					(0.02)

Panel C: Details of the six size-I/A portfolios

	Mean	t(Mean)	# Firms	Size	B/M	I/A	ROA
SL^I	0.94	3.13	902	257	1.43	−4.27	2.16
SM^I	0.88	3.13	1,075	287	1.09	7.05	3.60
SH^I	0.45	1.37	856	288	1.00	30.15	4.16
BL^I	0.76	3.31	137	8,277	0.83	−2.48	6.24
BM^I	0.56	2.61	353	9,108	0.67	7.18	7.76
BH^I	0.39	1.44	217	7,646	0.57	25.71	8.04

Panel D: Details of the six size-ROA portfolios

	Mean	t(Mean)	# Firms	Size	B/M	I/A	ROA
SL^P	−0.22	−0.59	842	253	1.03	11.49	−13.32
SM^P	0.73	2.67	975	297	1.17	11.35	4.28
SH^P	1.29	4.25	677	302	0.70	12.56	13.48
BL^P	0.09	0.29	74	6,629	0.89	9.96	−6.92
BM^P	0.43	1.99	334	9,391	0.83	9.40	4.64
BH^P	0.50	2.17	281	11,546	0.40	11.07	13.36

Table IA.II
Summary Statistics and Factor Regressions for Monthly Percent Excess Returns on 25 Size and Momentum Portfolios, 1/1972–12/2006 (420 Months)

The data for the one-month Treasury bill rate (r_f) and the Fama-French factors are obtained from Kenneth French's Web site. The monthly constructed size and momentum portfolios are the intersections of five portfolios formed on market equity and five portfolios formed on prior two- to seven-month returns. The monthly size breakpoints are the NYSE market equity quintiles. For each portfolio formation month t, we sort stocks on their prior returns from month $t-2$ to $t-7$ (skipping month $t-1$), and calculate the subsequent portfolio returns from month t to $t+5$. All portfolio returns are value-weighted. For all testing portfolios, Panel A reports mean percent excess returns and their t-statistics, CAPM alphas (α) and their t-statistics, and the intercepts (α^j_{FF}) and their t-statistics from Fama-French three-factor regressions. Panel B reports the new three-factor regressions: $r_j - r_f = \alpha^j_q + \beta^j_{MKT} r_{MKT} + \beta^j_{INV} r_{INV} + \beta^j_{ROA} r_{ROA} + \epsilon_j$. See Table I in the main text for the description of r_{INV} and r_{ROA}. All the t-statistics are adjusted for heteroskedasticity and autocorrelations. F_{GRS} is the Gibbons, Ross, and Shanken (1989) F-statistic testing that the intercepts of all 25 portfolios are jointly zero, and p_{GRS} is its associated p-value.

Panel A: Means, CAPM alphas, and Fama-French alphas

	L	2	3	4	W	W-L	L	2	3	4	W	W-L
	Mean						t_{Mean}					
S	−0.04	0.60	0.80	0.95	1.21	1.25	−0.09	1.89	2.78	3.29	3.54	5.49
2	−0.11	0.47	0.71	0.81	1.06	1.17	−0.27	1.54	2.60	2.94	3.07	4.75
3	0.03	0.39	0.58	0.71	0.98	0.95	0.08	1.39	2.29	2.80	3.03	3.63
4	0.05	0.36	0.47	0.63	0.90	0.85	0.13	1.31	1.93	2.62	2.97	3.01
B	−0.22	0.21	0.29	0.41	0.68	0.90	−0.65	0.86	1.37	1.95	2.46	3.17
	α						t_α ($F_{GRS} = 3.28$, $p_{GRS} = 0$)					
S	−0.59	0.15	0.40	0.53	0.73	1.33	−2.01	0.77	2.22	3.00	3.39	5.78
2	−0.69	0.01	0.29	0.38	0.55	1.23	−2.82	0.07	2.06	2.68	2.81	4.89
3	−0.51	−0.05	0.18	0.30	0.48	1.00	−2.21	−0.35	1.56	2.71	2.88	3.67
4	−0.49	−0.07	0.07	0.24	0.43	0.92	−2.02	−0.52	0.72	2.65	2.88	3.10
B	−0.69	−0.17	−0.07	0.05	0.25	0.94	−3.08	−1.40	−0.91	0.78	1.86	3.15
	α_{FF}						$t_{\alpha_{FF}}$ ($F_{GRS} = 3.40$, $p_{GRS} = 0$)					
S	−0.93	−0.30	−0.05	0.15	0.51	1.44	−3.67	−2.37	−0.54	1.88	4.89	5.54
2	−0.87	−0.34	−0.08	0.06	0.47	1.34	−3.82	−3.05	−1.05	0.84	4.15	4.72
3	−0.62	−0.35	−0.17	0.03	0.47	1.09	−2.58	−2.62	−1.91	0.45	4.26	3.57
4	−0.47	−0.31	−0.22	0.02	0.46	0.92	−1.64	−2.12	−2.47	0.30	3.65	2.68
B	−0.60	−0.13	−0.05	0.07	0.46	1.06	−2.41	−0.97	−0.74	1.01	3.31	3.19

Panel B: $r_j - r_f = \alpha^j_q + \beta^j_{MKT} r_{MKT} + \beta^j_{INV} r_{INV} + \beta^j_{ROA} r_{ROA} + \epsilon_j$

	L	2	3	4	W	W-L	L	2	3	4	W	W-L
	α_q						t_{α_q} ($F_{GRS} = 2.20$, $p_{GRS} = 0$)					
S	0.38	0.45	0.49	0.60	0.92	0.54	1.04	1.96	2.40	2.99	3.75	1.70
2	0.22	0.25	0.30	0.35	0.75	0.53	0.76	1.43	1.90	2.17	3.27	1.62
3	0.35	0.18	0.12	0.20	0.63	0.28	1.23	1.11	0.94	1.65	3.12	0.77
4	0.40	0.10	0.00	0.07	0.48	0.08	1.29	0.65	−0.03	0.76	2.57	0.19
B	−0.10	−0.01	−0.10	−0.11	0.31	0.41	−0.38	−0.07	−1.15	−1.50	1.99	1.13
	β_{INV}						$t_{\beta_{INV}}$					
S	−0.31	0.13	0.25	0.31	0.29	0.60	−1.70	1.02	2.21	2.71	2.25	4.66
2	−0.56	−0.05	0.11	0.17	0.07	0.62	−3.85	−0.44	1.18	1.90	0.57	4.60
3	−0.58	−0.16	0.05	0.12	0.00	0.58	−3.90	−1.76	0.59	1.61	−0.04	3.75
4	−0.80	−0.19	0.03	0.11	0.03	0.83	−4.84	−2.29	0.39	1.95	0.30	4.57
B	−0.67	−0.22	−0.11	0.07	−0.10	0.57	−5.16	−3.02	−2.56	1.84	−1.38	3.35
	β_{ROA}						$t_{\beta_{ROA}}$					
S	−0.80	−0.37	−0.24	−0.24	−0.35	0.45	−6.62	−4.95	−3.56	−3.75	−4.01	3.48
2	−0.59	−0.22	−0.07	−0.07	−0.24	0.35	−5.98	−3.58	−1.30	−1.25	−2.72	2.50
3	−0.53	−0.14	0.03	0.04	−0.14	0.39	−5.36	−2.39	0.67	0.91	−1.75	2.62
4	−0.44	−0.07	0.06	0.10	−0.06	0.38	−3.97	−1.06	1.29	3.07	−0.86	2.29
B	−0.21	−0.04	0.09	0.13	0.00	0.22	−2.41	−0.68	2.89	4.82	0.07	1.72

Table IA.III

Summary Statistics and Factor Regressions for Monthly Percent Excess Returns on Deciles Formed on Campbell, Hilscher, and Szilagyi's (2008) Failure Probability Measure and Deciles Formed on Ohlson's (1980) O-Score

The data on the one-month Treasury bill rate (r_f) and the Fama-French factors are from Kenneth French's Web site. See Table I in the main text for the description of r_{INV} and r_{ROA}. We sort all NYSE, Amex, and NASDAQ stocks each month into deciles based on failure probability and on O-score from at least four months ago. Monthly value-weighted returns on the portfolios are calculated for the current month, and the portfolios are rebalanced monthly. For each portfolio we report the average return in monthly percent and its t-statistics, the CAPM regression ($r_j - r_f = \alpha^j + \beta^j r_{MKT} + \epsilon_j$), the Fama-French three-factor regression ($r_j - r_f = \alpha^j_{FF} + b^j r_{MKT} + s^j SMB + h^j HML + \epsilon_j$), and the new three-factor regression ($r_j - r_f = \alpha^j_q + \beta^j_{MKT} r_{MKT} + \beta^j_{INV} r_{INV} + \beta^j_{ROA} r_{ROA} + \epsilon_j$). For each asset pricing model, we also report the Gibbons, Ross, and Shanken (1989) F-statistic (F_{GRS}) testing that the intercepts are jointly zero and its p-value (in parentheses). All the t-statistics are adjusted for heteroskedasticity and autocorrelations.

	Low	2	3	4	5	6	7	8	9	High	H-L	F_{GRS} (p)
	Panel A: The failure probability deciles, 6/1975–12/2006 (379 months)											
Mean	1.03	0.82	0.72	0.63	0.72	0.45	0.58	0.28	0.16	−0.35	−1.38	
t_{Mean}	4.07	3.69	3.33	2.79	2.93	1.57	1.80	0.80	0.39	−0.72	−3.53	
α	0.39	0.21	0.10	−0.01	0.01	−0.33	−0.30	−0.61	−0.86	−1.48	−1.87	3.01
β	0.95	0.90	0.93	0.95	1.06	1.17	1.30	1.32	1.51	1.69	0.73	(0)
t_α	2.60	1.99	1.13	−0.14	0.13	−2.50	−1.68	−2.75	−3.31	−4.57	−5.08	
α_{FF}	0.39	0.36	0.19	0.10	−0.01	−0.49	−0.27	−0.71	−1.06	−1.75	−2.14	4.75
b	0.91	0.87	0.93	0.94	1.06	1.21	1.24	1.24	1.38	1.48	0.57	(0)
s	0.17	−0.14	−0.18	−0.16	0.01	0.12	0.20	0.48	0.85	1.27	1.10	
h	−0.04	−0.19	−0.10	−0.13	0.03	0.20	−0.09	0.02	0.09	0.09	0.13	
$t_{\alpha_{FF}}$	2.46	3.30	2.18	0.95	−0.07	−3.15	−1.65	−3.24	−4.66	−6.39	−6.43	
α_q	0.19	−0.01	−0.11	−0.01	0.13	−0.07	0.33	0.34	0.24	−0.13	−0.32	1.78
β_{MKT}	0.99	0.95	0.97	0.95	1.03	1.10	1.16	1.11	1.27	1.42	0.43	(0.06)
β_{INV}	0.00	0.07	0.03	−0.08	−0.01	−0.19	−0.27	−0.34	−0.34	0.02	0.03	
β_{ROA}	0.18	0.17	0.17	0.04	−0.10	−0.14	−0.43	−0.69	−0.82	−1.22	−1.40	
t_{α_q}	1.09	−0.12	−1.29	−0.08	1.14	−0.44	2.23	2.00	1.03	−0.49	−1.09	
$t_{\beta_{MKT}}$	25.21	26.98	37.60	24.40	36.96	20.84	30.46	26.98	21.85	18.17	5.78	
$t_{\beta_{INV}}$	−0.04	1.06	0.65	−1.48	−0.15	−2.38	−2.40	−3.22	−2.21	0.16	0.18	
$t_{\beta_{ROA}}$	2.46	3.52	5.07	0.81	−2.46	−2.32	−6.77	−9.92	−11.54	−13.42	−14.64	
	Panel B: The O-score deciles, 1/1972–12/2006 (420 months)											
Mean	0.48	0.62	0.48	0.53	0.50	0.48	0.43	0.26	0.19	−0.44	−0.92	
t_{Mean}	2.04	2.54	1.91	2.24	2.03	1.97	1.64	0.92	0.59	−1.04	−2.84	
α	−0.04	0.09	−0.05	0.04	0.00	0.00	−0.07	−0.27	−0.40	−1.14	−1.10	2.49
β	1.02	1.05	1.05	0.98	1.00	0.95	0.99	1.06	1.18	1.38	0.36	(0.01)
t_α	−0.51	1.15	−0.50	0.42	−0.01	0.03	−0.51	−1.70	−2.06	−3.96	−3.56	
α_{FF}	0.12	0.09	−0.23	−0.21	−0.24	−0.22	−0.43	−0.52	−0.74	−1.32	−1.44	6.33
b	0.99	1.02	1.09	1.03	1.03	0.95	1.03	1.02	1.12	1.16	0.17	(0)
s	−0.15	0.11	0.21	0.30	0.33	0.45	0.55	0.66	0.92	1.35	1.50	
h	−0.21	−0.01	0.25	0.35	0.32	0.28	0.47	0.29	0.40	0.10	0.32	
$t_{\alpha_{FF}}$	1.68	0.98	−2.41	−2.49	−2.36	−2.11	−3.61	−3.86	−5.04	−6.39	−6.49	
α_q	0.02	0.14	−0.07	−0.01	0.02	0.19	0.14	0.10	0.17	−0.07	−0.09	1.10
β_{MKT}	1.00	1.03	1.06	1.00	1.00	0.93	0.97	1.00	1.09	1.21	0.22	(0.36)
β_{INV}	−0.21	−0.10	0.02	0.14	0.07	0.04	0.15	0.00	0.00	−0.01	0.20	
β_{ROA}	0.05	0.00	0.02	−0.02	−0.06	−0.20	−0.28	−0.36	−0.55	−1.02	−1.07	
t_{α_q}	0.20	1.50	−0.61	−0.05	0.19	1.40	0.97	0.63	0.91	−0.29	−0.32	
$t_{\beta_{MKT}}$	50.55	31.89	27.74	33.31	31.23	25.87	22.19	20.58	20.29	17.43	2.93	
$t_{\beta_{INV}}$	−4.29	−1.84	0.29	2.04	0.93	0.53	1.63	−0.04	0.02	−0.07	1.18	
$t_{\beta_{ROA}}$	2.74	0.10	0.38	−0.52	−1.55	−4.31	−5.86	−7.58	−9.04	−10.48	−11.03	

