

Focus On A Factor: Cash-Flow Component And Estimate Revision

A Quantitative Study

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- The most attractive stocks based on both cash-flow component and estimate revision gained over 40% annually.
- The backtest worked best in the growth universe.

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Building A Better Mouse Trap: Cash-Flow Component And Estimate Revision Worked

Over the years, many papers have been published that examined factors for both single and multi-factor stock models, which might be useful in evaluating and picking those small-cap stocks that should lead to profitable long- and short-term portfolio returns. At this stage, we wanted to focus on combining just two factors to see whether we could come up with a viable two-factor model that would incorporate the market dynamics in a more simplified, pared-down way. We believe it is easier to collect data on two factors versus multiple factors, and potentially many of the factors may add little value because they are highly correlated. We were looking for something that would give good buy and sell signals along with consistent results.

Our clients know from experience that estimate revision has been a reliable factor, but we are often asked if there are any other factors that, when paired with estimate revision, can predict, maximize, and enhance returns.

Our thinking began with associating estimate revision with yin-like qualities; i.e., more momentum driven, volatile, and growth oriented. Naturally, we then looked for more yang-like qualities; i.e., more stable, grounded, and value oriented. The focus of this study was to find

which valuation factors, when paired with estimate revision, would maximize returns.

So we began searching among valuation metrics, and the following five metrics, listed alphabetically, were selected based upon the strongest performers from our previous single-factor studies, which included: cash flow component, forward P/E, P/E to growth, relative forward P/E, and relative price to sales (Figure 1).

The Criteria Used To Pick The Winning Team

In determining which factor combinations worked best, we looked at the performance results of the two most attractive single-factor portfolios (Q1/Q1).

Figure 1. The Coupled Estimate Revision With These Valuation Factors

Valuation Factor
Cash-Flow Component
Forward P/E Ratio
Price Earnings To Growth
Relative Forward P/E Ratio
Relative Price-To-Sales

Source: Prudential Securities

Figure 2. The Q1/Q1 Portfolio For Cash Flow Component and The Highest Annualized Return... (Annualized)

		Factor Two Estimate Revision					Universe	Q1/Q5 Spread	Excess Return				
		Q1	Q2	Q3	Q4	Q5			Q1	Q2	Q3	Q4	Q5
Factor One Cash Flow Component	Q1	40.8	28.3	22.4	15.2	8.0	23.0	32.7	22.9	12.1	6.9	0.6	-5.6
	Q2	37.0	23.1	14.4	10.8	9.0	19.1	28.0	19.6	7.5	-0.1	-3.3	-4.8
	Q3	28.4	16.3	13.5	8.0	5.4	14.5	23.1	12.2	1.6	-0.8	-5.7	-8.0
	Q4	28.7	12.6	7.5	7.2	2.2	11.5	26.5	12.4	-1.7	-6.1	-6.3	-10.7
	Q5	22.3	4.9	1.3	-3.9	-6.5	3.7	28.8	6.8	-8.4	-11.6	-16.1	-18.3
	Universe	31.5	17.3	12.1	7.8	4.1	14.5	-	-	-	-	-	-
	Q1/Q5 Spread	18.4	23.4	21.1	19.1	14.6	-	-	-	-	-	-	-

Source: FactSet Research Systems; Prudential Securities.

Figure 3. ... And Topped The Small-Cap Universe's Average Over 70% of The Time

		Estimate Revision†				
		Q1	Q2	Q3	Q4	Q5
Cash-Flow Component*	Q1	73.2	65.0	58.6	46.4	45.5
	Q2	74.1	63.2	45.0	46.8	45.9
	Q3	69.1	54.5	49.5	35.9	39.1
	Q4	66.8	47.3	39.1	40.0	36.4
	Q5	60.0	45.5	36.4	33.6	34.1

* The percentage of months that the portfolio formed with quintiles from Factor One and Factor Two beat the universe.

Source: FactSet Research Systems; Prudential Securities.

We also used the results of the worst-performing portfolios and tried to analyze the spread between the most and least attractive groups. And the winning strategy was—cash flow component and estimate revision!

