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The 52-week high, q-theory, and the cross section of stock returns☆

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ABSTRACT

The Hou et al. (2015) q-factor model outperforms other factor models in capturing the price-to-high (PTH, the ratio of current price to 52-week high price) anomaly; that is, high-PTH stocks earn high future returns. PTH's relations with future profitability and future investment growth are both significantly positive, and they mirror PTH's relation with future returns in the cross section and by time horizons. Incorporating the information about future investment growth contained in price level variables (e.g., PTH) helps the q factors to capture better those anomalies rooted in future investment growth. Together, these results suggest that the PTH anomaly is consistent with the investment capital asset pricing model.

1. Introduction

George and Hwang (2004) show that a price-to-high (PTH) anomaly exists, that is, firms with stock prices nearest to their 52-week highs (high-PTH firms) earn higher factor-adjusted returns on average than firms whose stock prices are farthest from their 52-week highs (low-PTH firms). They interpret this finding as underreaction to information because investors use the 52-week high as a reference point when evaluating the impact of information on prices.[1] Their interpretation focuses on the implications for investors' behavior. In this paper, we consider the PTH anomaly using the framework of investment-based asset pricing [the investment capital asset pricing model (CAPM)].[2] Our findings suggest that the PTH anomaly is consistent with the joint hypothesis that PTH is positively related to expected profitability and expected investment growth, and that firms with higher expected profitability and higher expected investment growth have higher expected stock returns, as predicted by the investment CAPM.

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[1] See Huddart et al. (2009), Liu et al. (2011), Baker et al. (2012), Li and Yu (2012), Bhootra and Hur (2013), and Driessen et al. (2013) for similar interpretations of PTH.

[2] We follow Zhang (2015) in using the term "investment CAPM" to refer to the equation for expected stock return derived from investment-based asset pricing.

The investment CAPM is built on the q-theory of investment, which was first applied to asset pricing by Cochrane (1991). Under q-theory, optimal investment equates the marginal return on the firm's investment to its cost of capital. This relation can be written as an investment CAPM wherein expected stock returns are written as a function of variables that describe the firm's investment opportunities. In a two-period model, expected stock returns are a function of current investment and expected profitability. In a multi-period model, expected stock returns depend on current investment, expected profitability, and expected investment growth (Liu et al., 2009; Liu and Zhang, 2014).

Hou et al. (2015) test the investment CAPM using the Black et al. (1972) portfolio approach. They build a q-factor model, which includes a market factor, a size factor, an investment factor, and a profitability factor. In their construction, asset growth measures current investment. Return on equity (ROE), which measures current profitability, is therefore a proxy for expected profitability *and* expected investment growth. They show that the q-factor model outperforms the Fama and French (1993) three-factor and Carhart (1997) models in capturing a wide range of anomalies, including momentum. They further show that the q-factor model captures momentum through the ROE factor, suggesting that past stock prices contain information about expected profitability or expected investment growth, or both. Although PTH and momentum are conceptually different in capturing the information contained in past stock prices, PTH also could be positively related to expected profitability or expected investment growth, or both.[3] If so, and if cross-sectional variation in expected stock returns follows the prediction of the investment CAPM, then stocks with high PTH should earn high future returns. We conduct four sets of tests of this joint hypothesis.

First, we examine whether the q-factor model outperforms other factor models in capturing the PTH anomaly. We find that among the factor models we examine, i.e., the single-factor market model (market), the Fama-French three-factor (FF3) and five-factor (FF5) models, the Carhart model (Carhart), and the q-factor model, the q-factor model delivers the best performance, whether the PTH anomaly is formed based on the entire sample using value-weighted returns (ALL&VW) or based on the all–but–micro capitalization sample and equal-weighted returns (ABM&EW). The q-factor model is the only model that results in an insignificant high-minus-low PTH decile alpha, which is also the smallest in magnitude across all the models. The average magnitude of alpha across all the deciles is the smallest for the q-factor model as well. The q-factor model is the only model that is not rejected by the test of Gibbons et al. (1989) in ALL&VW, but it is rejected in ABM&EW. Moreover, the loading on the profitability factor increases across the low to high PTH deciles, and it is large and positive for the high-minus-low PTH decile, suggesting that the q-factor model captures the PTH anomaly through the profitability factor.

Second, consistent with the prediction of the joint hypothesis, we find that stocks with low current investment and high PTH earn very high returns, and stocks with high current investment and low PTH earn very low returns. Furthermore, the q-factor model outperforms the other models in capturing these extreme returns.

Third, we find that PTH is positive and significant as a predictor of both future profitability (FROE) and future investment growth (FGROW). Also, we find that among firms with smaller size, younger age, lower book-to-market ratio, lower credit rating, higher share turnover, and higher return volatility, PTH has a stronger relation with both FROE and FGROW, and the relation between PTH and future stock returns (FRET) is stronger among such firms as well. In addition, we find that the relation between PTH and FROE is persistently positive, but the relation between PTH and FGROW changes from positive at short horizons to negative at long horizons. The relation between PTH and FRET also changes from positive to negative, suggesting that the relation between PTH and FGROW is important to the relation between PTH and FRET.

Fourth, we examine whether price-level variables (including PTH and PTL, i.e., price-to-low, the ratio of the current price to the lowest price during the past year) contain additional information about FROE and FGROW beyond what is already contained in ROE and, if so, whether a factor that combines the information in ROE and price levels outperforms the ROE factor in capturing the operating accrual (OA) and R&D-to-market (RD/M) anomalies. As explained above, ROE serves as a proxy for expected profitability and expected investment growth in constructing the q factors. Indeed, we find that ROE has a significantly positive relation with both FROE and FGROW. However, ROE's predictive power for FROE is much stronger than for FGROW, suggesting that ROE is a better proxy for expected profitability than it is for expected investment growth. This, in turn, suggests that the ROE factor could be weak in capturing certain anomalies formed on variables strongly related to FGROW.

HXZ (2015) find that the q-factor model under-performs the FF3 and Carhart models in capturing the OA and RD/M anomalies, which could occur if OA and RD/M are strongly related to FGROW. The relation between OA (RD/M) and FGROW is significantly negative (positive). Also, OA (RD/M) is positively (negatively) related to FROE. Thus, both anomaly variables are related to FGROW and FROE with opposite signs. Although the ROE factor in the q model captures well the return variation associated with FROE, it leaves the return variation associated with FGROW uncaptured. This could explain why the q-factor model results in a greater negative alpha for the OA anomaly and a greater positive alpha for the RD/M anomaly, relative to the FF3 and Carhart models, which capture neither source of variation.

In examining PTH and PTL, we find that although they do not add much to the prediction of FROE, they do contain a significant amount of additional information about FGROW beyond what is contained in ROE. Hence, a fac-

[3] Momentum captures how stock prices have changed over a fixed period of time, and PTH captures how prices have changed from their recent peaks. Perhaps due to this conceptual difference, PTH is not the same as momentum in how it predicts stock returns. George and Hwang (2004) find that PTH has independent power in predicting future stock returns even after controlling momentum.

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