Table IA.IV
Summary Statistics and Factor Regressions for Monthly Percent Excess Returns on the Net Stock Issues Deciles and the Asset Growth Deciles, 1/1972–12/2006 (420 Months)

The data on the one-month Treasury bill rate (r_f) and the Fama-French factors are from Kenneth French's Web site. See Table I in the main text for the description of r_{INV} and r_{ROA}. We measure net stock issues as the natural log of the ratio of the split-adjusted shares outstanding at the fiscal year-end in $t-1$ (Compustat annual item 25 times the Compustat adjustment factor, item 27) divided by the split-adjusted shares outstanding at the fiscal year-end in $t-2$. In June of each year t, we sort all NYSE, Amex, and NASDAQ stocks into 10 deciles based on the breakpoints of net stock issues measured at the end of last fiscal year-end. Monthly value-weighted returns are calculated from July of year t to June of year $t+1$. In June of each year t, we sort all NYSE, Amex, and NASDAQ stocks into 10 deciles based on asset growth measured at the fiscal year ending in calendar year $t-1$. Asset growth for fiscal year $t-1$ is the change in total assets (item 6) from the fiscal year-end of $t-2$ to the fiscal year-end of $t-1$ divided by total assets at the fiscal year-end of $t-2$. Monthly value-weighted returns are calculated from July of year t to June of year $t+1$. For each portfolio we report the average return in monthly percent and its t-statistics, the CAPM regression ($r_j - r_f = \alpha^j + \beta^j r_{MKT} + \epsilon_j$), the Fama-French three-factor regression ($r_j - r_f = \alpha^j_{FF} + b^j r_{MKT} + s^j SMB + h^j HML + \epsilon_j$), and the new three-factor regression ($r_j - r_f = \alpha^j_q + \beta^j_{MKT} r_{MKT} + \beta^j_{INV} r_{INV} + \beta^j_{ROA} r_{ROA} + \epsilon_j$). We also report the Gibbons, Ross, and Shanken (1989) F-statistic (F_{GRS}) testing that the intercepts are jointly zero and its p-value (in parentheses). The t-statistics are adjusted for heteroskedasticity and autocorrelations.

	Low	2	3	4	5	6	7	8	9	High	H-L	F_{GRS} (p)
					Panel A: The net stock issues deciles							
Mean	1.00	0.77	0.39	0.85	0.82	0.88	0.72	0.68	0.27	0.16	−0.84	
t_{Mean}	4.73	3.65	1.53	3.88	3.61	3.59	2.68	2.35	0.89	0.55	−4.64	
α	0.42	0.17	−0.30	0.25	0.17	0.18	−0.04	−0.13	−0.55	−0.64	−1.06	3.97
β	0.88	0.90	1.05	0.92	0.99	1.06	1.16	1.23	1.24	1.21	0.33	(0)
t_α	3.68	1.84	−2.13	2.25	1.98	1.73	−0.36	−0.94	−3.21	−4.34	−5.07	
α_{FF}	0.22	0.08	−0.28	0.15	0.13	0.16	0.00	−0.01	−0.41	−0.59	−0.82	3.10
b	0.99	0.96	1.03	0.99	1.01	1.04	1.12	1.14	1.13	1.14	0.15	(0)
s	0.01	−0.01	0.03	−0.06	0.00	0.18	0.08	0.12	0.16	0.26	0.25	
h	0.32	0.15	−0.03	0.17	0.08	0.04	−0.06	−0.19	−0.23	−0.07	−0.39	
$t_{\alpha_{FF}}$	2.39	0.88	−2.12	1.37	1.36	1.55	−0.01	−0.07	−2.45	−3.89	−4.33	
α_q	0.09	0.00	0.01	0.12	0.24	0.35	0.24	0.43	0.16	−0.19	−0.28	2.67
β_{MKT}	0.96	0.95	0.97	0.94	0.96	1.01	1.07	1.06	1.05	1.08	0.12	(0)
β_{INV}	0.11	0.07	−0.22	−0.10	−0.17	−0.12	−0.40	−0.51	−0.50	−0.43	−0.55	
β_{ROA}	0.21	0.10	−0.15	0.14	0.02	−0.08	−0.06	−0.23	−0.36	−0.18	−0.39	
t_{α_q}	0.90	0.05	0.06	1.07	2.49	2.90	1.96	3.14	1.10	−1.10	−1.39	
$t_{\beta_{MKT}}$	45.73	43.08	29.22	35.43	42.35	34.29	37.39	35.95	33.72	29.85	2.67	
$t_{\beta_{INV}}$	1.66	1.47	−3.17	−1.69	−3.47	−1.77	−5.36	−5.80	−6.00	−4.74	−4.25	
$t_{\beta_{ROA}}$	5.06	3.01	−2.47	3.29	0.53	−1.61	−1.58	−6.78	−7.23	−4.09	−6.53	

	Low	2	3	4	5	6	7	8	9	High	H-L	F_{GRS} (p)
	Panel B: The asset growth deciles											
Mean	1.10	0.79	0.84	0.75	0.63	0.64	0.60	0.49	0.31	0.05	−1.04	
t_{Mean}	3.48	3.06	3.66	3.63	3.03	3.00	2.58	1.85	1.06	0.15	−5.19	
α	0.49	0.27	0.36	0.31	0.18	0.17	0.09	−0.08	−0.32	−0.67	−1.16	5.82
β	1.21	1.04	0.95	0.87	0.89	0.92	1.02	1.14	1.24	1.43	0.23	(0)
t_α	2.92	2.22	3.84	3.81	2.59	2.38	1.37	−0.98	−2.94	−4.77	−5.92	
α_{FF}	0.17	0.02	0.11	0.13	0.01	0.07	0.11	0.04	−0.11	−0.48	−0.65	3.71
b	1.20	1.11	1.05	0.97	0.98	0.98	1.02	1.06	1.11	1.27	0.07	(0)
s	0.65	0.21	0.08	−0.07	0.00	−0.06	−0.04	0.09	0.15	0.31	−0.34	
h	0.40	0.34	0.37	0.28	0.26	0.16	−0.03	−0.21	−0.33	−0.33	−0.72	
$t_{\alpha_{FF}}$	1.15	0.19	1.31	1.82	0.10	1.11	1.66	0.54	−1.15	−3.84	−3.57	
α_q	0.45	0.07	0.15	0.06	0.03	0.05	0.16	0.25	0.17	−0.10	−0.55	3.05
β_{MKT}	1.26	1.12	1.02	0.93	0.94	0.93	0.99	1.04	1.10	1.28	0.02	(0)
β_{INV}	0.59	0.56	0.40	0.28	0.24	−0.03	−0.23	−0.56	−0.74	−0.79	−1.38	
β_{ROA}	−0.25	−0.09	0.02	0.10	0.03	0.13	0.04	−0.05	−0.11	−0.16	0.09	
t_{α_q}	2.49	0.57	1.34	0.66	0.41	0.74	2.11	3.32	1.66	−0.72	−3.06	
$t_{\beta_{MKT}}$	27.15	41.93	43.85	49.88	45.42	54.12	56.76	60.54	52.69	43.03	0.44	
$t_{\beta_{INV}}$	5.99	8.44	5.89	6.14	5.19	−0.72	−5.96	−12.82	−11.96	−9.47	−15.04	
$t_{\beta_{ROA}}$	−4.06	−1.77	0.36	2.24	0.85	3.82	1.23	−2.12	−3.28	−4.25	1.30	

Table IA.V
Summary Statistics and Factor Regressions for Monthly Percent Excess Returns on Deciles Formed on Most Recent (and Four-month-lagged) Standardized Unexpected Earnings (SUE), 1/1972–12/2006 (420 Months)

The data on the one-month Treasury bill rate (r_f) and the Fama-French three factors are from Kenneth French's Web site. See Table I in the main text for the description of r_{INV} and r_{ROA}. We define SUE as the change in quarterly earnings per share from its value announced four quarters ago divided by the standard deviation of earnings change over the prior eight quarters. In Panel A we rank all NYSE, Amex, and NASDAQ stocks into 10 deciles at the beginning of each month by their most recent past SUE. Monthly value-weighted returns on the SUE portfolios are calculated for the current month, and the portfolios are rebalanced monthly. In Panel B we use the same procedure but instead of the most recent SUE we sort on the SUE from at least four months ago. For each portfolio we report the average return in monthly percent and its t-statistics, the CAPM regression ($r_j - r_f = \alpha^j + \beta^j r_{MKT} + \epsilon_j$), the Fama-French three-factor regression ($r_j - r_f = \alpha^j_{FF} + b^j r_{MKT} + s^j SMB + h^j HML + \epsilon_j$), and the new three-factor regression ($r_j - r_f = \alpha^j_q + \beta^j_{MKT} r_{MKT} + \beta^j_{INV} r_{INV} + \beta^j_{ROA} r_{ROA} + \epsilon_j$). For each asset pricing model, we also report the Gibbons, Ross, and Shanken (1989) F-statistic (F_{GRS}) testing that the intercepts are jointly zero and its p-value (in parentheses). All the t-statistics are adjusted for heteroskedasticity and autocorrelations.

	Low	2	3	4	5	6	7	8	9	High	H-L	F_{GRS} (p)
					Panel A: Most recent SUE							
Mean	−0.10	0.21	0.11	0.13	0.26	0.61	0.61	0.90	0.96	1.08	1.18	
t_{Mean}	−0.41	0.88	0.43	0.53	1.09	2.68	2.68	3.87	4.14	4.84	8.34	
α	−0.62	−0.29	−0.42	−0.39	−0.25	0.12	0.11	0.41	0.47	0.61	1.22	10.65
β	1.02	0.99	1.05	1.02	1.01	0.98	0.98	0.98	0.98	0.94	−0.08	(0)
t_α	−6.65	−3.07	−4.17	−3.92	−2.86	1.57	1.54	4.38	5.45	7.22	8.76	
α_{FF}	−0.58	−0.25	−0.41	−0.34	−0.32	0.14	0.15	0.43	0.46	0.64	1.22	11.01
b	1.02	0.98	1.02	0.97	1.02	0.98	0.98	0.98	1.00	0.95	−0.07	(0)
s	−0.03	−0.04	0.10	0.14	0.08	−0.04	−0.09	−0.05	−0.06	−0.10	−0.07	
h	−0.04	−0.05	−0.03	−0.09	0.09	−0.02	−0.04	−0.03	0.03	−0.03	0.01	
$t_{\alpha_{FF}}$	−6.16	−2.45	−3.77	−3.48	−3.65	1.69	2.05	4.86	5.03	7.14	8.19	
α_q	−0.43	−0.21	−0.12	−0.17	−0.17	0.11	−0.01	0.24	0.34	0.47	0.90	5.56
β_{MKT}	0.98	0.96	0.98	0.98	0.99	0.98	1.00	1.01	1.00	0.96	−0.02	(0)
β_{INV}	−0.17	−0.22	−0.25	−0.08	0.02	0.01	0.01	0.11	0.03	−0.01	0.16	
β_{ROA}	−0.10	0.03	−0.17	−0.17	−0.09	0.00	0.11	0.10	0.11	0.14	0.23	
t_{α_q}	−4.47	−1.98	−1.11	−1.45	−1.88	1.23	−0.10	2.66	3.42	5.53	6.52	
$t_{\beta_{MKT}}$	40.67	32.30	31.55	39.48	41.41	50.54	54.29	47.16	44.70	39.62	−0.54	
$t_{\beta_{INV}}$	−2.86	−3.52	−4.10	−1.64	0.32	0.30	0.29	2.10	0.56	−0.22	1.87	
$t_{\beta_{ROA}}$	−3.08	0.78	−4.04	−3.43	−2.20	0.15	4.25	2.27	3.30	4.47	4.61	