- The cash flow component factor—a measure of earnings quality—when paired with estimate revision yielded the best annualized monthly returns in the study across all alpha tests. The synergistic effect of the two factors greatly enhanced returns and exceeded those returns generated by either factor independently.
- When quintiling on cash flow component first, which is a considerably more stable factor than estimate revision, turnover was reduced by nearly 60 percentage points annually (please note: turnover is calculated based on Quintile 1 of cash flow component only. Thus if a stock moves from Q1/Q1 to Q1/Q2, it is not reflected in the turnover statistics).
- The Q1/Q1 portfolio consistently beat the overall universe average, whereas the Q5/Q5 trailed most frequently.

We will discuss in full detail the results of the winning strategy, along with performance across the two investment styles. With these factors, we also reversed the order (sorting by estimate revision first, then by cash flow component) to determine if the results were significantly different. Finally, at the end of the report we will discuss the construction and results of the four factors we did not select.

The Nuts And Bolts Behind The Tests

Before we discuss the highlights of the cash flow component and estimate revision model, a brief description of the factors and backtest methodology is appropriate. As in both of our quantitative models, estimate revision is defined as the three-month weighted-average change in the I/B/E/S mean estimate. The most recent change in estimates received a weighting of 50%, the change from two months earlier was weighted at 30%, and the change from three months ago was allocated 20%. Each change in estimate was normalized by the beginning-of-the-month price. To be included in the universe for the factor's backtest, a company had to have at least two analysts covering it when the universe was rebalanced.

Cash Flow Component Is A Factor We Employ In Our New Quantitative Growth Model. This factor compares net income from operations, less an accrual factor to the company's average total assets. This eliminates some of the balance-sheet accounting tricks from net income to derive a return on cash flow. The accrual factor was calculated by taking the 12-month change in current assets and subtracting it from the change in a firm's cash and equivalents. From this we subtracted the change in current liabilities, less the change in debt (including current liabilities), and less the change in taxes payable. Finally, we subtracted from this the depreciation and amortization expense.

Backtest Methodology. The backtests we ran looked at the combination of the two factors, with cash flow component lagged for reporting delays on a quarterly basis. We examined the results for the time period beginning December 31, 1981, and ending on April 30, 2000.

In our backtest, we first formed quintiles based on cash flow component, with Q1 designated as the best, and then broke each quintile into five subsets based on factor 2, estimate revision, again with Q1s ranked as the best. This created a five-by-five matrix of portfolios, which were rebalanced monthly.

Company Universe. We applied this analysis to a small-cap universe of companies, which we define as the 20th through the 45th market-cap percentiles of the Compustat database. We excluded ADRs, closed-end funds, and REITs. We also eliminated fallen angels, defined as those companies that have sales figures seven or more times greater than their market caps. These companies sometimes skew model results.

Cash Flow Component Coupled With Estimate Revision Proved To Be Head And Shoulders Above The Rest...

The most attractive stocks based on the cash flow component and estimate revision, the Q1/Q1 portfolio, turned in an

annualized return of 40.8% (Figure 2). Considering that performance for the single-factor cash flow component model's Q1 stock portfolio had an annualized return of 23.0% and the Q1's on the single-factor estimate revision model had a return of 31.5% during the same period, the combined portfolio's annualized return of 40.8% shows superior performance for these "double winners." Not far behind was portfolio Q2/Q1 with an excess return of 19.7%. Of the top ten portfolios (out of those that ranked Q1 or Q2 on the estimate revision factor), just two portfolios lagged the universe average.

The Q5 portfolio, based on cash flow component, and Q2, based on revision, trailed the universe by 8.4%, whereas the Q4/Q2 trailed by 1.6%.

In contrast, the portfolio with the worst performance was the Q5/Q5 portfolio, which lagged by more than 18% per year and produced an absolute return of -6.5%. For the single-factor cash flow component model, the Q5 portfolio had an annualized return of 3.7% over the same time period. Meanwhile the single-factor estimate revision model Q5s were even higher, 4.1%. This implies that companies with poor rankings on both the cash flow component model and on the estimate revision model have a difficult time with subsequent performance. Of the ten groups that ranked either Q4 or Q5 on the estimate revision factor, nine of them trailed the universe.

...As It Provided Consistent Statistically Significant Results...

The results were consistent, as both the Q1/Q1 and Q2/Q1 portfolios respectively topped the universe average in 73.2% and 74.1% of the months we tested (Figure 3). On the flipside, Q5/Q4 and Q5/Q5 were the two worst-performing portfolios, respectively beating the universe just 33.6% and 34.1% of the time.

