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Stock return, dividend growth and consumption growth predictability across markets and time: Implications for stock price movement

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ABSTRACT

This paper links variation in the predictive regressions for stock returns, dividend growth and consumption growth to economic and market factors. The nature of these links can reveal whether movement in asset prices occurs primarily through the discount rate or cash flow channel, while they also help explain the reported mixed results for predictability. Variation is examined through cross-sectional regressions across 15 markets and over time using rolling regressions. The cross-sectional and time-varying parameters are regressed against output growth, interest rates and inflation as well as market variables using fixed effects panel as well as both OLS and logit approaches. The key implication for asset pricing is that although movement occurs through both channels, stock return predictability is more dominated by the discount rate channel and consumption growth predictability more so by the cash flow channel. Intuitively, such a difference may arise as investors and households rebalance their asset holdings and consumption at different speeds. There is also some evidence of money illusion through the inflation variable.

1. Introduction

The ability of the dividend yield to predict stock returns, dividend growth and consumption growth lies at the heart of several asset pricing models. For example, the present value model of Campbell and Shiller (1988a, b) demonstrates that movement in the dividend yield arises from changes to expected returns (discount rates) or expected dividend growth. From this a debate has arisen about whether discount rates or cash flow are the key drivers (e.g., Ang, 2011; Cochrane, 2011). Empirically, the question concerns whether there is greater evidence of stock return or dividend growth predictability. For consumption growth, while the consumption-CAPM approach assumes such growth is unpredictable, the long-run risk model (Bansal & Yaron, 2004) argues that consumption growth is predictable and changes in expectations regarding future consumption are reflected through changes in the dividend yield. Consistent empirical evidence, however, for all such predictability is lacking. With respect to stock return predictability there is perhaps evidence for and against such predictability in equal measure. Dividend growth predictability had largely been ruled out but recent evidence has supported its existence. Consumption growth predictability is similarly mixed and particularly as it relates to the dividend yield and the long-run risk model.[1]

This paper examines the predictability of stock returns, dividend growth and consumption growth using the dividend yield with the aim of trying to explain why predictability appears to vary with markets and time. In doing so, we also seek to determine whether predictability is driven primarily by changes in discount rates or changes in cash flow. We believe that the mixed nature of the above results arises from both market- and, perhaps primarily, time-variation within the predictive ability of the dividend yield. Notably, this time-variation will include periods where the coefficients' signs will be wrong (and right) with respect to the theoretical prediction of the models as well as statistically significant and insignificant. Moreover, we believe that this variation is explicitly linked to both macroeconomic and market factors. In particular, underlying each of the predictive relationships are expectations regarding future economic performance. For example, Cochrane (2011) argues that the positive relationship between the dividend yield and stock returns arises as high current prices (low yield) predict low expected future returns due to lower macroeconomic risk and risk

[1] For a selection of studies relating to stock return, dividend growth and consumption growth predictability, see, for example, Campbell (2003), Bansal and Yaron (2004), Campbell and Yogo (2006), Ang and Bekaert (2007), Welch and Goyal (2008), Campbell and Thompson (2008), Chen (2009), Engsted and Pedersen (2010), Kellard, Nankervis, and Papadimitriou (2010), Park (2010), Ang, (2011), Cochrane (2008, 2011).

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premiums. Similarly, Bansal and Yaron (2004) argue for a negative relationship between consumption growth and the dividend yield as a high price (low yield) signals improved expected future economic performance and higher future consumption growth. Therefore, it would seem likely that variation in the predictive coefficient is linked to key macroeconomic variables, such as output growth, short term interest rates and inflation, as well as to the market variables of stock returns and dividend growth. Understanding these links will contribute to our knowledge of asset price movement as their nature will reveal whether predictability, and movements in asset prices, are driven primarily by expectations regarding future returns (discount rates) or cash flows.

Time-variation in the stock return and dividend growth predictive relationships has recently been considered in the empirical literature. Chen (2009) reports evidence that the dividend yield may predict either returns or dividend growth but across different time periods, a result also confirmed by McMillan and Wohar (2013) using a different econometric approach. Park (2010) demonstrates that in a sub-sample of US data that includes the 1990s, the predictive power of the dividend yield disappears. Park argues that this is related to non-stationary behaviour of the dividend yield over this period. Similar arguments for the possible disappearance of dividend yield predictability are made by Goyal and Welch (2003) and Campbell and Yogo (2006). Engsted and Pedersen (2010), employing long-term annual data for the US, Sweden, Denmark and the UK, report evidence of market- and time-variation in the strength of predictive power for returns and dividend growth. They report evidence of predictability for US long-horizon real returns, with the correct coefficient sign and for real dividend growth with the wrong sign. For Scandinavian markets they report evidence for dividend growth predictability but not for returns, while UK based results are mixed. Henkel, Martin, and Nardari (2011) argue that returns predictability occur only during economic contractions for the G7 markets but disappear during expansions. This, they argue, is related to not only time-variation within the predictor variables, but also, and perhaps of greater interest, counter-cyclical risk premiums (i.e., higher risk premiums during recessions). In a panel data setting, Hjalmarsson (2010) provides evidence in favour of predictability, notably from interest rate variables while time-variation is revealed through recursive regressions.