	Low	2	3	4	5	6	7	8	9	High	H-L	F_{GRS} (p)
						Panel B: Four-month-lagged SUE						
Mean	0.34	0.34	0.30	0.26	0.32	0.58	0.66	0.67	0.72	0.86	0.52	
t_{Mean}	1.36	1.44	1.19	1.04	1.37	2.52	2.90	3.06	3.04	3.86	3.61	
α	−0.18	−0.16	−0.23	−0.26	−0.18	0.09	0.17	0.20	0.22	0.39	0.57	3.65
β	1.04	1.00	1.06	1.04	1.00	0.98	0.96	0.93	0.98	0.94	−0.10	(0)
t_α	−1.83	−1.87	−2.42	−2.60	−2.10	1.11	2.08	2.48	2.25	4.52	3.98	
α_{FF}	−0.16	−0.13	−0.22	−0.26	−0.20	0.10	0.14	0.23	0.22	0.45	0.62	4.60
b	1.05	0.98	1.03	1.00	1.00	0.99	1.00	0.93	0.99	0.94	−0.11	(0)
s	−0.06	0.00	0.07	0.18	0.03	−0.06	−0.12	−0.07	−0.02	−0.13	−0.08	
h	−0.02	−0.05	−0.03	−0.04	0.04	−0.01	0.06	−0.04	0.01	−0.08	−0.06	
$t_{\alpha_{FF}}$	−1.57	−1.41	−2.31	−2.40	−2.28	1.12	1.86	2.90	2.22	5.21	4.03	
α_q	−0.02	−0.06	0.00	−0.06	−0.11	0.04	0.04	0.08	0.16	0.30	0.33	1.79
β_{MKT}	1.00	0.96	0.99	0.99	0.98	0.99	1.00	0.96	1.00	0.96	−0.04	(0.06)
β_{INV}	−0.14	−0.19	−0.19	−0.10	−0.01	0.03	0.07	0.06	0.00	−0.04	0.10	
β_{ROA}	−0.12	−0.01	−0.17	−0.19	−0.08	0.05	0.13	0.12	0.08	0.13	0.25	
t_{α_q}	−0.22	−0.64	0.01	−0.56	−1.26	0.41	0.48	0.98	1.60	3.51	2.24	
$t_{\beta_{MKT}}$	31.24	35.05	37.40	39.37	41.53	42.33	48.75	48.04	43.54	39.09	−0.88	
$t_{\beta_{INV}}$	−1.97	−3.00	−3.54	−2.01	−0.18	0.53	1.56	1.23	0.08	−0.73	1.14	
$t_{\beta_{ROA}}$	−3.45	−0.23	−4.30	−3.11	−2.01	1.91	4.35	3.90	1.99	4.40	5.03	

Table IA.VI
Summary Statistics and Factor Regressions for Monthly Percent Excess Returns on 25 Size and Book-to-Market Portfolios, 1/1972–12/2006 (420 Months)

The data for the one-month Treasury bill rate (r_f), the Fama-French factors, and the 25 size and book-to-market portfolios are obtained from Kenneth French's Web site. For all testing portfolios, Panel A reports mean percent excess returns and their t-statistics, CAPM alphas (α) and their t-statistics, and the intercepts (α_{FF}) and their t-statistics from Fama-French three-factor regressions. Panel B reports the new three-factor regressions: $r_j - r_f = \alpha_q^j + \beta_{MKT}^j r_{MKT} + \beta_{INV}^j r_{INV} + \beta_{ROA}^j r_{ROA} + \epsilon_j$. See Table I in the main text for the description of r_{INV} and r_{ROA}. All the t-statistics are adjusted for heteroskedasticity and autocorrelations. F_{GRS} is the Gibbons, Ross, and Shanken (1989) F-statistic testing that the intercepts of all 25 portfolios are jointly zero, and p_{GRS} is its associated p-value.

	L	2	3	4	*H*	*H-L*	*L*	2	3	4	*H*	*H-L*	*L*	2	3	4	*H*	*H-L*	*L*	2	3	4	*H*	*H-L*
	Panel A: Means, CAPM alphas, and Fama-French alphas												Panel B: $r_j - r_f = \alpha_E^j + \beta^j\, MKT + \beta_I^j r_{INV} + \beta_R^j r_{ROA} + \epsilon_j$											
	Mean						t_{Mean}						α_q						t_{α_q} ($F_{GRS} = 2.72$, $p_{GRS} = 0$)					
S	0.10	0.81	0.88	1.07	1.19	1.09	0.25	2.40	3.10	4.05	4.21	5.08	0.08	0.64	0.46	0.59	0.64	0.57	0.27	2.49	2.23	3.10	3.31	2.72
2	0.34	0.66	0.90	1.00	1.04	0.69	0.93	2.27	3.51	4.06	3.77	3.27	0.14	0.19	0.32	0.40	0.38	0.24	0.63	1.09	2.18	2.75	2.19	1.21
3	0.41	0.72	0.74	0.84	1.07	0.66	1.22	2.70	3.14	3.67	4.12	2.86	0.19	0.14	0.07	0.15	0.31	0.13	1.05	1.05	0.60	1.17	1.86	0.57
4	0.51	0.58	0.79	0.84	0.92	0.42	1.68	2.28	3.30	3.72	3.65	1.93	0.19	−0.12	0.05	0.15	0.08	−0.11	1.23	−1.18	0.40	1.32	0.52	−0.45
B	0.40	0.61	0.59	0.65	0.65	0.25	1.67	2.68	2.75	3.13	2.80	1.20	−0.11	−0.13	−0.04	−0.03	0.03	0.14	−1.17	−1.51	−0.39	−0.26	0.16	0.61
	α						t_α ($F_{GRS} = 4.25$, $p_{GRS} = 0$)						β_{INV}						$t_{\beta_{INV}}$					
S	−0.63	0.21	0.37	0.60	0.70	1.32	−2.61	1.03	2.15	3.64	3.82	7.10	−0.11	0.15	0.35	0.45	0.58	0.69	−0.76	1.20	3.22	4.18	4.68	5.63
2	−0.38	0.09	0.40	0.53	0.53	0.91	−2.07	0.57	2.96	3.78	3.18	4.83	−0.36	0.05	0.25	0.32	0.51	0.87	−3.26	0.54	2.98	3.67	4.43	6.97
3	−0.27	0.17	0.27	0.40	0.59	0.86	−1.74	1.45	2.32	3.16	3.71	3.96	−0.43	0.03	0.24	0.33	0.50	0.93	−4.43	0.46	3.39	4.06	4.20	7.03
4	−0.13	0.04	0.30	0.39	0.45	0.58	−1.14	0.37	2.68	3.33	3.06	2.82	−0.36	0.08	0.26	0.39	0.52	0.87	−5.75	1.24	3.88	5.14	5.41	7.30
B	−0.11	0.13	0.16	0.26	0.25	0.36	−1.29	1.48	1.54	2.18	1.61	1.81	−0.26	0.12	0.14	0.26	0.42	0.68	−5.17	2.51	2.19	3.54	3.76	5.05
	α_{FF}						$t_{\alpha_{FF}}$ ($F_{GRS} = 3.08$, $p_{GRS} = 0$)						β_{ROA}						$t_{\beta_{ROA}}$					
S	−0.52	0.08	0.09	0.23	0.16	0.68	−4.48	0.88	1.35	3.31	2.16	5.50	−0.62	−0.47	−0.26	−0.21	−0.23	0.39	−5.65	−4.21	−3.00	−2.91	−3.50	4.53
2	−0.21	−0.12	0.05	0.09	−0.07	0.15	−2.63	−1.55	0.67	1.23	−0.93	1.42	−0.31	−0.12	−0.04	−0.03	−0.11	0.21	−3.71	−1.82	−0.70	−0.58	−1.63	2.64
3	−0.03	−0.05	−0.12	−0.09	−0.02	0.01	−0.37	−0.58	−1.50	−1.13	−0.22	0.08	−0.23	0.02	0.07	0.07	0.02	0.24	−2.95	0.36	1.55	1.27	0.25	2.10
4	0.11	−0.17	−0.07	−0.05	−0.11	−0.22	1.33	−1.87	−0.83	−0.56	−1.06	−1.84	−0.13	0.12	0.12	0.04	0.10	0.23	−2.03	2.74	2.10	0.68	1.49	2.10
B	0.17	0.04	−0.02	−0.13	−0.26	−0.43	2.75	0.55	−0.28	−1.75	−2.34	−3.34	0.12	0.19	0.12	0.16	0.01	−0.11	4.75	5.63	2.61	2.58	0.11	−1.23

Table IA.VII

Summary Statistics and Factor Regressions for Monthly Percent Excess Returns on Deciles Formed on Pre-ranking CAPM Betas and the Market Equity, 1/1972–12/2006 (420 Months)

The one-month Treasury bill rate (r_f), the Fama-French factors, and 10 market equity portfolios are from Kenneth French's Web site. See Table I in the main text for the description of r_{INV} and r_{ROA}. We estimate pre-ranking CAPM betas on 60 (at least 24) monthly returns prior to July of year t. In June of year t we sort all stocks into 10 deciles based on the pre-ranking betas. The value-weighted monthly returns on the portfolios are calculated from July of year t to June of year $t+1$. For each portfolio we report the average return in monthly percent and its t-statistics, the CAPM regression ($r_j - r_f = \alpha^j + \beta^j r_{MKT} + \epsilon_j$), the Fama-French three-factor regression ($r_j - r_f = \alpha^j_{FF} + b^j r_{MKT} + s^j SMB + h^j HML + \epsilon_j$), and the new three-factor regression ($r_j - r_f = \alpha^j_q + \beta^j_{MKT} r_{MKT} + \beta^j_{INV} r_{INV} + \beta^j_{ROA} r_{ROA} + \epsilon_j$). For each asset pricing model, we also report the Gibbons, Ross, and Shanken (1989) F-statistic (F_{GRS}) testing that the intercepts are jointly zero and its p-value (in parentheses). All the t-statistics are adjusted for heteroskedasticity and autocorrelations.

Panel A: 10 pre-ranking CAPM beta deciles

	Low	2	3	4	5	6	7	8	9	High	H-L	F_{GRS} (p)
Mean	0.48	0.69	0.62	0.66	0.57	0.54	0.57	0.54	0.51	0.37	−0.10	
t_{Mean}	2.26	3.73	3.32	3.31	2.55	2.20	2.14	1.81	1.40	0.80	−0.24	
α	0.16	0.37	0.27	0.26	0.10	0.01	0.00	−0.10	−0.23	−0.53	−0.69	1.60
β	0.62	0.63	0.70	0.79	0.93	1.05	1.14	1.26	1.49	1.79	1.17	(0.10)
t_α	0.95	3.04	2.53	2.63	1.10	0.09	−0.04	−0.95	−1.44	−2.23	−2.10	
α_{FF}	−0.16	0.14	0.09	0.09	−0.09	−0.12	−0.13	−0.15	−0.12	−0.31	−0.15	1.23
b	0.75	0.77	0.83	0.91	1.03	1.10	1.17	1.21	1.31	1.50	0.75	(0.27)
s	0.08	−0.11	−0.20	−0.13	−0.01	0.02	0.12	0.34	0.51	0.82	0.74	
h	0.48	0.37	0.29	0.28	0.30	0.19	0.18	0.04	−0.25	−0.45	−0.92	
$t_{\alpha_{FF}}$	−0.94	1.21	0.93	0.96	−1.10	−1.40	−1.37	−1.47	−0.81	−1.54	−0.53	
α_q	−0.07	0.05	−0.09	−0.10	−0.14	−0.13	0.03	0.19	0.34	0.47	0.54	1.77
β_{MKT}	0.67	0.70	0.78	0.86	0.98	1.07	1.13	1.20	1.37	1.57	0.91	(0.06)
β_{INV}	0.15	0.16	0.25	0.15	0.10	0.00	−0.11	−0.23	−0.29	−0.70	−0.85	
β_{ROA}	0.15	0.23	0.22	0.27	0.18	0.13	0.02	−0.17	−0.41	−0.62	−0.77	
t_{α_q}	−0.39	0.43	−0.85	−1.03	−1.44	−1.35	0.27	1.52	2.01	1.93	1.58	
$t_{\beta_{MKT}}$	12.22	20.05	25.79	40.48	39.76	48.99	37.96	35.24	31.21	26.35	9.74	
$t_{\beta_{INV}}$	1.61	2.27	4.65	3.16	1.87	0.07	−1.69	−3.03	−3.02	−4.84	−4.72	
$t_{\beta_{ROA}}$	2.26	4.27	5.73	7.70	4.30	3.60	0.51	−3.68	−7.43	−8.16	−7.32	

Panel B: 10 market equity deciles												
	Small	2	3	4	5	6	7	8	9	Big	S-B	F_{GRS} (p)
Mean	0.73	0.73	0.74	0.68	0.71	0.63	0.70	0.63	0.60	0.46	0.28	
t_{Mean}	2.42	2.37	2.55	2.42	2.60	2.47	2.77	2.54	2.65	2.15	1.16	
α	0.21	0.14	0.16	0.11	0.15	0.08	0.15	0.08	0.09	−0.02	0.23	1.79
β	1.03	1.16	1.15	1.13	1.12	1.08	1.09	1.08	1.00	0.94	0.09	(0.06)
t_α	1.08	0.86	1.10	0.84	1.30	0.90	1.90	1.17	1.70	−0.31	0.96	
α_{FF}	−0.04	−0.06	−0.04	−0.08	−0.02	−0.08	0.02	−0.04	0.00	0.06	−0.10	1.82
b	0.88	1.01	1.04	1.03	1.05	1.04	1.07	1.07	1.03	0.97	−0.10	(0.06)
s	1.18	1.07	0.90	0.80	0.68	0.48	0.38	0.28	0.06	−0.31	1.49	
h	0.22	0.17	0.18	0.18	0.16	0.18	0.15	0.15	0.13	−0.08	0.31	
$t_{\alpha_{FF}}$	−0.40	−1.04	−0.84	−1.47	−0.36	−1.25	0.34	−0.68	0.07	2.47	−1.11	
α_q	0.46	0.38	0.33	0.25	0.29	0.13	0.13	0.14	0.04	−0.07	0.53	1.57
β_{MKT}	1.02	1.14	1.13	1.11	1.10	1.07	1.10	1.08	1.01	0.95	0.08	(0.11)
β_{INV}	0.34	0.22	0.09	0.04	0.02	0.03	0.10	0.06	0.05	−0.05	0.39	
β_{ROA}	−0.40	−0.33	−0.22	−0.15	−0.15	−0.06	−0.03	−0.08	0.02	0.08	−0.48	
t_{α_q}	2.00	1.94	2.14	1.72	2.29	1.28	1.29	1.66	0.73	−1.20	1.91	
$t_{\beta_{MKT}}$	17.56	23.20	26.27	27.08	30.06	37.05	48.96	65.39	75.97	59.37	1.07	
$t_{\beta_{INV}}$	2.84	2.04	1.04	0.48	0.35	0.42	2.14	1.43	1.53	−1.55	2.68	
$t_{\beta_{ROA}}$	−4.44	−4.05	−3.50	−2.60	−2.72	−1.67	−0.72	−2.27	0.96	3.51	−4.39	

Table IA.VIII
Summary Statistics and Factor Regressions for Monthly Percent Excess Returns on 25 I/A and ROA Portfolios, 1/1972–12/2006 (420 Months)

The data for the one-month Treasury bill rate (r_f) and the Fama-French (1993) factors are from Kenneth French's Web site. We sort all stocks into five quintiles each month based on quarterly ROA from four months ago, and all stocks independently in June of each year into five quintiles based on investment-to-assets (I/A) at the last fiscal year-end. Taking intersections yields 25 investment and profitability portfolios. We calculate value-weighted returns for the current month. Panel A reports mean percent excess returns and their t-statistics, the CAPM alphas (α) and their t-statistics, and the Fama-French alphas (α_{FF}) and their t-statistics. Panel B reports the equilibrium three-factor regressions: $r_j - r_f = \alpha_q^j + \beta_{MKT}^j\, r_{MKT} + \beta_{INV}^j\, r_{INV} + \beta_{ROA}^j\, r_{ROA} + \epsilon_j$. All the t-statistics are adjusted for heteroskedasticity and autocorrelations. F_{GRS} is the Gibbons, Ross, and Shanken (1989) F-statistic testing that the intercepts of all 25 portfolios are jointly zero, and p_{GRS} is the p-value.

