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Dividends, earnings, and predictability☆

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ABSTRACT

We show that the dividend yield and earnings yield jointly are strong predictors of dividend growth. We motivate the joint specification with a theoretical model and show how omitting the earnings yield biases the dividend yield coefficient towards zero, explaining why the dividend yield by itself is a poor predictor of dividend growth. Our empirical results are robust in pre- and post-war U.S. data, in recessions and expansions, in international data, and when controlling for additional predictors.

1. Introduction

Several papers have shown that the ability of the dividend yield to predict dividend growth is weak, see Campbell and Shiller (1988), Cochrane (2008, 2011), among others. We argue that the weak predictive power of the dividend yield for future dividend growth can be explained by a missing variable problem. The background is Lintner's (1956) dividend model from which it can be derived that the dividend yield and the earnings yield should be used jointly as explanatory variables of future dividend growth. Omitting the earnings yield from the equation causes the coefficient on the dividend yield to be biased towards zero. Together with the earnings yield, however, the dividend yield is a strong predictor of dividend growth. We show that this result is remarkably robust in both U.S. and international data.

We are not the first to show that the dividend yield predicts dividend growth when including the earnings yield in the specification. This intriguing result was first discovered by Ang and Bekaert (2007). They find that the dividend yield on its own contains only weak predictive power of dividend growth, but once they control for the earnings yield, the dividend yield is a significant predictor of dividend growth (and so is the earnings yield). Building on the work of Ang and Bekaert (2007), we show that their finding can be explained within the framework of Lintner's (1956) dividend model. Omitting the earnings yield conceals predictability by biasing the dividend yield coefficient towards zero.

We analyze and compare the strong predictive power of the dividend yield-earnings yield ($dy - ey$) model against a number of new findings in the literature. In recent years, an increasing number of papers have challenged the view that dividend yields do not predict dividend growth. Chen (2009) and Golez and Koudijs (2014) show that dividend yields predict dividend growth in the pre-war years, but not in the post-war years. This pre-war vs. post-war effect does not show up when using the $dy - ey$ model to predict dividend growth. While the dividend yield by itself has no predictive power for dividend growth in post-war data, the $dy - ey$ model contains substantial predictive power for dividend growth in both pre- and post-war data. We find that the omitted variable bias from not including the earnings yield is less severe in the pre-war period in part due to a lower correlation between dy and ey. In addition, as Chen et al. (2012) also show, there is less dividend smoothing in pre-war data. These two effects help explain the reversal in dividend growth predictability when using the dividend yield as the only predictor.

Engsted and Pedersen (2010) and Rangvid et al. (2014) show that dividend growth is predictable from dividend yields in countries with small market capitalizations but not in large markets such as the U.S. We examine a cross section of 14 developed countries and show that the $dy - ey$ model contains much more pre-

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dictive power for dividend growth than do univariate models with either the dividend yield or earnings yield as the only predictor. In line with the previous literature, we find that the $dy - ey$ model has more predictive power for dividend growth in countries with small market capitalizations compared to countries with large market capitalizations.

Recent literature has produced robust evidence that equity returns in the U.S. are substantially more predictable during economic downturns than during economic expansions, see Rapach et al. (2010) and Henkel et al. (2011). Hence, a natural question is whether the predictive power of the $dy - ey$ model varies with the state of the economy. Unlike return predictability, which seems to be restricted to a few periods around recessions, the $dy - ey$ model strongly predicts dividend growth in both expansions and recessions.

We also demonstrate that commonly used predictive variables such as the short rate, the term spread, the default spread, and the consumption-wealth ratio (cay) of Lettau and Ludvigson (2001) do not add much additional information about expected dividend growth beyond that contained in the $dy - ey$ model.

Overall, despite of its simplicity, the $dy - ey$ model contains robust predictive power for dividend growth in different subsamples, in both recessions and expansions, when controlling for additional variables, and across countries.[2]

The rest of the paper is structured as follows. Section 2 motivates why the dividend yield and earnings yield should be used jointly as predictive variables of dividend growth. Section 3 describes the data. Section 4 examines the U.S. evidence of dividend growth predictability, while Section 5 examines the international evidence. Section 6 concludes.

