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The cross section of expected holding period returns and their dynamics: A present value approach[☆]



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ABSTRACT

We provide a tractable model of firm-level expected holding period returns using two firm fundamentals—book-to-market ratio and return on equity—and study the cross-sectional properties of the model-implied expected returns. We find that firm-level expected returns and expected profitability are time-varying but highly persistent and that forecasts of holding period returns strongly predict the cross section of future returns up to three years ahead. We show a highly significant predictive pooled regression slope for future quarterly returns of 0.86. The popular factor-based expected return models have either an insignificant or a significantly negative association with future returns. In supplemental analyses, we show that these forecasts are also informative of the time series variation in aggregate conditions. For a representative firm, the slope of the conditional expected return curve is more positive in good times, when expected short-run returns are relatively low, and the model-implied forecaster of aggregate returns exhibits modest predictive ability. Collectively, we provide a simple, theoretically motivated, and practically useful approach to estimating multi-period-ahead expected returns.

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1. Introduction

The ample evidence that expected equity returns are time-varying (Cochrane, 2011) has significant implications on how investors should make capital allocation decisions when they face different investment horizons.¹ In particular, capturing the dynamics in expected returns is critical in assessing the

holding period returns of investment opportunities over different horizons, which can guide investors in tailoring their portfolios to match their desired investment horizons. For example, investors who allocate their capital intertemporally must make projections of firm-level expected holding period returns to construct optimal portfolios. Ignoring the dynamics of expected returns, such as by assuming that expected returns are constant across time for a given firm, can lead to poor capital allocation decisions and, as shown by Ang and Liu (2004), significant equity valuation errors.

Despite its importance, a solution does not yet exist for obtaining time-varying expected holding period returns on equity at the firm level that can be easily applied to the cross section of firms. Popular firm-level expected returns produced by the traditional capital asset pricing model (CAPM) and the Fama and French (1993) three-factor model, or the more recent proxies suggested by the

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¹ This paper uses the terms “expected rates of stock returns,” “expected returns,” “cost of capital,” and “discount rates” interchangeably.

implied cost of equity capital literature, implicitly assume constant expected returns.

Our paper fills a void in the literature and contributes by providing a theoretically motivated, parsimonious, and easily implementable model of expected holding period returns over arbitrary horizons. The model is derived from the present value approach of [Vuolteenaho \(2002\)](#) with a valuation equation similar to the popular [Ohlson \(1995\)](#) residual income model but extended to allow for dynamic expected returns.

We make two key assumptions. First, building on prior research, we assume that both expected stock returns and expected return on equity (ROE) are mean-reverting. Second, we assume that in the long run expected returns and expected ROE converge or, stated differently, a firm's ability to generate profits over and above its cost of capital (abnormal profitability) is eroded by competition over time. These lead to a parsimonious solution for estimating the expected holding period returns over arbitrary horizons, an approach that can be easily applied to the cross section of firms using regressions of historical returns on two firm fundamentals: the book-to-market (BM) ratio and return on equity.

Our approach relates to the recent line of literature that utilizes the present value relation to study expected returns (e.g., [Ang and Bekaert, 2007](#); [van Binsbergen and Kojien, 2010](#); [Campbell and Thompson, 2008](#); [Cochrane, 2008](#); [Ferreira and Clara, 2011](#); [Kelly and Pruitt, 2013](#); [Lettau and Ludvigson, 2005](#); [Lettau and van Nieuwerburgh, 2008](#); [Pástor, Sinha, and Swaminathan, 2008](#)). Whereas the literature focuses on forecasting aggregate returns (at the market or portfolio levels), we spotlight on firm-level expected returns and their performance in predicting the cross section of future returns.

Also related to our study is the recent line of literature that has begun to study the prices and risk premiums of the term structure of dividend strips (e.g., [van Binsbergen, Brandt, and Kojien, 2012](#); [van Binsbergen, Hueskes, Kojien, and Vrugt, 2013](#); [Lettau and Wachter, 2007](#)). While related, ours is devoted to studying the expected returns from holding equity over different horizons. Further, a central theme in the term structure literature is the use of forward-looking market-based prices (such as the value of dividend strips or bonds). Our paper differs, as we derive holding period returns estimates based on historical realized returns and accounting data and do not require instruments such as dividend strips to form projections.

Our baseline implementation of the model uses BM and ROE constructed with quarterly financial statements to forecast holding period returns in quarterly intervals. We study the cross-sectional properties of the model-implied proxies of expected holding period returns and show that they exhibit significant ability in predicting the cross section of future holding period returns up to three years ahead. In out-of-sample tests, which range from 1986 to 2013, our expected return estimates predict the cross section of future returns with a regression slope coefficient for three-, 12-, 24-, and 36-month-ahead log returns of 0.86, 0.72, 0.60, and 0.52, respectively, where all coefficients are significant at the 1% level. Three-month ahead proxies are especially reliable, as the regression slope is statistically no different from one and the intercept is no

different from zero, consistent with the behavior of true expected returns. Portfolio sorts using these proxies also yield a strong monotonic relation with future returns. Going long the top decile and short the bottom decile of three-, 12-, 24-, and 36-month expected return firms produce average spreads in future returns of 5.48%, 15.42%, 30.44%, and 46.32%, respectively, all significant at the 1% level.

These results are robust to various implementations of the model, for example, by implementing instrumental variables (IV) estimation or using annual financial statement data. In contrast to our model-implied proxies, we find that firm-level expected returns produced by the popular factor-based models [i.e., CAPM, [Fama and French, 1993](#) three-factor model, and a four-factor model that augments Fama and French with a momentum factor] do not positively predict the cross section of future returns. Overall, our firm-level proxies are far more reliable than the factor-based alternatives.

These empirical findings make several contributions. First, we contribute methodologically by providing a fundamentals-based model that can forecast the cross section of stock returns out-of-sample and over different horizons. This builds on the work of [Ang and Liu \(2004\)](#), who develop a conditional CAPM model to discount portfolio-level cash flows at different horizons. To our knowledge, our paper and that of [Callen and Lyle \(2011\)](#) provide the only empirical methods for obtaining the firm-level multi-period-ahead expected returns forecasts. However, unlike the work of [Callen and Lyle \(2011\)](#), who estimate firm-level expected holding period returns implied by option contracts that are limited by the existence and liquidity of contracts of different expirations, our methodology uses accounting data and is easily applied to the cross section of firms. Moreover, our firm-level proxies are particularly useful in light of the observation that CAPM and other common factor-based models can be difficult to apply over different investment horizons (unless one assumes that factor loadings and premiums are flat), coupled with the finding that these models do not reliably and positively predict out-of-sample future returns. Our solution is a more useful input to inform investors' capital allocation decisions.

Second, whereas the asset pricing literature has mostly focused on the performance of aggregate predictive regressions (e.g., [Welch and Goyal, 2008](#); [Campbell and Thompson, 2008](#)) and, more generally, the out-of-sample predictive ability of aggregate return forecasters (e.g., [van Binsbergen and Kojien, 2010](#); [Kelly and Pruitt, 2013](#)), relatively little evidence exists on the out-of-sample predictive ability and reliability of firm-level expected returns produced by cross-sectional regressions. We contribute new evidence to this end and show that cross-sectional regression-based estimates of firm-level expected returns are reliably associated with the cross section of future returns.

Moreover, our results show that reliable proxies of firm-level expected holding period returns can be obtained using only realized returns, the BM ratio, and ROE. This finding contributes to the recent literature on the estimation of firm-level expected returns, such as the implied cost of capital literature, which has produced a plethora of proxies that not only are fraught with implementation issues but also have not been found to be

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