	L^P	2	3	4	H^P	H-L^P	L^P	2	3	4	H^P	H-L^P	L^P	2	3	4	H^P	H-L^P	L^P	2	3	4	H^P	H-L^P
	Panel A: Means, CAPM alphas, and Fama-French regressions												Panel B: $r_j - r_f = \alpha_q^j + \beta_{MKT}^j\, r_{MKT} + \beta_{INV}^j\, r_{INV} + \beta_{ROA}^j\, r_{ROA} + \epsilon_j$											
	Mean						t(Mean)						α_q						t_{α_q} ($F_{GRS} = 2.42$, $p_{GRS} = 0$)					
L^I	0.13	0.67	0.71	1.03	0.93	0.80	0.30	2.05	2.52	3.84	3.02	2.20	0.25	0.15	−0.12	0.00	0.04	−0.21	0.79	0.67	−0.69	0.00	0.20	−0.63
2	0.44	0.62	0.83	0.57	0.84	0.40	1.06	2.03	3.46	2.43	3.30	1.24	0.67	0.52	0.23	−0.16	0.05	−0.62	2.54	2.46	1.54	−1.39	0.37	−2.23
3	−0.26	0.29	0.45	0.71	0.68	0.95	−0.64	0.97	1.73	3.02	2.91	3.13	0.19	0.20	−0.15	0.09	0.08	−0.12	0.87	1.00	−0.86	0.67	0.66	−0.52
4	−0.58	0.31	0.48	0.43	0.58	1.16	−1.37	0.99	1.72	1.79	2.07	3.62	−0.10	0.47	0.04	−0.08	0.20	0.30	−0.38	2.48	0.25	−0.76	1.63	1.06
H^I	−0.98	−0.42	0.22	0.41	0.67	1.65	−2.06	−1.19	0.74	1.43	2.08	4.97	−0.46	−0.18	−0.15	0.05	0.23	0.68	−1.58	−0.86	−0.79	0.30	1.62	2.28
L-H^I	1.11	1.09	0.49	0.62	0.26		3.41	4.63	2.39	3.10	1.23		0.71	0.33	0.03	−0.05	−0.19		1.97	1.48	0.16	−0.23	−0.87	
	α						t_α ($F_{GRS} = 4.20$, $p_{GRS} = 0$)						β_{INV}						$t_{\beta_{INV}}$					
L^I	−0.56	0.07	0.19	0.52	0.35	0.91	−1.76	0.36	1.12	3.47	1.98	2.51	0.56	0.45	0.47	0.54	0.28	−0.29	3.28	4.37	4.28	5.72	2.32	−1.48
2	−0.25	0.05	0.37	0.10	0.33	0.58	−0.90	0.30	2.92	0.91	2.57	1.85	0.27	−0.09	0.37	0.40	0.13	−0.15	2.12	−0.79	4.20	5.57	1.92	−1.12
3	−0.97	−0.26	−0.04	0.24	0.21	1.18	−3.71	−1.44	−0.25	2.09	1.89	4.11	−0.46	−0.08	0.06	0.07	−0.05	0.40	−3.71	−0.72	0.74	0.86	−0.82	3.20
4	−1.26	−0.27	−0.06	−0.07	0.00	1.26	−4.28	−1.44	−0.43	−0.67	−0.02	4.12	−0.39	−0.34	−0.18	−0.21	−0.52	−0.13	−2.43	−3.53	−1.82	−3.70	−7.75	−0.75
H^I	−1.81	−1.07	−0.35	−0.15	0.01	1.82	−5.98	−4.94	−1.99	−1.01	0.08	5.70	−0.83	−0.60	−0.33	−0.66	−0.75	0.08	−5.41	−5.58	−2.93	−7.24	−8.91	0.51
L-H^I	1.25	1.14	0.53	0.67	0.34		4.00	4.72	2.56	3.36	1.61		1.39	1.06	0.80	1.20	1.03		7.67	8.69	6.63	9.48	7.69	
	α_{FF}						$t_{\alpha_{FF}}$ ($F_{GRS} = 4.36$, $p_{GRS} = 0$)						β_{ROA}						$t_{\beta_{ROA}}$					
L^I	−0.67	−0.24	−0.16	0.27	0.25	0.93	−2.44	−1.23	−1.04	1.81	1.42	2.83	−1.05	−0.30	0.06	0.23	0.16	1.21	−9.12	−3.93	1.04	5.18	3.40	11.40
2	−0.32	−0.12	0.11	−0.08	0.31	0.63	−1.32	−0.63	0.86	−0.74	2.24	2.15	−1.01	−0.40	−0.04	0.06	0.20	1.21	−8.15	−4.69	−0.75	1.46	4.48	9.59
3	−0.93	−0.37	−0.33	0.11	0.33	1.26	−3.69	−2.01	−2.17	0.95	3.11	4.69	−0.89	−0.41	0.08	0.11	0.16	1.05	−13.69	−6.01	1.17	1.92	4.60	14.19
4	−1.24	−0.35	−0.27	−0.14	0.28	1.51	−4.36	−1.79	−1.84	−1.29	2.37	5.00	−0.92	−0.54	−0.01	0.11	0.06	0.98	−11.61	−7.65	−0.18	2.71	1.31	10.31
H^I	−1.82	−1.09	−0.58	−0.21	0.22	2.04	−6.40	−5.15	−3.27	−1.30	1.66	6.61	−0.89	−0.56	−0.03	0.14	0.16	1.05	−9.08	−6.39	−0.40	2.47	3.38	9.11
L-H^I	1.15	0.85	0.43	0.49	0.04		3.45	3.56	1.99	2.28	0.17		−0.16	0.26	0.09	0.10	−0.00		−1.16	3.33	1.35	1.79	0.04	

Table IA.IX
Summary Statistics and Factor Regressions for Monthly Percent Excess Returns on 25 Size and 11/1/1-Momentum Portfolios, 1/1972–12/2006 (420 Months)

The data for the one-month Treasury bill rate (r_f), the Fama-French (1993) factors, and the 25 size and momentum (11-1-1) portfolio returns are obtained from Kenneth French's Web site. All portfolio returns are value-weighted. For all testing portfolios, Panel A reports mean percent excess returns and their t-statistics, CAPM alphas (α) and their t-statistics, and the intercepts (α^j_{FF}) and their t-statistics from Fama-French (1993) three-factor regressions. Panel B reports the new three-factor regressions: $r_j - r_f = \alpha^j_q + \beta^j_{MKT}\, r_{MKT} + \beta^j_{INV}\, r_{INV} + \beta^j_{ROA}\, r_{ROA} + \epsilon_j$. See Table I in the main text for the description of the investment factor r_{INV} and the ROA factor r_{ROA}. All the t-statistics are adjusted for heteroskedasticity and autocorrelations. F_{GRS} is the Gibbons, Ross, and Shanken (1989) F-statistic testing that the intercepts of all 25 portfolios are jointly zero, and p_{GRS} is its associated p-value.

Panel A: Means, CAPM alphas, and Fama-French alphas

	L	2	3	4	W	W-L	L	2	3	4	W	W-L
	Mean						t_{Mean}					
S	−0.19	0.65	0.91	1.08	1.52	1.72	−0.49	2.40	3.61	4.16	4.68	7.63
2	−0.07	0.55	0.82	1.02	1.32	1.40	−0.19	2.00	3.28	3.96	3.96	5.99
3	0.12	0.46	0.66	0.79	1.23	1.11	0.34	1.76	2.78	3.34	3.94	4.17
4	0.14	0.54	0.57	0.79	1.07	0.93	0.40	2.03	2.42	3.37	3.69	3.19
B	0.17	0.45	0.31	0.55	0.81	0.64	0.53	1.90	1.45	2.56	3.07	2.16
	α						t_α ($F_{GRS} = 3.28$, $p_{GRS} = 0$)					
S	−0.84	0.16	0.46	0.61	0.94	1.78	−3.43	0.99	2.95	3.82	4.61	8.23
2	−0.76	0.02	0.33	0.51	0.68	1.45	−3.76	0.16	2.47	3.75	3.77	6.30
3	−0.54	−0.06	0.18	0.31	0.61	1.15	−2.71	−0.49	1.59	2.64	3.83	4.34
4	−0.50	0.01	0.09	0.30	0.50	1.00	−2.38	0.06	0.86	3.10	3.51	3.43
B	−0.41	0.00	−0.13	0.11	0.28	0.69	−2.06	0.00	−1.49	1.17	2.17	2.33
	α_{FF}						$t_{\alpha_{FF}}$ ($F_{GRS} = 3.40$, $p_{GRS} = 0$)					
S	−1.18	−0.26	0.06	0.26	0.78	1.96	−5.74	−2.42	0.64	3.22	6.98	7.97
2	−0.97	−0.33	−0.01	0.21	0.64	1.61	−5.43	−3.04	−0.10	2.74	5.86	6.30
3	−0.71	−0.38	−0.15	0.02	0.60	1.31	−3.35	−3.52	−1.74	0.23	5.05	4.42
4	−0.66	−0.27	−0.21	0.06	0.51	1.17	−2.78	−2.09	−2.30	0.76	3.95	3.55
B	−0.44	−0.10	−0.21	0.08	0.41	0.85	−2.00	−0.74	−2.40	0.91	2.97	2.58

Panel B: $r_j - r_f = \alpha^j_q + \beta^j_{MKT}\, r_{MKT} + \beta^j_{INV}\, r_{INV} + \beta^j_{ROA}\, r_{ROA} + \epsilon_j$

	L	2	3	4	W	W-L	L	2	3	4	W	W-L
	α_q						t_{α_q} ($F_{GRS} = 2.20$, $p_{GRS} = 0$)					
S	0.12	0.38	0.50	0.57	1.01	0.89	0.37	1.86	2.72	3.06	4.10	3.25
2	0.09	0.21	0.27	0.42	0.70	0.61	0.38	1.21	1.81	2.71	3.25	2.36
3	0.28	0.03	0.09	0.11	0.51	0.23	1.27	0.21	0.70	0.81	2.77	0.73
4	0.32	0.07	−0.04	0.05	0.26	−0.06	1.36	0.46	−0.37	0.46	1.52	−0.18
B	0.03	0.01	−0.29	−0.24	−0.04	−0.07	0.12	0.05	−2.81	−2.60	−0.27	−0.19
	β_{INV}						$t_{\beta_{INV}}$					
S	−0.42	0.24	0.33	0.41	0.31	0.73	−2.18	1.87	2.98	3.50	2.15	5.09
2	−0.59	0.02	0.24	0.26	0.12	0.71	−4.18	0.20	2.41	2.57	0.99	4.88
3	−0.65	0.04	0.18	0.23	0.08	0.73	−4.62	0.39	2.21	2.88	0.76	4.12
4	−0.76	0.06	0.18	0.28	0.20	0.96	−5.20	0.70	2.62	4.27	2.12	4.72
B	−0.50	−0.04	0.09	0.26	0.18	0.68	−3.47	−0.47	1.50	4.89	1.98	3.19
	β_{ROA}						$t_{\beta_{ROA}}$					
S	−1.04	−0.41	−0.24	−0.18	−0.26	0.78	−7.28	−4.07	−2.76	−2.36	−2.52	5.38
2	−0.80	−0.26	−0.05	−0.03	−0.08	0.72	−8.28	−2.87	−0.64	−0.46	−0.88	5.40
3	−0.74	−0.14	0.02	0.14	0.08	0.82	−7.47	−1.85	0.25	2.61	1.03	5.38
4	−0.67	−0.11	0.08	0.18	0.21	0.88	−5.90	−1.29	1.12	3.48	2.44	4.91
B	−0.31	0.01	0.16	0.31	0.33	0.64	−2.78	0.14	3.18	7.04	3.84	3.54