2. Motivation

This section motivates why the dividend yield and earnings yield should be used jointly as predictors of dividend growth. Consider Lintner's (1956) model of dividend payout in log form

$$\Delta d_{t+1} = a + c\left(d^*_{t+1} - d_t\right) + u_{t+1}, \quad (1)$$

where d_t is the actual log dividend at time t and $\Delta d_{t+1} = d_{t+1} - d_t$ is log dividend growth at time $t+1$. We specify the log target dividend as $d^*_{t+1} = r + e_{t+1}$, where r is the log target payout ratio and e_{t+1} is actual log earnings at time $t+1$.[3] The non-negative parameter c measures the speed of adjustment towards the target and reflects the degree of dividend smoothing. The model can be motivated by a quadratic cost function where managers are penalized for deviations of dividend growth from a normal rate as well as for deviations of realized dividends from target dividends, see Garrett and Priestley (2000). We next assume that e_{t+1} is well approximated by a random walk.[4] After rearranging, we then arrive at the following specification for dividend growth

$$\Delta d_{t+1} = \alpha - c((d_t - e_t) - r) + \nu_{t+1}. \quad (2)$$

Lintner's model can therefore be seen as a theoretical motivation for predicting dividend growth using the log payout ratio, $d_t - e_t$. If the current payout ratio is above the target level, dividend growth is expected to fall. We also see from (2) that the level of predictability is linked to the degree of dividend smoothing. If we then add and subtract $c \times p_t$, where p_t is the log price, and ignore the constant r, we obtain the following model

$$\Delta d_{t+1} = \alpha - c \times dp_t + c \times ep_t + \nu_{t+1}, \quad (3)$$

where $dp_t = d_t - p_t$ is the dividend yield and $ep_t = e_t - p_t$ is the earnings yield. Next, consider a miss-specified model that only includes the dividend yield

$$\Delta d_{t+1} = \alpha + \beta dp_t + \varepsilon_{t+1}, \quad (4)$$

where $\beta = -c$ and $\varepsilon_{t+1} = c \times ep_t + \nu_{t+1}$. If we estimate this model using OLS, we get an omitted variable bias due to not including the earnings yield. The bias is

$$E\left(\widehat{\beta}\right) - (-c) = \gamma c, \quad (5)$$

where γ is the slope coefficient from an auxiliary regression of ep_t on dp_t (and a constant). Rearranging, we get

$$E\left(\widehat{\beta}\right) = -c(1-\gamma). \quad (6)$$

If the dividend yield and the earnings yield have a high correlation (γ close to 1), regressing dividend growth on the dividend yield could lead us to wrongly conclude that dividend growth is not predictable. The intuition is that dp_t and ep_t have the opposite sign in (3) but are positively correlated. Omitting ep_t pulls the estimated coefficient of dp_t towards zero. This point is not restricted to the Lintner model, but extends to other models of dividend behavior where potential omitted variables correlate with the dividend yield. The models of Marsh and Merton (1987) and Garrett and Priestley (2012) are interesting alternatives.[5]

3. Data

3.1. U.S. data

We use S&P 500 data to compute returns, dividend growth, dividend yields, and earnings yields. In our main regressions, we use a quarterly sample over the period 1927:1 to 2013:4. We compute returns on the S&P 500 index including dividends. To compute the excess return, we subtract a three-month T-bill rate. We derive monthly dividend payments from returns with and without dividends and compute annual dividends as the sum of dividend payments on the S&P 500 index over the past year. We compute dividend growth as the quarterly growth rate in annual dividends and the quarterly dividend yield is then given by the sum of dividends over the past year divided by the end-of-quarter price. In a similar vein, the quarterly earnings yield is defined as earnings over the past year divided by the end-of-quarter price. All variables are in logs.

We also work with annual data over the period 1871 to 2013. We have obtained both the quarterly and annual data from the updated Goyal and Welch (2008) dataset, which is available on Amit Goyal's website.[6]

3.2. International data

We also carry out an international analysis using data on the following 14 countries: Australia, Austria, Belgium, Canada, Denmark, France, Germany, Hong Kong, Japan, the Netherlands, Singapore, South Africa, Switzerland, and United Kingdom. For these

[2] Our results from simple OLS regressions confirm recent evidence of strong dividend growth predictability based on more advanced methods. Golez (2014) extracts a forward looking measure of expected dividend growth from options and futures and shows that it predicts dividend growth, while Binsbergen and Koijen (2010) use state-space models to show that past values of dividend growth help to forecast both returns and dividend growth.

[3] Lintner (1956) originally specified the model with all variables in levels. We follow Garrett and Priestley (2000) and Chen et al. (2012) by specifying the model in logs.

[4] Since the work of Ball and Watts (1972), several empirical studies have shown that earnings are close to a random walk, see the review in Kothari (2001).

[5] The focus of the paper is on predictability of dividend growth from dividend yields and we acknowledge that the dividend behavior model of Lintner (1956) does not provide guidance on predictability of returns from dividend yields. In particular, the model cannot be used to understand the joint dynamics of expected returns and expected dividend growth.

[6] The S&P earnings yield originates from Robert Shiller's website and the S&P Corporation.