Figure 4. The Reversal of The Layered Factors Estimate Revision By CFC Yielded High Performance But Even Higher Turnover (Annualized)

Factors Reversed	Factor Two Cash Flow Component					Universe	Q1/Q5 Spread	Excess Return					
	Q1	Q2	Q3	Q4	Q5			Q1	Q2	Q3	Q4	Q5	
Factor Order Estimate Revision	Q1	40.8	35.6	31.2	30.7	22.5	32.2	18.3	23.0	18.5	14.6	14.2	7.0
	Q2	27.7	22.5	19.0	15.4	6.3	18.1	21.5	11.6	7.0	4.0	0.8	-7.2
	Q3	18.7	13.9	13.6	9.1	2.3	11.9	16.4	3.7	-0.5	-0.7	-4.6	-10.6
	Q4	11.7	10.6	8.6	6.5	-2.3	7.5	14.0	-2.4	-3.4	-5.1	-7.0	-14.6
	Q5	10.1	6.1	6.1	-1.4	-7.7	3.1	17.8	-3.9	-7.3	-7.3	-13.8	-19.4
Universe	22.08	17.79	15.78	11.75	4.42	14.46	-	-	-	-	-	-	
Q1/Q5 Spread	30.8	29.5	25.1	32.1	30.2	-	-	-	-	-	-	-	

Source: FactSet Research Systems; Prudential Securities.

The strength of the model was also confirmed statistically, as the IC for the first factor on the backtest, cash flow component, was fairly strong at 0.05. In addition, the IC for the second factor, estimate revision, which is found within the first factor (cash flow component), was even stronger at 0.07. Historically, in our single-factor tests, the IC of 0.05 for the cash flow component is stronger than most valuation-based factors, such as P/B, but not nearly as strong as our momentum-based factors such as estimate revision, which is supported by our two-factor test.

...And Lowered Turnover

In developing a model strategy like this, turnover was an important consideration. In the past we have focused on developing stock-picking models, but now we are focusing on reducing turnover. Again, the turnover figure was calculated based on the cash flow component factor, not estimate revision. Thus, if a company moved from Q1 on both factors to Q1/Q2, it was not reflected in the turnover figure. Average turnover for the cash flow component, coupled with estimate revision, was nearly 25% over the entire period, while average weighted turnover was 26%. An order effect does exist when cash flow component is the first factor—the average turnover decreased by 60.5 percentage points.

Reversing The Factor Order Increases Turnover

When the factor order was reversed; i.e., quintiling the universe by estimate revision first, then by cash flow component, the companies that had a top ranking on the estimate revision factor and then a top ranking on cash flow component had nearly identical performance to the CFC-ER model. Companies ranked highly on both factors continued

to have a better annualized return than their counterparts from the lowest-ranked portfolios.

Similar to the CFC-ER model, the Q1/Q1 portfolios for the ER-CFC had an annualized return of 40.8%, with an excess return of 23.0% (Figure 4). Considering the estimate revision model's Q1 stocks had an annualized return of 32.2% and the cash flow component model Q1s had a return of 22.1% (again during the same period), the combined portfolio return of 40.8% shows superior performance for this layered, two-factor model.

But despite the fact that performance was identical, we found turnover substantially increased to 85.5% for the average percentage, and to 85.4% for the weighted figure (for the Q1s versus the CFC-ER model, where quintile 1 stocks had an average percent total turnover of 25.0% and 26.1%, respectively). This would eliminate much of the portfolio's excess return.

In Growth, The Most Attractive Stocks In Both Factors Did Even Better Than The Overall Universe

Our two-factor model did even better in a growth stock universe than in the overall universe. The Q1/Q1 portfolio had the highest return, as it gained 44.4% and beat the universe by 26.7% (Figure 5). Ten other portfolios also outperformed the universe, but not to the extent of the performance by the Q1/Q1 portfolio. As hoped for and consistent with the backtest for the overall universe, the Q5/Q5 portfolio was the worst-performing group, as it actually lost 7.8% annually and trailed the universe by 19.2%. This was a wider gap than that for the portfolio for the overall universe.

Figure 5. In The Growth Universe, The Q1/Q1 Portfolio Did Even Better Than The Overall Universe...