Table IA.X

Summary Statistics and Factor Regressions for Monthly Percent Excess Returns on Deciles Formed on Earnings-to-Price (E/P), Dividend-to-Price (D/P), Cash flow-to-Price (C/P), Prior 13- to 60-month Returns (Reversal), Past Five-year Sales Growth (5-Yr SR), Market Leverage (A/ME), and Book-to-Market Equity (B/M) 1/1972–12/2006 (420 Months)

For each portfolio we report the average return and volatility in monthly percent, the CAPM regression ($r_j - r_f = \alpha^j + \beta^j\, r_{MKT} + \epsilon_j$), the Fama-French three-factor regression ($r_j - r_f = \alpha^j_{FF} + b^j\, r_{MKT} + s^j\, SMB + h^j\, HML + \epsilon_j$), and the new three-factor regression ($r_j - r_f = \alpha^j_q + \beta^j_{MKT}\, r_{MKT} + \beta^j_{INV}\, r_{INV} + \beta^j_{ROA}\, r_{ROA} + \epsilon_j$). For each asset pricing model, we also report the Gibbons, Ross, and Shanken (1989) F-statistic (F_{GRS}) testing that the intercepts are jointly zero and its p-value (in parentheses). All the t-statistics are adjusted for heteroskedasticity and autocorrelations. The data on the one-month Treasury bill, r_f, the Fama-French three factors, and $E/P, D/P$, B/M, and reversal portfolio returns are from Kenneth French's Web site. Following Lakonishok, Shleifer, and Vishny (1994), we measure the five-year sales rank for June of year t, 5-Yr $SR(t)$, as the weighted average of the annual sales growth ranks for the prior five years, $\sum_{j=1}^{5} (6-j) \times \text{Rank}(t-j)$. The sales growth for year $t-j$ is the percentage change in sales (Compustat annual item 12) from year $t-j-1$ to $t-j$, log[Sales($t-j$)/Sales($t-j-1$)]. Only firms with data for all five prior years are used to determine the annual sales growth ranks for years $t-5$ to $t-1$. To create the sales growth ranks, we sort firms into 10 deciles in an ascending order on sales growth in each June, and then assign rank i, where $i = 1, \ldots, 10$, to a firm if its sales growth falls into the i^{th} decile. Following Fama and French (1992), we measure market leverage as the ratio of book assets (item 6) to market equity (price times number of shares). To form 5-Yr SR and A/ME deciles, we sort all NYSE, Amex, and NASDAQ stocks at the beginning of June of year t using the breakpoints of 5-Yr SR and A/ME measured at the fiscal year-end of $t-1$ for the stocks traded on all three exchanges. Monthly value-weighted returns on the portfolios are calculated from July of year t to June of $t+1$.

	Low	2	3	4	5	6	7	8	9	High	H-L
					Panel A: E/P Deciles						
Mean	0.30	0.41	0.58	0.56	0.53	0.64	0.83	0.80	0.82	0.98	0.68
Std	6.07	4.92	4.75	4.49	4.60	4.46	4.38	4.47	4.74	5.38	4.88
α	−0.30	−0.09	0.11	0.11	0.07	0.22	0.41	0.38	0.39	0.50	0.81
β	1.23	1.02	0.95	0.91	0.92	0.86	0.84	0.85	0.87	0.97	−0.25
t_α	−2.59	−1.09	1.12	1.35	0.79	2.06	4.00	3.54	3.12	3.29	3.42
α_{FF}	0.06	0.03	0.09	0.07	−0.08	−0.02	0.13	0.05	−0.03	−0.05	−0.11
b	1.05	1.00	0.99	0.96	1.02	0.99	1.00	1.00	1.06	1.19	0.13
s	−0.02	−0.15	−0.16	−0.13	−0.13	−0.04	−0.10	0.04	0.06	0.23	0.25
h	−0.57	−0.16	0.05	0.09	0.25	0.39	0.45	0.51	0.65	0.84	1.41
$t_{\alpha_{FF}}$	0.71	0.35	0.93	0.91	−0.85	−0.27	1.59	0.59	−0.29	−0.48	−0.79
α_q	−0.06	−0.20	−0.08	−0.04	−0.07	0.00	0.11	0.18	0.25	0.32	0.38
β_{MKT}	1.16	1.03	0.98	0.94	0.94	0.91	0.91	0.90	0.91	1.02	−0.14
β_{INV}	−0.37	−0.06	−0.03	0.01	0.01	0.15	0.23	0.19	0.17	0.19	0.56
β_{ROA}	−0.06	0.18	0.26	0.18	0.17	0.18	0.22	0.13	0.06	0.10	0.16
t_{α_q}	−0.47	−2.48	−0.83	−0.51	−0.73	−0.03	1.12	1.62	1.88	2.08	1.57
$t_{\beta_{MKT}}$	34.88	52.22	42.15	45.65	35.81	33.66	33.08	23.42	19.66	21.89	−1.96
$t_{\beta_{INV}}$	−5.84	−1.36	−0.60	0.32	0.19	2.26	4.40	3.37	2.10	2.01	4.06
$t_{\beta_{ROA}}$	−1.48	7.01	6.10	6.11	3.79	3.53	4.63	2.80	0.94	1.21	1.44

	Low	2	3	4	5	6	7	8	9	High	H-L
					Panel B: D/P Deciles						
Mean	0.51	0.48	0.61	0.58	0.50	0.58	0.65	0.75	0.70	0.61	0.10
Std	5.85	5.19	5.12	4.86	4.72	4.61	4.41	4.34	4.04	4.00	5.53
α	−0.09	−0.04	0.11	0.11	0.06	0.15	0.24	0.36	0.36	0.36	0.45
β	1.20	1.06	1.02	0.96	0.90	0.88	0.84	0.80	0.69	0.50	−0.71
t_α	−0.86	−0.47	1.03	0.98	0.51	1.31	2.20	3.13	2.85	2.24	2.08
α_{FF}	0.11	0.07	0.16	0.00	−0.09	−0.07	0.01	0.06	0.00	−0.13	−0.24
b	1.13	1.03	1.05	1.05	1.02	1.03	1.00	0.97	0.88	0.74	−0.39
s	−0.09	−0.11	−0.25	−0.14	−0.23	−0.20	−0.20	−0.13	−0.09	−0.04	0.05
h	−0.30	−0.16	−0.05	0.19	0.26	0.37	0.38	0.48	0.59	0.77	1.07
$t_{\alpha_{FF}}$	1.14	0.80	1.56	−0.03	−0.80	−0.71	0.14	0.63	−0.03	−0.99	−1.37
α_q	−0.04	−0.09	−0.07	−0.22	−0.31	−0.2	−0.11	0.13	0.13	0.15	0.18
β_{MKT}	1.17	1.06	1.05	1.03	0.98	0.96	0.92	0.86	0.75	0.55	−0.62
β_{INV}	−0.37	−0.19	−0.07	0.15	0.18	0.24	0.30	0.18	0.33	0.30	0.67
β_{ROA}	0.18	0.18	0.27	0.30	0.34	0.27	0.24	0.16	0.07	0.07	−0.11
t_{α_q}	−0.36	−1.08	−0.67	−2.43	−2.75	−1.81	−1.00	1.05	1.01	0.81	0.76
$t_{\beta_{MKT}}$	46.88	48.88	39.81	48.24	32.20	33.27	36.78	28.52	21.76	10.94	−9.37
$t_{\beta_{INV}}$	−7.23	−3.97	−1.09	3.22	3.11	4.13	5.12	2.76	4.52	3.28	5.71
$t_{\beta_{ROA}}$	5.38	7.12	6.01	7.08	6.74	5.52	4.76	2.79	1.28	0.89	−1.13
					Panel C: C/P Deciles						
Mean	0.34	0.43	0.57	0.58	0.68	0.59	0.69	0.66	0.87	0.84	0.50
Std	5.87	4.90	4.70	4.77	4.56	4.49	4.44	4.50	4.39	5.05	4.48
α	−0.26	−0.06	0.09	0.11	0.23	0.16	0.27	0.26	0.47	0.38	0.64
β	1.20	1.01	0.96	0.97	0.91	0.87	0.85	0.83	0.80	0.92	−0.28
t_α	−2.48	−0.78	1.10	1.21	2.42	1.52	2.43	2.13	3.93	2.80	3.03
α_{FF}	0.08	0.06	0.06	0.00	0.05	0.00	0.00	−0.09	0.05	−0.09	−0.17
b	1.06	0.98	1.00	1.04	1.01	0.99	0.97	1.01	0.99	1.10	0.04
s	−0.07	−0.16	−0.11	−0.09	−0.02	−0.15	0.03	−0.09	0.05	0.21	0.29
h	−0.52	−0.18	0.06	0.17	0.28	0.28	0.42	0.55	0.65	0.71	1.23
$t_{\alpha_{FF}}$	1.04	0.81	0.75	0.06	0.57	0.00	0.02	−0.90	0.60	−0.80	−1.17
α_q	−0.11	−0.16	−0.07	−0.05	0.01	−0.15	0.06	0.00	0.32	0.36	0.48
β_{MKT}	1.16	1.02	0.99	1.00	0.97	0.94	0.90	0.89	0.84	0.93	−0.23
β_{INV}	−0.29	−0.10	0.00	0.02	0.17	0.21	0.10	0.19	0.15	0.05	0.35
β_{ROA}	0.01	0.18	0.20	0.18	0.16	0.25	0.20	0.19	0.09	−0.01	−0.03
t_{α_q}	−1.06	−1.90	−0.85	−0.57	0.07	−1.43	0.50	0.03	2.54	2.44	2.09
$t_{\beta_{MKT}}$	39.96	45.26	49.76	43.51	38.90	37.31	30.48	23.38	20.09	19.10	−3.2
$t_{\beta_{INV}}$	−4.70	−2.54	−0.07	0.36	3.20	4.12	1.55	2.72	1.96	0.62	2.54
$t_{\beta_{ROA}}$	0.42	6.41	6.70	4.00	3.91	5.58	3.91	3.31	1.55	−0.16	−0.26

	Low	2	3	4	5	6	7	8	9	High	H-L
	Panel D: Deciles Formed on Prior 13- to 60-month Returns										
Mean	0.93	0.86	0.83	0.68	0.72	0.64	0.61	0.58	0.54	0.52	−0.41
Std	6.77	5.42	4.92	4.50	4.45	4.34	4.58	4.53	4.87	6.13	5.21
α	0.35	0.35	0.36	0.25	0.29	0.22	0.16	0.14	0.05	−0.10	−0.45
β	1.18	1.03	0.94	0.88	0.88	0.86	0.91	0.90	0.99	1.25	0.07
t_α	1.78	2.64	2.90	2.55	2.97	2.26	1.71	1.43	0.54	−0.92	−1.81
α_{FF}	−0.06	0.04	0.10	0.00	0.07	0.03	0.03	0.07	0.06	0.18	0.24
b	1.18	1.09	1.01	0.98	0.99	0.97	1.01	0.98	1.03	1.13	−0.05
s	0.87	0.40	0.22	0.10	−0.05	−0.09	−0.15	−0.20	−0.20	−0.06	−0.93
h	0.51	0.43	0.38	0.38	0.35	0.32	0.23	0.14	0.01	−0.43	−0.94
$t_{\alpha_{FF}}$	−0.40	0.33	0.92	−0.01	0.84	0.32	0.31	0.79	0.73	1.80	1.18
α_q	0.47	0.29	0.19	0.09	0.06	−0.01	−0.07	−0.09	−0.12	0.06	−0.41
β_{MKT}	1.18	1.06	0.99	0.93	0.93	0.91	0.96	0.95	1.02	1.20	0.02
β_{INV}	0.33	0.24	0.26	0.21	0.21	0.18	0.12	0.09	−0.08	−0.41	−0.74
β_{ROA}	−0.37	−0.08	0.05	0.06	0.16	0.17	0.21	0.22	0.26	0.07	0.44
t_{α_q}	2.30	1.99	1.40	0.86	0.56	−0.10	−0.74	−0.93	−1.38	0.53	−1.58
$t_{\beta_{MKT}}$	21.31	24.79	25.49	31.54	35.41	32.25	42.56	36.69	47.75	37.39	0.24
$t_{\beta_{INV}}$	3.05	3.06	3.55	3.77	3.75	3.42	1.73	1.87	−1.89	−7.14	−5.60
$t_{\beta_{ROA}}$	−4.52	−1.32	0.82	1.35	3.59	3.65	5.52	5.57	8.18	1.82	4.18
	Panel E: 5-Year SR										
Mean	0.35	0.22	0.15	0.10	0.01	0.07	0.00	0.19	−0.06	0.00	−0.35
Std	5.02	4.73	4.55	4.57	4.29	4.50	4.74	4.90	5.40	6.80	4.74
α	−0.11	−0.22	−0.28	−0.35	−0.41	−0.37	−0.48	−0.30	−0.60	−0.66	−0.55
β	0.93	0.90	0.87	0.91	0.85	0.90	0.98	1.00	1.11	1.35	0.42
t_α	−0.82	−1.90	−2.56	−3.66	−4.38	−4.13	−5.99	−3.36	−6.22	−4.60	−2.53
α_{FF}	−0.42	−0.45	−0.51	−0.45	−0.48	−0.41	−0.44	−0.26	−0.45	−0.36	0.06
b	1.02	1.01	1.00	0.97	0.92	0.97	0.99	1.01	1.04	1.18	0.16
s	0.25	0.00	−0.07	−0.06	−0.18	−0.20	−0.12	−0.13	−0.04	0.08	−0.17
h	0.45	0.36	0.37	0.17	0.14	0.09	−0.04	−0.04	−0.24	−0.49	−0.94
$t_{\alpha_{FF}}$	−3.30	−3.98	−5.25	−4.49	−5.61	−4.69	−5.71	−2.94	−4.78	−2.76	0.31
α_q	−0.38	−0.55	−0.53	−0.38	−0.58	−0.44	−0.45	−0.31	−0.38	−0.10	0.28
β_{MKT}	1.00	0.99	0.94	0.92	0.89	0.91	0.97	1.00	1.04	1.19	0.19
β_{INV}	0.41	0.47	0.30	0.10	0.12	−0.06	−0.10	−0.15	−0.43	−0.76	−1.17
β_{ROA}	0.06	0.11	0.11	−0.02	0.13	0.12	0.02	0.11	0.01	−0.21	−0.27
t_{α_q}	−2.64	−4.60	−4.54	−3.23	−5.85	−4.50	−5.58	−3.37	−4.18	−0.71	1.42
$t_{\beta_{MKT}}$	23.62	34.90	34.38	39.73	35.85	38.29	51.96	48.71	43.67	37.50	3.51
$t_{\beta_{INV}}$	5.22	6.75	4.49	1.68	2.09	−1.22	−2.11	−3.20	−9.30	−10.6	−10.07
$t_{\beta_{ROA}}$	1.30	2.22	2.08	−0.40	3.38	2.89	0.70	3.15	0.27	−3.81	−3.59