Related lines of literature that also consider time-variation in the predictive relationship include those focussing on non-linear models, where the strength of any predictive power varies across regimes of behaviour, and on structural breaks in the predictor variables. For example, Psaradakis, Sola, and Spagnolo (2004) use a Markov switching approach to examine regimes within an error-correction framework for US stock prices and dividends. McMillan and Wohar (2010) present evidence where a smooth-transition model is able to provide predictive power for stock market returns of the G7 using dividend yield data. Regarding structural breaks, evidence for predictability when accounting for such breaks is reported by Carlson, Pelz, and Wohar, (2002), Paye and Timmermann (2006) and Lettau and Van Nieuwerburgh (2008). Finally, while the above cited work focusses on non-linear models between stocks and the dividend yield only, Ghosh and Constantinides (2010) introduce a two-regime model where returns are forecastable in one regime and dividend and consumption growth forecastable in the second regime. However, the economic factors that drive the regimes are not specified.

This paper speaks to, and expands on, the above literature primarily by seeking to explain whether variation in predictability across both markets and time is linked to specific factors. Knowledge of such factors will help us to understand why predictability varies under different circumstances, which in turn will aid our ability to model asset price dynamics. Knowledge of such predictability will also aid in portfolio and risk management and market timing decisions. Therefore, we consider predictability for stock returns, dividend growth and consumption growth both across markets and time. The variation uncovered is then linked to macroeconomic and market variables. The nature of these links will reveal whether variations result from changes in discount rates or cash flows. As an aside, the paper also speaks to the non-linear body of work by considering those variables that might explain switching or regime-specific behaviour. Such switching models typically use a single threshold variable; here it is argued that several variables may be important in determining the variation. Moreover, the paper expands on, and contributes to, the recent literature, including the work of Hjalmarsson (2010) and McMillan and Wohar (2013) who consider panel regressions by explicitly linking the presence of variation in the predictive regressions to economic factors and thus providing evidence of the source of asset price movement, previous work to date has only identified time-variation.

2. Theoretical background

To examine the theoretical underpinnings for why the dividend yield has predictive power for stock returns, dividend growth and consumption growth we begin with the model of Campbell and Shiller (1988a, b). Log stock returns (r_t) are given by $r_t \equiv \log(P_t + D_t) - \log(P_{t-1})$, where P_t and D_t represent prices and dividends. The time-varying log return is a non-linear function of log prices and dividends for which Campbell and Shiller have provided the well-known approximation around a first-order Taylor expansion of the mean price–dividend ratio:

$$r_t \approx k + \rho p_t + (1-\rho d_t) - p_{t-1} \tag{1}$$

where k and ρ are linearisation parameters. Solving Eq. (1) forward, taking expectations and imposing the transversality condition, which rules out explosive behaviour, we can re-write Eq. (1) in terms of the log price–dividend (p_t–d_t) ratio[2]:

$$p_t - d_t = (k/1-\rho) + E_t \sum_{i=0}^{\infty} \rho^i \left(\Delta d_{t+i+1} - r_{t+i+1}\right). \tag{2}$$

Although this equation is obtained from an accounting identity, the relationship states intuitively, that the price–dividend ratio (dividend yield) will be low (high) if dividend growth is expected to be low or future returns are expected to be high. Equally, high current prices and a high ratio (low yield) will occur if dividends are expected to grow, or future returns are expected to be low. As noted, although this is an accounting relationship, the economic content of the equation is summed up by Cochrane (2010, p. 8, negative sign added):

$$p_t - d_t = ((-)\textit{expected return})_t + (\textit{expected dividend growth})_t + \textit{error}. \tag{3}$$

That is, movement in the price–dividend ratio arises from changes in expected returns (discount rates) or dividends growth. This then motivates the usual predictive regression, whereby the dividend–price ratio (dividend yield) is used to forecast returns and dividend growth as such:

$$x_{t+k} = \alpha + \beta(d_t - p_t) + \varepsilon_{t+k} \tag{4}$$

where x represents returns and dividend growth respectively and k represents the forecast horizon. Here it is expected that the estimated beta will be positive for the stock return equation and negative for the dividend growth equation. This states, for example, that a low dividend yield (high current price) can forecast future low returns or future high dividend growth. Indeed, which of these two factors are more

[2] The transversality condition, which rules out bubbles, is a theoretical construct to ensure the existence of a unique stock price. This is not to deny the potential presence of bubbles, which then becomes an empirical matter. A bubble component can be added to the stock price equation and this does not affect the analysis below. An interesting and relevant discussion in provided by Gurkaynak (2005).