The existence and source of stock return predictability: Evidence from dividend, output and consumption ratios

Angela J. Black
University of Aberdeen – Business School

Olga Klinkowska
University of Aberdeen – Business School

David G. McMillan
University of Stirling

Fiona Jayne McMillan
University of Saint Andrews

Abstract

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Key words: Stock returns, predictability, ratios, long-horizon.

JEL Classification: C22, G12

Corresponding author: Professor Angela J. Black, University of Aberdeen, Edward Wright Building, Aberdeen, U.K. AB24 3QY, Tel: +44(0) 1224-272167, Fax +44(0) 1224-282181.

E-mail addresses: angela.black@abdn.ac.uk, o.klinkowska@abdn.ac.uk, david.mcmillan@stir.ac.uk, fjm59@st-andrews.ac.uk

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Abstract

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1. Introduction

Predicting stock market returns is important for two broad reasons. First, at a simple level, the ability to predict returns would improve trading and asset allocation decisions. Second, the returns predictability equation helps us understand the dynamics of asset price movements and their causes. That is, the predictive regression and the asset pricing models that underlie the regression can allow us to elicit from them whether prices predominantly move due to changes in expected future cash flow (dividends) or changes in discount rates (risk premium). This has perhaps been argued most strongly by Cochrane (2008) and Cochrane (2011) who suggested that the evidence from predictive regressions supported the view that asset prices move according to changes in discount rates and not expected dividend growth. The evidence provided by Cochrane comes from United States (U.S.) data. This paper aims to contribute to the debate on both the existence and source of stock return predictability and thus the nature of asset price movement.

The line of research regarding returns predictability, while having an established history has yet to reach a conclusion on whether such predictability indeed exists. Dating back to Fama and French (1988), Campbell and Shiller (1988a) and Campbell and Shiller (1988b), evidence in favour of predictability has been provided by, amongst others, Campbell et al. (1997), Campbell and Shiller (2005), Campbell and Yogo (2006), Campbell and Thompson (2008), Kellard et al. (2010) and Henkel et al. (2011). However, several authors have argued against such predictability, in part due to econometric issues relating to persistence in the regressor or small sample bias. For example, see Nelson and Kim (1993), Wolf (2000), Lanne (2002), Goyal and Welch (2003), Valkanov (2003), Ang and Bekaert (2007) and Welch and Goyal (2008). The majority of this evidence is U.S. based, although it does include some international evidence.

One development of the above research is to examine whether the inclusion of key macroeconomic variables can improve the predictive regression. This approach would also help further our understanding of the links between financial markets and such key variables as output and consumption. Again, while this allows us to see whether returns forecasts can be made more accurate, it would also enhance our understanding of the sources of stock price dynamics. While some initial research in this direction includes Lettau and Ludvigson (2001), Julliard (2007) and Santos and Veronesi (2006), a simple approach that does not require estimating cointegrating relationships was introduced through the price-output ratio by Rangvid (2006). From a different perspective, albeit of equal relevance in this context, Menzly et al. (2004) included the stock price-consumption ratio in the predictive equation. This, they argue, helps disentangle the offsetting effects of time-varying expected dividend growth on the expected returns and dividend yield relationship. More specifically, they argue that whether the price-dividend or price-consumption ratio is more prominent in the predictive regression depends on the mean reverting properties of dividend growth, such that slower mean reversion results in a stronger role for the dividend yield.

In examining returns predictability, the flip-side of the relationship is dividend growth predictability (or output-growth predictability in the model of Rangvid (2006)). While it has been argued that evidence for such predictability is limited (e.g. Cochrane (2008)) more recent work has suggested that such predictability does indeed exist (Chen (2009), Engsted and Pedersen (2010), Rangvid and Schrimpf (2012), Ang (2012)). Furthermore, a related but distinct line of research examining consumption and stock markets has argued that dividend yields may have predictive power for future consumption growth. In particular, where dividend yields proxy for future expected economic performance, a low yield (high price) may indicate high expected future consumption growth (Campbell (2003), Bansal and Yaron (2004)).

This paper seeks to provide a greater range of international evidence on the above questions by considering the predictive power of the different ratios identified above for a number of markets. In particular, we will consider returns predictability that may arise from the dividend yield, price-output ratio and the consumption-price ratio. We will also consider the flip-side of dividend growth, output growth and consumption growth predictability. Finally, we will use the obtained results to consider the implications for asset pricing and the source of predictability.

2. Theoretical relationships between prices, dividends, output and consumption

The idea that key stock market variables, such as prices, dividends and dividend yields, are linked to key macroeconomic variables, such as consumption and output, both makes intuitive sense as stocks respond to (expected future) changes in economic conditions and has been extensively researched at both a theoretical and empirical level.