	Low	2	3	4	5	6	7	8	9	High	H-L
					Panel F: A/ME Deciles						
Mean	−0.20	−0.13	−0.01	0.12	0.21	0.16	0.26	0.23	0.35	0.37	0.57
Std	6.30	5.24	4.85	4.93	4.74	4.61	4.34	4.47	4.90	5.69	5.15
α	−0.79	−0.66	−0.50	−0.37	−0.25	−0.29	−0.15	−0.19	−0.09	−0.14	0.65
β	1.20	1.07	1.00	1.00	0.95	0.91	0.83	0.84	0.89	1.03	−0.17
$t(\alpha)$	−4.98	−7.14	−5.90	−4.10	−2.57	−2.92	−1.42	−1.67	−0.70	−0.90	2.62
α_{FF}	−0.32	−0.50	−0.50	−0.42	−0.38	−0.53	−0.46	−0.59	−0.60	−0.63	−0.32
b	1.00	1.02	0.99	1.04	1.02	1.02	0.97	1.02	1.08	1.18	0.18
s	−0.13	−0.10	0.03	−0.04	−0.04	0.04	0.04	0.06	0.25	0.38	0.50
h	−0.73	−0.23	0.00	0.09	0.20	0.37	0.48	0.63	0.75	0.73	1.45
$t_{\alpha_{FF}}$	−2.56	−5.50	−5.59	−4.60	−3.91	−5.82	−5.37	−7.56	−6.35	−5.02	−1.95
α_q	−0.50	−0.52	−0.51	−0.43	−0.37	−0.33	−0.28	−0.32	−0.15	−0.15	0.35
β_{MKT}	1.12	1.03	0.99	1.01	0.97	0.92	0.87	0.87	0.91	1.05	−0.07
β_{INV}	−0.44	−0.31	−0.11	0.04	0.09	0.07	0.21	0.17	0.19	0.32	0.76
β_{ROA}	−0.07	0.03	0.09	0.05	0.08	0.00	0.03	0.05	−0.06	−0.19	−0.12
t_{α_q}	−2.97	−5.29	−5.65	−4.15	−3.59	−3.10	−2.53	−2.45	−0.99	−0.80	1.28
$t_{\beta_{MKT}}$	26.64	47.90	46.69	41.13	34.66	32.85	28.31	25.15	21.69	19.63	−0.89
$t_{\beta_{INV}}$	−4.67	−5.43	−2.31	0.67	1.48	1.28	3.30	2.38	2.23	3.50	5.06
$t_{\beta_{ROA}}$	−1.24	0.92	2.65	1.14	1.79	−0.04	0.55	0.81	−0.80	−2.35	−1.10
					Panel G: B/M						
Mean	0.31	0.52	0.58	0.67	0.62	0.69	0.77	0.74	0.81	0.97	0.66
Std	5.36	4.84	4.86	4.74	4.50	4.38	4.31	4.26	4.56	5.34	4.68
α	−0.24	0.01	0.07	0.18	0.17	0.24	0.35	0.34	0.38	0.50	0.74
β	1.10	1.03	1.02	0.97	0.90	0.88	0.82	0.81	0.86	0.94	−0.16
t_α	−2.51	0.08	0.87	1.94	1.76	2.72	3.28	3.11	3.20	3.16	3.29
α_{FF}	0.13	0.06	−0.01	0.00	−0.07	0.00	−0.03	−0.12	−0.11	−0.14	−0.27
b	0.97	1.02	1.07	1.05	1.02	1.00	1.00	1.00	1.05	1.16	0.20
s	−0.17	−0.06	−0.05	−0.02	−0.04	0.01	0.01	0.11	0.15	0.35	0.52
h	−0.55	−0.07	0.12	0.27	0.37	0.38	0.59	0.68	0.73	0.93	1.48
$t_{\alpha_{FF}}$	2.04	0.85	−0.08	0.04	−0.76	−0.05	−0.42	−2.02	−1.46	−1.41	−2.47
α_q	−0.11	−0.12	−0.13	−0.04	−0.06	0.09	0.14	0.06	0.17	0.22	0.33
β_{MKT}	1.05	1.05	1.06	1.01	0.95	0.93	0.88	0.88	0.92	1.04	−0.01
β_{INV}	−0.44	0.00	0.09	0.14	0.19	0.21	0.27	0.34	0.39	0.65	1.09
β_{ROA}	0.09	0.12	0.15	0.14	0.13	0.05	0.08	0.09	0.01	−0.05	−0.14
t_{α_q}	−1.17	−1.67	−1.60	−0.48	−0.63	0.92	1.25	0.60	1.39	1.26	1.41
$t_{\beta_{MKT}}$	41.15	57.78	56.60	36.54	36.83	33.97	25.87	28.72	24.77	20.50	−0.11
$t_{\beta_{INV}}$	−8.02	−0.04	1.91	2.82	3.20	3.89	3.64	5.38	4.93	5.47	7.29
$t_{\beta_{ROA}}$	2.97	4.94	4.53	3.66	3.02	1.20	1.46	1.89	0.12	−0.75	−1.61

Table IA.XI

New Three-factor Regressions with the Quarterly Investment Factor ($r_j - r_f = \alpha_q^j + \beta^j_{MKT}\, r_{MKT} + \beta^j_{INV^Q}\, r^Q_{INV} + \beta^j_{ROA}\, r_{ROA} + \epsilon_j$) for Monthly Percent Excess Returns on 25 Size and 11/1/1 Momentum Portfolios and on 25 Size and 6/1/6 Momentum Portfolios, 1/1975–12/2006 (420 Months)

The data for the one-month Treasury bill rate (r_f), the market factor, and the 25 size and 11/1/1 momentum portfolios are from Kenneth French's Web site. See Table IA.IX for the description of the 25 size and 11/1/1-momentum portfolios. See Section III in this Internet Appendix for the construction of the quarterly investment factor, denoted r^Q_{INV} and Table I in the main text for the description of the ROA factor r_{ROA}. The t-statistics are adjusted for heteroskedasticity and autocorrelations. F_{GRS} is the Gibbons, Ross, and Shanken (1989) F-statistic testing that the intercepts of all 25 portfolios are jointly zero, and p_{GRS} is its associated p-value.

	L	2	3	4	W	W-L	L	2	3	4	W	W-L	L	2	3	4	W	W-L	L	2	3	4	W	W-L
Panel A: 25 Size and 6/1/6-Momentum Portfolios																								
	α_q						t_{α_q} ($F_{GRS} = 4.61$, $p_{GRS} = 0$)						β_{MKT}											
S	0.50	0.51	0.54	0.65	1.14	0.65	1.59	2.46	2.68	3.06	4.33	2.54	1.25	1.05	1.01	1.03	1.19	−0.06						
2	0.15	0.18	0.20	0.28	0.73	0.57	0.63	1.17	1.31	1.75	3.07	2.01	1.30	1.11	1.06	1.09	1.28	−0.02						
3	0.21	0.03	0.03	0.10	0.55	0.34	0.92	0.24	0.21	0.83	2.76	1.10	1.23	1.07	1.04	1.05	1.23	0.00						
4	0.22	−0.02	−0.09	−0.03	0.49	0.27	0.88	−0.18	−0.86	−0.33	2.85	0.79	1.18	1.04	1.02	1.03	1.18	0.00						
B	−0.09	−0.06	−0.18	−0.15	0.26	0.35	−0.40	−0.46	−2.20	−2.02	2.17	1.21	1.00	0.89	0.88	0.92	1.08	0.08						
	β_{INV^Q}						$t_{\beta_{INV^Q}}$						β_{ROA}						$t_{\beta_{ROA}}$					
S	−0.01	0.24	0.22	0.14	−0.24	−0.23	−0.05	1.24	1.46	0.99	−1.53	−1.11	−0.95	−0.42	−0.30	−0.28	−0.38	0.57	−6.80	−4.79	−3.51	−3.10	−3.29	4.53
2	−0.10	0.21	0.21	0.14	−0.33	−0.23	−0.55	1.52	1.59	1.15	−2.09	−1.25	−0.72	−0.20	−0.07	−0.03	−0.15	0.56	−6.19	−2.89	−1.06	−0.43	−1.51	3.95
3	−0.07	0.24	0.29	0.19	−0.32	−0.24	−0.52	1.91	2.88	2.09	−2.27	−1.46	−0.62	−0.11	0.06	0.08	−0.05	0.57	−5.53	−1.87	1.14	1.62	−0.61	3.69
4	−0.08	0.24	0.32	0.24	−0.27	−0.19	−0.59	2.61	3.91	4.02	−2.73	−1.01	−0.56	−0.08	0.09	0.14	0.03	0.59	−4.53	−1.14	1.68	3.25	0.39	3.52
B	0.01	0.11	0.12	0.05	−0.33	−0.34	0.08	1.29	2.90	1.46	−5.32	−2.13	−0.31	−0.01	0.11	0.19	0.07	0.38	−3.12	−0.12	2.67	5.63	1.34	2.87

	L	2	3	4	W	W-L	L	2	3	4	W	W-L	L	2	3	4	W	W-L	L	2	3	4	W	W-L
Panel B: 25 Size and 11/1/1-Momentum Portfolios																								
	α_q						t_{α_q} ($F_{GRS} = 3.40$, $p_{GRS} = 0$)						β_{MKT}											
S	0.09	0.40	0.56	0.76	1.36	1.28	0.27	2.11	3.05	3.64	4.74	3.83	1.20	0.94	0.90	0.94	1.13	−0.08						
2	0.00	0.16	0.26	0.50	1.01	1.01	0.01	0.94	1.71	2.94	3.77	3.06	1.30	1.03	1.00	1.03	1.24	−0.06						
3	0.17	−0.07	0.04	0.07	0.69	0.51	0.71	−0.48	0.29	0.49	3.14	1.37	1.23	1.04	0.97	1.00	1.23	0.01						
4	0.14	−0.07	−0.12	−0.08	0.45	0.31	0.51	−0.46	−1.06	−0.81	2.27	0.75	1.21	1.06	0.99	1.03	1.16	−0.05						
B	−0.08	−0.09	−0.35	−0.22	0.06	0.14	−0.29	−0.57	−3.25	−2.10	0.38	0.35	1.08	0.87	0.89	0.91	1.08	0.00						
	β_{INV^Q}						$t_{\beta_{INV^Q}}$						β_{ROA}						$t_{\beta_{ROA}}$					
S	−0.01	0.35	0.32	0.16	−0.25	−0.24	−0.06	1.85	2.16	1.34	−1.51	−1.07	−1.05	−0.35	−0.18	−0.16	−0.31	0.74	−7.16	−4.37	−2.45	−1.92	−2.48	4.51
2	−0.09	0.26	0.28	0.16	−0.40	−0.31	−0.53	1.84	2.40	1.55	−2.34	−1.53	−0.82	−0.20	0.03	0.02	−0.15	0.67	−7.67	−2.64	0.46	0.30	−1.27	4.13
3	−0.11	0.30	0.33	0.23	−0.31	−0.21	−0.77	2.87	3.42	3.34	−2.31	−1.03	−0.73	−0.07	0.10	0.22	0.04	0.77	−6.22	−1.07	1.79	4.28	0.45	4.13
4	−0.03	0.36	0.37	0.35	−0.24	−0.21	−0.17	3.93	5.22	5.84	−2.03	−0.85	−0.67	−0.03	0.17	0.28	0.18	0.85	−4.80	−0.34	2.90	6.07	1.73	3.86
B	0.14	0.27	0.12	0.10	−0.17	−0.31	0.90	2.85	2.15	1.23	−1.54	−1.28	−0.32	0.05	0.19	0.34	0.31	0.62	−2.39	0.64	3.70	6.97	3.25	3.05

Table IA.XII

Fundamentals for Deciles Formed on Campbell-Hilscher-Szilagyi's (2008) Failure Probability Measure (*F*-Prob), Ohlson's (1980) *O*-Score, Standardized Unexpected Earnings (*SUE*), Earnings-to-price (*E/P*), Cash Flow-to-price (*C/P*), Dividend-to-price (*D/P*), Prior 13- to 60-month Returns (Reversal), Past Five-year Sales Growth (5-Yr *SR*), and Market Leverage (*A/ME*)

ROA is quarterly percent earnings (Compustat quarterly item 8) divided by one-quarter-lagged assets (item 44). *I/A* (in annual percent) is the annual change in gross property, plant, and equipment (Compustat annual item 7) plus the annual change in inventories (item 3) divided by the lagged book value of assets (item 6). Portfolio *ROA* and *I/A* are value-weighted *ROA*s and *I/A*s of all the stocks in the portfolio, respectively, where the weights are provided by their market equity. The breakpoints for the *E/P*, *C/P*, *D/P*, and reversal portfolio deciles are from Kenneth French's Web site. See this appendix or the main text for the description of the formation of the *F*-Prob and *O*-score portfolios, the *SUE* portfolios, the 5-Yr *SR*, net stock issues, asset growth, and *A/ME* portfolios.