		Estimate Revision					Q1/Q5 Spread		Excess Return				
		Q1	Q2	Q3	Q4	Q5	Universe	Q1	Q2	Q3	Q4	Q5	
Cash-Flow Component	Q1	44.4	28.1	26.9	16.8	8.3	36.1	25.1	26.7	12.4	11.3	2.4	-5.0
	Q2	41.4	17.8	12.9	10.3	8.9	32.5	18.6	24.0	3.3	-0.9	-3.2	-4.4
	Q3	36.2	12.6	14.6	-2.9	4.7	31.4	12.9	19.4	-1.2	0.5	-14.8	-8.1
	Q4	33.0	7.8	6.5	0.5	-0.9	33.9	9.2	16.7	-5.4	-6.6	-11.8	-13.1
	Q5	18.5	5.9	-0.3	-1.8	-7.8	26.3	3.5	3.9	-7.1	-12.6	-13.9	-19.2
Universe		35.2	15.2	13.0	5.4	3.0	-	14.0	-	-	-	-	-
Q1/Q5 Spread		25.9	22.2	27.2	18.6	16.2	-	-	-	-	-	-	-

Note: Returns are annualized percents.

Source: FactSet Research Systems; Prudential Securities.

Figure 6. ...With The Portfolio Topping The Universe 70% of The Time

		Factor Two Estimate Revision				
		Q1	Q2	Q3	Q4	Q5
Factor One Cash Flow Component	Q1	73.1	70.6	68.1	61.3	53.8
	Q2	62.5	54.4	53.1	46.3	45.6
	Q3	61.9	51.3	50.0	42.5	36.9
	Q4	54.4	45.6	31.9	44.4	36.3
	Q5	45.0	48.8	41.9	39.4	30.0

* The percentage of months that a portfolio formed with quintiles from Factor One and Factor Two beat the universe.

Source: FactSet Research Systems; Prudential Securities.

The IC score was just as strong for small-cap growth as it was for the overall universe for both cash flow component and estimate revision, at 0.05 and 0.07, respectively.

The results were consistent, as the Q1/Q1 portfolio beat the universe average in 73.1% of the months we tested (Figure 6). In contrast, the Q5/Q5 portfolio lagged the universe most often in 70% of the months we looked at.

The Value Universe Saw Good Results As Well

For the value universe, the two-factor model, combining cash flow component and estimate revision, was strong, but worked third best after growth and the overall universe. A high ranking on both the cash flow component factor and on the estimate revision factor did produce the strongest performance in the backtest.

The Q1/Q1 portfolio gained 39.5% and beat the universe by 21.6% (Figure 7). Taking second place was Q2/Q1, as it produced an excess return of 12.0%. The Q5/Q3 portfolio

within the value universe had the poorest absolute and excess returns, at -6.7% and -18.7%, respectively. The most unattractive stocks based on the two factors were not far ahead. Meanwhile, 14 out of 25 possible portfolios outperformed the universe.

Overall, turnover was surprisingly greater within the value universe than in the growth universe, with an average percent total turnover of 52.9% versus growth's 31.6%.

The top performance pattern of the Q1/Q1 portfolio suggests an equally robust model, which is confirmed by the IC scores for both the cash flow component and estimate revision factors, at 0.05 and 0.07, respectively.

The results were slightly less consistent than both the overall and growth universes, as both Q1/Q3 and Q1/Q1 respectively beat the universe average in 65.0% and 64.4% of the months we tested (Figure 8). Q5/Q5 was the worst-performing portfolio, beating the universe just 32% of the time, suggesting that a low cash flow component equals subsequent low returns, even within the value universe.

Figure 7. Results Were Good In The Valuation Universe

		Estimate Revision					Q1/Q5		Excess Return				
		Q1	Q2	Q3	Q4	Q5	Spread	Universe	Q1	Q2	Q3	Q4	Q5
Cash-Flow Component	Q1	39.5	25.1	18.5	13.1	20.5	19.0	23.8	21.6	9.1	3.3	-1.4	5.1
	Q2	28.5	120.4	20.8	11.8	7.4	21.1	18.3	12.0	4.9	5.3	-2.6	-6.4
	Q3	26.5	23.4	18.8	16.8	6.0	20.5	18.8	10.3	7.6	3.6	1.8	7.6
	Q4	23.9	17.1	11.0	3.5	3.4	20.5	21.1	8.0	2.1	-3.2	-9.8	-9.9
	Q5	25.4	2.5	-6.7	-1.3	-5.8	31.3	3.1	9.4	-10.6	-18.7	-14.0	-17.9
Universe		28.5	18.3	12.4	9.1	6.8	-	14.7	-	-	-	-	-
Q1/Q5 Spread		14.1	22.6	25.2	14.5	26.4	-	-	-	-	-	-	-

Note: Returns are annualized percent.

