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Predicting dividends in log-linear present value models ☆

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ABSTRACT

In a present value model, high dividend yields imply that either future dividend growth must be low, or future discount rates must be high, or both. While previous studies have largely focused on the predictability of future returns from dividend yields, dividend yields also strongly predict future dividends, and the predictability of dividend growth is much stronger than the predictability of returns at a one-year horizon. Inference from annual regressions over the 1927–2000 sample imputes over 85% of the variation of log dividend yields to variations in dividend growth. Point estimates of the predictability of both dividend growth and discount rates are stronger when the 1990–2000 decade is omitted.

1. Introduction

In a present value model, the market price-dividend ratio is the present value of future expected dividend growth, discounted at the required rate of return of the market. If the dividend yield, the inverse of the price-dividend ratio, is high, then future expected dividend growth must be low, or future discount rates must be high, or both. While there is a very large body of research focusing on the predictability of future returns by the dividend yield, the forecasting power of dividend yields for future dividend growth has been largely ignored. In fact, Cochrane's (2011) presidential address to the American Finance Association overlooks totally

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the predictive ability of the dividend yield to forecast future cashflows and concentrates entirely on the dividend yield's ability to forecast future returns.[1] In this paper, I highlight the evidence of predictability of dividend growth by the dividend yield, and estimate the relative importance of future dividends for explaining the variation of the dividend yield.

I begin by standard simple regressions of long-horizon dividend growth and long-horizon total returns (which include both capital gain and dividend income). To characterize the predictability of dividend growth and expected returns, I work with the log-linear dividend yield model of Campbell and Shiller (1988b). Although this setup only approximates the true non-linear dividend yield process, this approach maps the one-period regression coefficients directly to the variance decompositions.[2] However, since long-horizon regression coefficients can be very different from one-period regression coefficients, I also run weighted long-horizon regressions following Cochrane (1992) to compute variance decompositions. Here, future dividend growth or returns are geometrically downweighted by a constant, which is determined from the log-linear approximation.

In my analysis, I am careful to use robust t-statistics and account for small sample biases (see Nelson and Kim, 1993). Using a log-linear Vector Autoregression (VAR) as a data generating process, I show that Newey and West (1987) and robust Hansen and Hodrick (1980) t-statistics have large size distortions (see also Hodrick, 1992; and Ang and Bekaert, 2007). On the other hand, Hodrick (1992) t-statistics are well-behaved and have negligible size distortions. Simulating under the alternative hypothesis of dividend growth or return predictability by log dividend yields, I find that Hodrick (1992) t-statistics are also the most powerful among these three t-statistics. Whereas using Wald tests to determine the significance of variance decompositions produces severe small sample distortions, testing the variance decompositions from regression coefficients has much better small sample behavior. Further, if log dividend yields are used as predictive instruments rather than dividend yields in levels, the Stambaugh (1999) bias resulting from a correlated regressor variable is negligible.

The first striking result is that using data from 1927 to 2000 on the CRSP value-weighted market index, dividend growth is strongly predictable by log dividend yields. A 1% increase in the log dividend yield, lowers next year's forecast of future dividend growth by 0.13%. Dividend growth predictability is much stronger at short horizons (one-year) than at long horizons. In contrast, returns are not forecastable by log dividend yields at any horizon, unless the returns during the 1990s are excluded.

Second, if the 1990s are omitted, the evidence of both dividend growth predictability and return predictability becomes stronger.[3] From 1927 to 1990, the magnitude and significance of the predictability coefficient of dividend growth still dominates, by a factor of two, the predictability coefficient of returns at an annual horizon. Without the 1990s, dividend growth predictability is significant at longer horizons (up to four years) with data at a monthly frequency.

Third, using one-period regressions (restricted VARs) to infer the variance decomposition of dividend yields assigns over 85% of the variance of the log dividend yield to dividend growth over the full sample. This is because, at one-year horizons, the magnitude of the predictability coefficient of dividend growth is much larger than the predictability coefficient of returns. While it is hard to make any statistically significant statements about the variance decompositions using the asymptotic critical values from Wald tests, I can attribute a major portion of the variance of the log dividend yield to dividend growth, and this attribution is highly significant once I account for the size distortions of the small sample distributions.

Finally, inference from weighted long-horizon regressions to compute the variance decomposition is treacherous because of the serious size distortions induced by the use of overlapping data. Use of Newey and West (1987) or robust Hansen and Hodrick (1980) standard errors leads to incorrect inference that attributes most of the variation in log dividend yields to expected returns. With robust t-statistics, no

[1] For a partial list of the literature using dividend yields to predict returns, see Fama and French (1988), Campbell and Shiller (1988a), Cochrane (1992, 2011), Lettau and Ludvigson (2001), Lewellen (2004), Campbell and Yogo (2006), Ang and Bekaert (2007), Welch and Goyal (2008), Campbell and Thompson (2008), Lettau and Van Nieuwerburgh (2008), Chen (2009), Chen and Zhao (2009), and van Binsbergen and Koijen (2010).

[2] Campbell (1991), Campbell and Ammer (1993), Ammer and Mei (1996), Vuolteenaho (2002), and Chen and Zhao (2009), among others, use the Campbell and Shiller (1988b) log-linear model.

[3] Both Welch and Goyal (2008) and Ang and Bekaert (2007) document that when the 1990s are included in the sample period, dividend yields do not predict excess returns at any horizon. Authors who employ standard errors implied from nearly-integrated variables usually find weak or no evidence of predictability by dividend yields. See, for example, Valkanov (2003).