	Low	2	3	4	5	6	7	8	9	High	H-L
	Panel A: Means and standard deviations (in annual percent) of *ROA*										
	The *F*-prob deciles (1975–2006)										
Mean(*ROA*)	11.20	9.48	8.04	6.32	5.20	3.52	2.32	0.04	−4.40	−12.32	−23.52
Std(*ROA*)	1.04	0.74	0.74	0.80	1.12	1.12	1.42	2.58	3.70	9.54	9.32
	The *O*-score deciles (1972–2006)										
Mean(*ROA*)	9.68	5.96	4.92	3.76	2.92	1.64	−0.32	−2.84	−5.96	−20.60	−30.16
Std(*ROA*)	0.82	1.12	1.02	1.24	1.36	1.64	2.18	3.50	3.72	12.88	12.66
	The *SUE* deciles (1972–2006)										
Mean(*ROA*)	4.00	5.64	5.76	6.32	6.56	6.88	7.52	7.68	7.68	8.88	4.88
Std(*ROA*)	2.06	1.22	1.18	0.98	0.86	0.86	0.82	0.84	0.82	1.10	2.40
	Panel B: Means and standard deviations (in annual percent) of *I/A*										
	The net stock issues deciles (1972–2006)										
Mean(*I/A*)	6.26	7.64	7.42	5.54	8.31	9.17	9.30	10.76	14.60	30.83	24.58
Std(*I/A*)	2.92	3.13	3.48	1.94	2.75	2.82	3.25	3.41	3.90	12.70	14.01
	The asset growth deciles (1972–2006)										
Mean(*I/A*)	−8.83	−1.69	1.72	4.26	6.39	8.31	10.80	14.56	21.59	42.56	51.40
Std(*I/A*)	4.79	3.26	2.65	2.55	2.59	2.85	3.03	3.49	5.29	11.91	13.72
	The *E/P* deciles (1972–2006)										
Mean(*I/A*)	11.58	10.65	9.81	9.05	8.03	8.24	8.33	8.83	8.23	8.59	−2.99
Std(*I/A*)	4.66	4.03	3.58	4.46	6.32	4.34	3.59	5.23	3.42	4.31	6.24
	The *C/P* deciles (1972–2006)										
Mean(*I/A*)	13.54	10.25	9.95	9.05	8.95	9.26	8.55	9.56	8.88	7.70	−5.84
Std(*I/A*)	4.91	3.86	4.50	3.94	4.84	5.08	4.76	6.35	4.48	3.89	6.50
	The *D/P* deciles (1972–2006)										
Mean(*I/A*)	15.11	11.02	8.85	8.24	7.98	6.76	7.70	6.66	6.93	5.80	−9.3
Std(*I/A*)	4.57	3.58	3.52	4.16	4.10	3.82	4.34	4.92	3.18	4.29	5.66
	Deciles formed on prior 13–60 month returns (1972–2006)										
Mean(*I/A*)	3.93	4.09	5.86	6.46	7.38	8.00	8.93	9.23	11.36	16.34	12.41
Std(*I/A*)	5.49	5.85	4.48	4.02	3.60	3.50	3.53	3.70	4.09	5.43	7.01
	The 5-Yr *SR* deciles (1972–2006)										
Mean(*I/A*)	4.86	5.87	5.40	6.87	7.45	8.34	8.87	10.07	11.53	17.32	12.46
Std(*I/A*)	5.60	3.95	3.18	3.29	3.27	5.19	3.42	3.42	4.13	6.37	8.01
	The *A/ME* deciles (1972–2006)										
Mean(*I/A*)	15.70	11.79	10.17	9.48	8.76	7.85	7.40	5.95	5.07	5.30	−10.4
Std(*I/A*)	6.78	4.23	3.36	4.38	3.76	2.81	2.70	4.09	2.83	4.67	8.74

Table IA.XIII
Summary Statistics and CAPM Regressions for Monthly Percent Excess Returns on Annually Rebalanced Deciles Formed on Standardized Unexpected Earnings, Prior 12-month Returns, Campbell, Hilscher, and Szilagyi's (2008) Failure Probability, and Ohlson's (1980) *O*-Score, 1/1972–12/2006 (420 Months)

For each portfolio we report the average return and volatility in monthly percent and the CAPM regression ($r_j - r_f = \alpha^j + \beta^j \, r_{MKT} + \epsilon_j$). For each asset pricing model, we also report the Gibbons, Ross, and Shanken (1989) F-statistic (F_{GRS}) testing that the intercepts are jointly zero and its p-value (in parentheses). All the t-statistics are adjusted for heteroskedasticity and autocorrelations. The data on one-month Treasury bill, r_f, are from Kenneth French's Web site. To construct the testing portfolios, in June of each year t we sort all NYSE, Amex, and NASDAQ stocks into 10 deciles based on, separately, the Standardized Unexpected Earnings measured at the fiscal year-end of $t-1$, the 12-month prior return from June of year $t-1$ to May of year t, and Campbell, Hilscher, and Szilagyi's (2008) failure probability and Ohlson's (1980) O-score measured at the fiscal year-end of $t-1$. Monthly value-weighted returns are calculated from July of year t to June of $t+1$ and the portfolios are rebalanced in June.

	Low	2	3	4	5	6	7	8	9	High	H-L	F_{GRS} (p)
Panel A: Prior returns from June of year $t-1$ to May of year t												
Mean	0.44	0.49	0.33	0.46	0.43	0.44	0.57	0.54	0.62	0.51	0.07	
Std	8.77	7.04	5.88	5.5	4.87	4.46	4.35	4.79	5.84	7.2	7.28	
α	−0.31	−0.13	−0.21	−0.06	−0.06	−0.01	0.13	0.04	0.06	−0.17	0.13	0.79
β	1.48	1.24	1.08	1.03	0.97	0.9	0.87	0.98	1.12	1.35	−0.13	(0.64)
t_α	−1.13	−0.62	−1.28	−0.39	−0.54	−0.16	1.37	0.46	0.39	−0.89	0.37	
Panel B: SUE measured as the fiscal year-end of $t-1$												
Mean	0.46	0.39	0.44	0.52	0.56	0.69	0.61	0.7	0.6	0.59	0.13	
Std	5.25	4.92	5.2	5.48	4.97	4.7	4.49	4.56	5.06	4.48	2.81	
α	−0.08	−0.12	−0.08	−0.04	0.05	0.2	0.14	0.22	0.08	0.13	0.21	2.09
β	1.06	1.01	1.03	1.12	1.02	0.97	0.94	0.94	1.03	0.91	−0.15	(0.02)
t_α	−0.73	−1.23	−0.7	−0.39	0.55	2.41	1.83	2.6	0.81	1.46	1.52	
Panel C: Failure probability measured at the fiscal year-end of $t-1$, 6/1975–12/2006 (379 months)												
Mean	0.7	0.61	0.41	0.46	0.67	0.47	0.51	0.77	0.63	0.71	0.01	
Std	5.06	4.73	4.53	4.81	4.87	5.44	6.12	6.96	8.17	8.69	6.73	
α	0.09	0.02	−0.15	−0.12	0.05	−0.19	−0.22	−0.02	−0.25	−0.17	−0.26	1.05
β	1.01	0.98	0.93	0.96	1.03	1.1	1.21	1.31	1.47	1.46	0.45	(0.40)
t_α	0.73	0.16	−1.37	−0.98	0.53	−1.48	−1.36	−0.08	−1.01	−0.57	−0.81	
Panel D: O-score measured at the fiscal year-end of $t-1$												
Mean	0.46	0.47	0.68	0.52	0.68	0.71	0.59	0.46	0.53	0.3	−0.16	
Std	4.75	4.93	5.08	4.99	4.99	4.85	5.17	5.62	6.42	8.45	6.17	
α	−0.04	−0.04	0.16	0.02	0.18	0.23	0.1	−0.06	−0.04	−0.41	−0.37	1.84
β	1	1.03	1.05	1	0.99	0.96	1	1.04	1.15	1.43	0.43	(0.05)
t_α	−0.55	−0.59	1.79	0.22	1.68	2.12	0.81	−0.43	−0.24	−1.59	−1.34	

Table IA.XIV
Mean Percentage Excess Monthly Returns of the 45 Portfolios Formed on Size, Investment-to-Assets, and Investment Factor Loadings and the 45 Portfolios Formed on Size, *ROA*, and *ROA* Factor Loadings, 1/1972–12/2006 (420 Months)

In Panel A we first rank all NYSE firms by their market capitalization at the end of June of year t and independently rank all NYSE, Amex, and NASDAQ stocks by their investment-to-assets (I/A) at the end of fiscal year $t-1$. We form 20%, 30%, and 50% breakpoints for size and 30%, 40%, and 30% breakpoints for I/A. Starting in July of year t, we place all NYSE, Amex, and NASDAQ stocks into the three size groups and three I/A groups based on these breakpoints. Taking interactions forms nine size and I/A portfolios. The firms remain in these portfolios from July of year t to June of year $t+1$. The individual firms in each of these nine portfolios are further sorted into one of five equal-numbered subgroups based on the investment factor loadings (β^j_{INV}) from the regression: $r_j - r_f = \alpha^j_q + \beta^j_{MKT} r_{MKT} + \beta^j_{INV} r_{INV} + \beta^j_{ROA} r_{ROA} + \epsilon_j$. The regression is run with 36 months of returns (at least 24 months) prior to the formation date in June of year t. We report the mean excess monthly value-weighted returns in percentage for all the 45 portfolios, the nine high-minus-low β_{INV} portfolios, and the averages across the nine size and I/A portfolios. The t-statistics test whether the average high-minus-low β_{INV} portfolio returns equal zero. Panel B is similar to Panel A, except that we first conduct independent sorts on size and β_{INV} and then subdivide each of the nine resulting portfolios further into five equal-numbered I/A subgroups. In Panel C we run an independent three-by-three sort on size and ROA each month to form nine portfolios. We form 20%, 30%, and 50% NYSE breakpoints for size at the end of the portfolio formation month and 30%, 40%, and 30% NYSE, Amex, and NASDAQ breakpoints for quarterly ROA with earnings announced at least four months ago. Each of the nine portfolios is further divided into five equal-numbered subgroups based on their ROA factor loadings (β^j_{ROA}) estimated with 36 months of data (at least 24 months) prior to the portfolio formation month. Panel D is similar to Panel C, except that we first conduct independent sorts on size and β^j_{ROA} and then subdivide each of the nine resulting portfolios into five equal-numbered ROA subgroups.

Panel A: Sorts on size and I/A, then on β_{INV}

		β_{INV}						
Size	I/A	Low	2	3	4	High	*H-L*	t
Micro	Low	1.18	1.29	1.15	1.24	1.15	−0.03	−0.15
Micro	Medium	1.18	1.13	1.18	1.11	1.16	−0.02	−0.13
Micro	High	0.42	0.68	0.57	0.71	0.54	0.12	0.59
Small	Low	1.11	1.05	1.19	0.97	0.80	−0.32	−1.34
Small	Medium	1.03	1.03	1.00	1.06	0.84	−0.20	−0.97
Small	High	0.74	0.57	0.68	0.75	0.45	−0.29	−1.14
Big	Low	0.92	0.99	0.87	0.80	0.81	−0.11	−0.45
Big	Medium	0.72	0.58	0.65	0.66	0.57	−0.15	−0.66
Big	High	0.70	0.41	0.34	0.50	0.31	−0.39	−1.42
Average		0.89	0.86	0.85	0.87	0.73	−0.15	−1.05

Panel B: Sorts on size and β_{INV}, then on I/A

		I/A						
Size	β_{INV}	Low	2	3	4	High	*H-L*	t
Micro	Low	1.32	1.12	1.22	1.05	0.31	−1.00	−5.37
Micro	Medium	1.21	1.25	1.20	1.07	0.51	−0.70	−5.26
Micro	High	1.24	1.19	1.02	1.14	0.36	−0.88	−5.42
Small	Low	1.09	0.87	0.99	0.93	0.42	−0.67	−3.31
Small	Medium	1.10	0.99	1.02	0.92	0.63	−0.47	−3.71
Small	High	0.88	0.96	0.97	0.76	0.39	−0.50	−2.35
Big	Low	0.77	0.71	0.81	0.74	0.45	−0.32	−1.52
Big	Medium	0.86	0.71	0.62	0.46	0.26	−0.60	−4.62
Big	High	0.79	0.75	0.58	0.54	0.35	−0.43	−1.89
Average		1.03	0.95	0.94	0.84	0.41	−0.62	−6.58