Source: FactSet Research Systems; Prudential Securities.

Figure 8. ...But Slightly Less Consistent

Factor	Q1	Percentage Of Months Quintile Outperformed				
		Factor Two Estimate Revision				
		Q1	Q2	Q3	Q4	Q5
Cash Flow Component	Q1	64.4	61.3	65.0	60.0	61.9
	Q2	56.9	55.6	56.9	52.5	39.4
	Q3	47.5	60.0	50.6	45.0	35.6
	Q4	48.8	48.1	51.3	38.8	37.5
	Q5	48.8	44.4	39.4	41.9	31.9

* The percentage of months that a portfolio formed with quintiles from Factor One and Factor Two beat the universe.

Source: FactSet Research Systems; Prudential Securities.

The Factors That Failed- And Why

Again, we looked at four other factors with estimate revision, but they all failed to live up to the results posted by estimate revision and cash flow component. Below we highlight the factors we reviewed and their results.

Relative Forward P/E. This factor compares a company's next-12-months P/E with its respective sector average. We weighted the average sectoral P/E based on market capitalization. This model had the second-best-performing Q1/Q1 portfolio, and the Q5/Q5 lagged by a wide margin. The Q1/Q1 portfolio, however, was only the second best, after portfolio Q2/Q1. The Q2/Q1 portfolio outperformed all other portfolios with an annualized return of 34.1%. The Q5/Q5 portfolio had the second-poorest return at -0.01%, and lagged by 13.4%.

Relative Price To Sales. This factor is defined as the current price-to-sales ratio relative to its respective sector average. This model created the third-best-performing Q1/Q1 portfolio. However, the Q1/Q1 portfolio was only the fourth best, after Q4/Q1. The Q4/Q1 outperformed

all other portfolios with an annualized return of 32.8% and an excess return of 15.7%. The Q5/Q5 portfolio had a -0.3% annualized return, and an excess return of -13.1%.

P/E To Growth. This factor was calculated by using a forward fiscal-year 1 P/E compared with the I/B/E/S long-term growth rate. The universe was segmented into five portfolios based on its PEG ratio: 0.0 to 0.75; 0.75 to 1.00; 1.00 to 1.25; 1.25 to 2.00; and greater than 2.0.

The companies that had a top ranking on the valuation metric P/E to growth (e.g; a PEG ratio of 0.0 to 0.75), plus a top ranking when sorted by estimate revision, did not end up performing the best. In fact, portfolio Q4/Q1 (e.g; a PEG ratio of 1.25 to 2.0) did the best by far for this two-factor test. The Q4/Q1 portfolio had an annualized return of 35.8%, with an excess return of 18.2%. The Q5/Q5 portfolio had a -0.43% annualized return, and an excess return of -13.3%. This was the only negative absolute performance of all 25 of the portfolios in this model.

Forward P/E. This factor was calculated using the weighted I/B/E/S consensus mean of fiscal-year 1 and fiscal-year 2 earnings estimates. The companies that ranked the best had a low value on forward P/E, and those that had a top rank when sorted by estimate revision did not end up doing the best. The segment that ended up doing far better than any other portfolio was the high P/E and best estimate revision (Q5/Q1) portfolio. The Q5/Q1 portfolio had an annualized return of 35.5%, with an excess return of 18.0%. The Q5/Q5 portfolio had a -2.5% annualized return, and an excess return of -15.1%.

Our Definitions of Growth And Value

In this study, we used the same definition of growth and value as we use for the Prudential Securities Growth and Value Style Indexes.

- In order to be characterized as a growth stock, a company has to possess at least three of the following four characteristics:
 - Above-average consensus earnings growth.
 - High sales growth.
 - Low debt to market cap.
 - A low dividend payout ratio.

- In order to be categorized as a value stock, a company has to have the following:
 - A low P/E ratio.
 - A high sustainable yield if the company pays a dividend.

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