Panel C: Sorts on size and ROA, then on β_{ROA}								
		β_{ROA}						
Size	ROA	Low	2	3	4	High	H-L	t
Micro	Low	−0.23	0.13	−0.16	−0.09	−0.29	−0.06	−0.19
Micro	Medium	1.02	1.17	1.05	0.91	0.85	−0.17	−0.73
Micro	High	2.22	1.95	2.28	1.91	1.99	−0.22	−0.79
Small	Low	−0.21	−0.07	0.09	0.20	0.34	0.55	1.38
Small	Medium	0.76	0.82	0.95	0.78	0.72	−0.04	−0.16
Small	High	1.19	1.33	1.14	1.26	1.10	−0.09	−0.37
Big	Low	0.32	0.21	0.21	−0.04	0.16	−0.16	−0.39
Big	Medium	0.72	0.49	0.46	0.71	0.65	−0.07	−0.25
Big	High	0.74	0.51	0.72	0.65	0.63	−0.10	−0.37
Average		0.73	0.73	0.75	0.70	0.69	−0.04	−0.18

Panel D: Sorts on size and β_{ROA}, then on ROA								
		ROA						
Size	β_{ROA}	Low	2	3	4	High	H-L	t
Micro	Low	−0.49	0.14	0.66	1.33	2.13	2.61	9.42
Micro	Medium	−0.23	0.31	0.93	1.27	2.12	2.35	11.39
Micro	High	−0.49	0.00	0.76	1.41	2.06	2.54	8.95
Small	Low	−0.31	0.31	0.61	0.77	1.18	1.49	4.89
Small	Medium	0.26	0.68	1.03	1.04	1.35	1.10	6.60
Small	High	0.32	0.83	0.80	0.92	1.30	0.98	4.49
Big	Low	0.37	0.33	0.55	0.84	1.04	0.67	2.16
Big	Medium	0.34	0.33	0.47	0.50	0.76	0.42	2.07
Big	High	0.47	0.61	0.59	0.53	0.65	0.17	0.91
Average		0.03	0.39	0.71	0.96	1.40	1.37	9.65

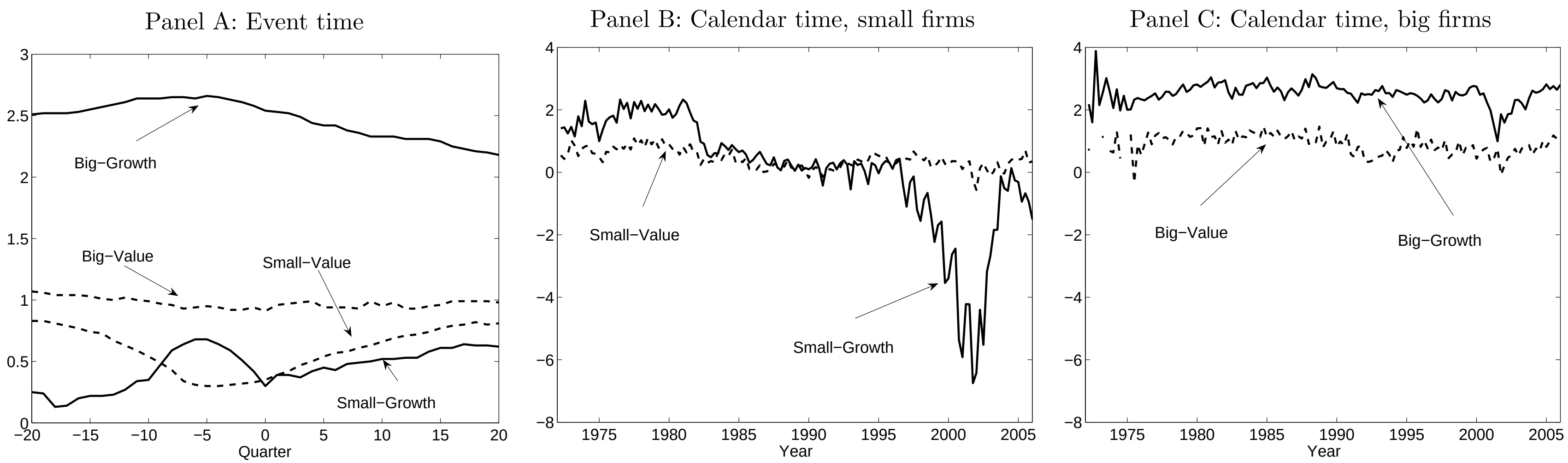

Figure 1. Quarterly ROA for the 25 size and book-to-market portfolios, 1972:Q1 to 2006:Q4 (140 quarters). We measure ROA as quarterly earnings (Compustat quarterly item 8) divided by one-quarter-lagged assets (item 44). For each portfolio formation year $t = 1972$ to 2005, we calculate the quarterly ROAs for $t+q, q = -20, \ldots, 20$. The ROA for $t+q$ are then averaged across portfolio formation years t. We follow Fama and French (1996) in constructing the 25 size and book-to-market portfolios. We plot the median ROA among the firms in a given portfolio.

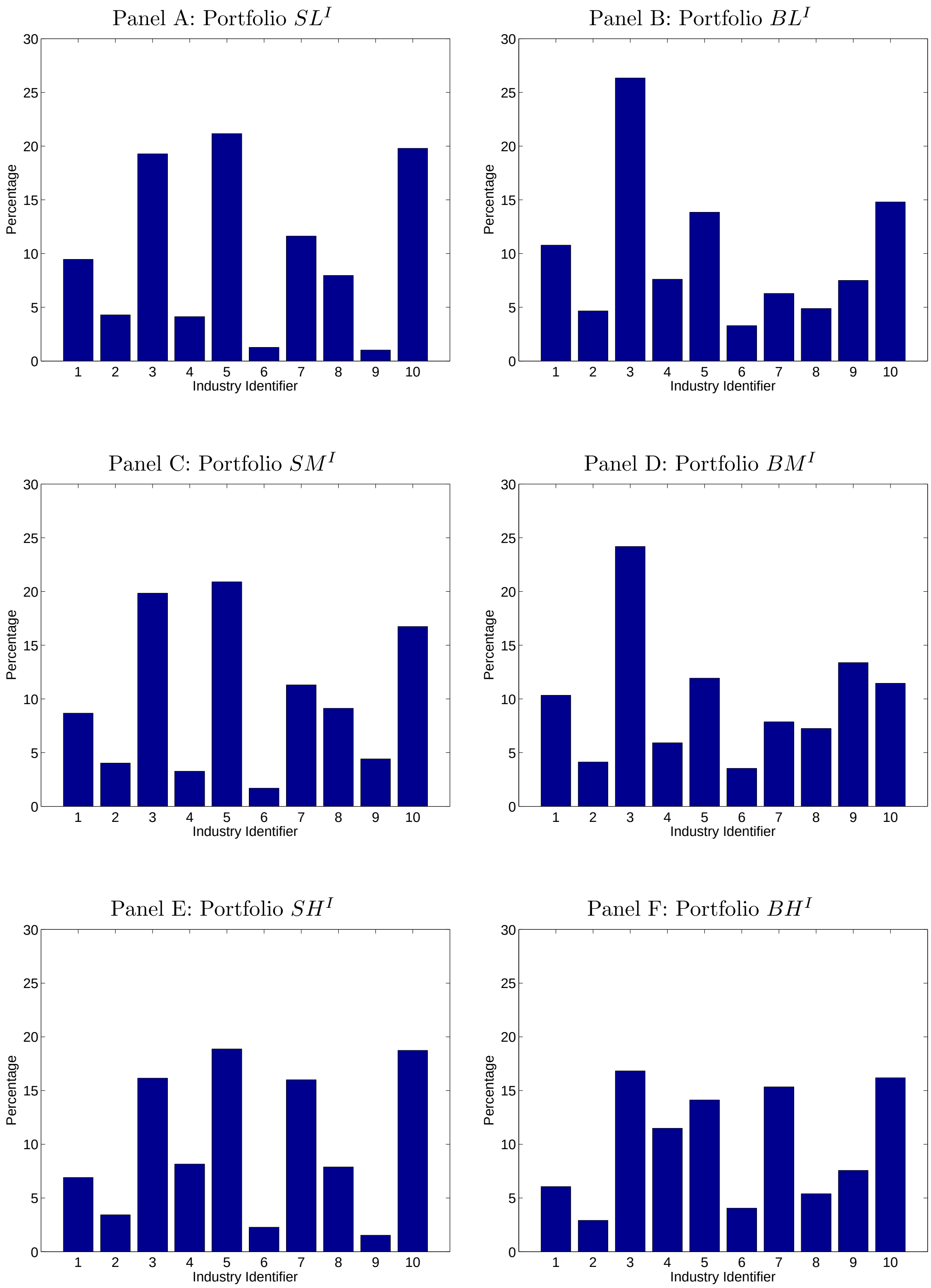

Figure 2. Industry distributions of firm-month observations for the six size-I/A portfolios used to construct the investment factor. The classification of 10 industries follows Fama and French (1997): industry 1 is consumer nondurables, industry 2 is consumer durables, industry 3 is manufacturing, industry 4 is energy, industry 5 is high tech business equipment, industry 6 is telecommunications, industry 7 is wholesale, retail, and similar services, industry 8 is health care, industry 9 is utilities, and industry 10 is all others.

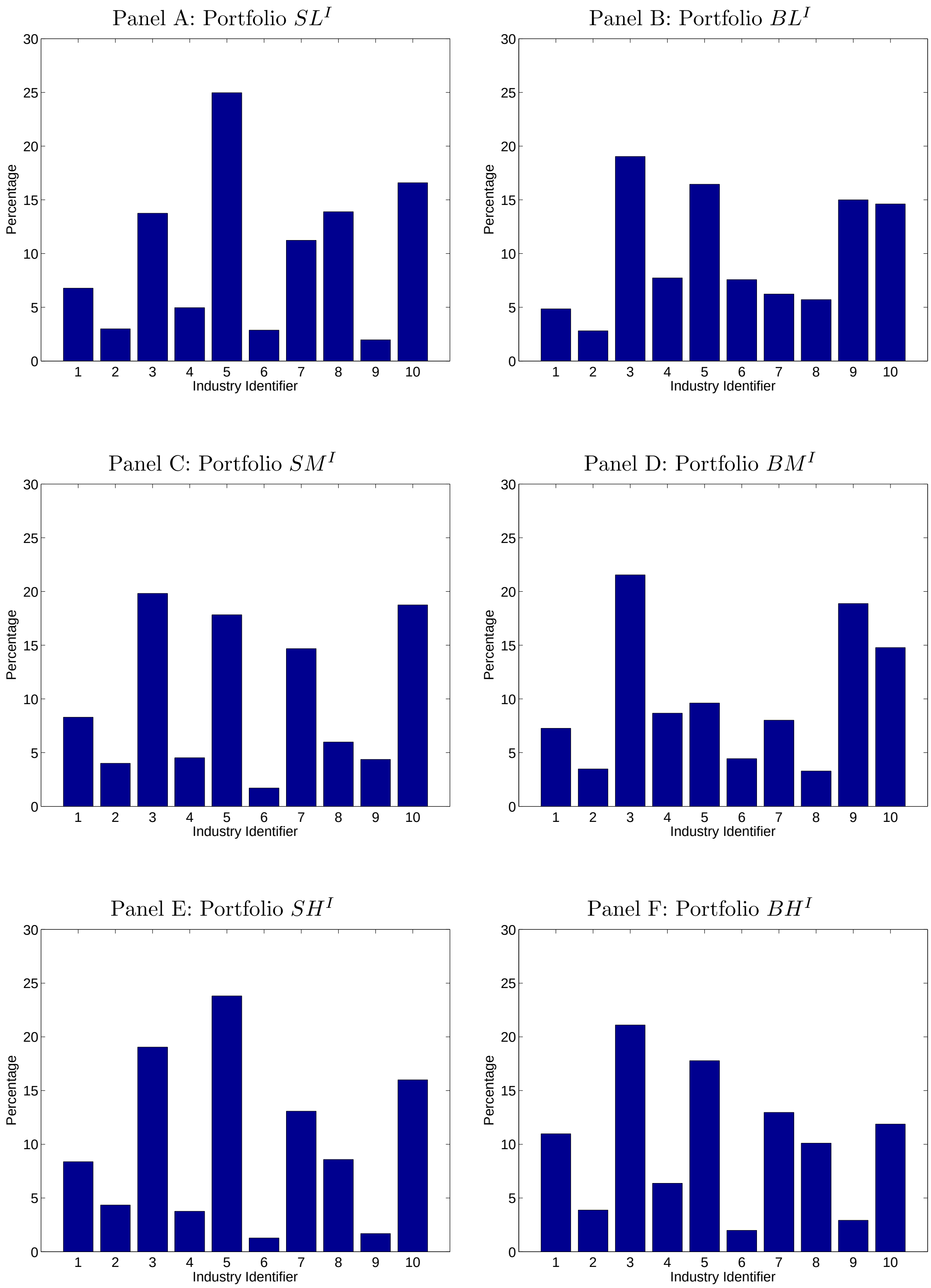

Figure 3. Industry distributions of firm-month observations for the six size-ROA portfolios used to construct the investment factor. The classification of 10 industries follows Fama and French (1997): industry 1 is consumer nondurables, industry 2 is consumer durables, industry 3 is manufacturing, industry 4 is energy, industry 5 is high tech business equipment, industry 6 is telecommunications, industry 7 is wholesale, retail, and similar services, industry 8 is health care, industry 9 is utilities, and industry 10 is all others.