To examine the nature of any relationship between these variables, we begin with the log-linear present value model of Campbell and Shiller (1988a), where prices change according to changes in expected future dividends and the discount rate, thus the fundamental price is given by:

$$P_t = \sum_{i=1}^{\infty} \delta^i \mathbb{E}_t D_{t+i} \tag{1}$$

where $\delta = 1/(1+R)$ is the discount factor and R the discount rate. Log returns are given by $r \equiv \log(P_t + D_t) - \log(P_{t-1})$ and where the time-varying log return is a non-linear function of log prices and dividends, Campbell and Shiller have provided the well known approximation around a first-order Taylor expansion of the mean price-dividend ratio:

$$r_t \approx k + \rho p_t + (1 - \rho d_t) - p_{t-1} \tag{2}$$

where k and ρ are linearisation parameters. Solving equation (2) forward, taking expectations and imposing the transversality condition, which rules out explosive behaviour, we can rewrite equation (2) in terms of the log price-dividend ratio:

$$p_t - d_t = (k/1-\rho) + \mathbb{E}_t \sum_{i=0}^{\infty} \rho^i (\Delta d_{t+i+1} - r_{t+i+1}). \tag{3}$$

This connection states intuitively, that if dividends are expected to grow, then current prices will be higher and the ratio will be high, while if the future discount rate is expected to be high, then current prices will be low and the ratio will be low. Further, the log price-dividend ratio will be stationary provided that changes in dividends and the discount rate are stationary. This relationship has motivated the usual predictive regression, whereby the dividend-price ratio is used to forecast returns and dividend growth:

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

where k represents the forecast horizon and it is expected that the estimated beta will be positive. This equation implies that a low dividend yield can forecast future low returns due to either the expectation of low future discount rates or low dividend growth. Indeed, which of these two factors are more important (i.e. cash flow or discount rates) is a source of current debate (e.g. Cochrane (2008), Ang (2012)).

Rangvid (2006) used the above present value relationship to motivate replacing dividends with output in the predictive equation. Rangvid (2006) reported that the price-output relationship provided greater forecasting power than the price-dividend relationship. In particular, Rangvid argued that the non-stationary component of dividends arises from output, such that $d_t = y_t + \nu_t$ where y_t represents output and where ν_t is a zero-meaned stationary error term. Should this be the case, equation (3) can be rewritten as the price-output ratio:

$$p_t - y_t = (k/1-\rho) + \mathbb{E}_t \sum_{i=0}^{\infty} \rho^i (\Delta y_{t+i+1} - r_{t+i+1}) + \nu_t \tag{5}$$

This equation states that for higher prices relative to output, investors will expect either improved future economic performance or a lower discount rate (or both). As with the relationship between prices and dividends above, equation (5) also implies a cointegrating relationship between log prices and log output with a cointegrating vector of (1,-1).

Following the analysis in papers such as Lucas (1978), Mehra and Prescott (1985), Campbell (1986) and Abel (1999) we can link dividends to consumption whereby aggregate consumption is the dividend on wealth (approximated by equity in the former two papers) and where dividends equal aggregate consumption raised to a power (in the latter papers), as such and in logs:

$$d_t = \lambda c_t. \tag{6}$$

Furthermore, and in extending the long-run risks model of Bansal and Yaron (2004), Bansal et al. (2007) show that although consumption and dividends are separate stochastic processes they are linked by a cointegrating relationship as such:

$$d_t - c_t = \mu_{dc} + s_t \tag{7}$$

where μ_{dc} is a constant term and s_t is a stationary process, representing the error-correction term.

Further to this, Campbell (2003) presents a theoretical model linking consumption with the price-dividend ratio and argues that consumption can have an offsetting relationship whereby increases in future expected consumption growth increases expected future dividends, while it also increases expected future interest rates. More specifically, Campbell argues that where the price-dividend ratio embodies the rational forecasts of future dividend growth and stock returns, a positive relationship with consumption may arise through increased future dividends and prices, while a negative relationship may arise through increased future discount rates. This can be seen by linking equation (6) with the usual representative agent model (e.g.Lucas (1978), Breeden (1979), Grossman and Shiller (1981), Mehra and Prescott (1985)) with Epstein-Zin-Weil (Epstein and Zin (1991), Weil (1989)) utility. As such, the expected log return on equity (or any asset) is just a (asset-specific) constant plus the expected consumption growth divided by the elasticity of intertemporal substitution (ψ):

$$\mathbb{E}_{t-1} r_t = \mu + \left(\frac{1}{\psi} \mathbb{E}_{t-1} \Delta c_t \right). \tag{8}$$

Substituting equations (6) and (8) into equation (3) yields:

$$p_t - d_t = (k/1-\rho) + \left(\lambda - \frac{1}{\psi} \right) \mathbb{E}_t \sum_{i=0}^{\infty} \rho^i \Delta c_{t+i+1}. \tag{9}$$

Thus, expected future consumption has a positive effect on the price-dividend ratio through increases in expected future dividends, hence an increase in price, and a negative effect through increases in expected future discount rates. In their long-run risks model, Bansal and Yaron (2004) argue the relationship in equation (9) should be positive, as a higher price-dividend ratio is associated with improved future economic performance.

The above theoretical models describe the nature of the cointegrating relationship between prices and dividends, prices and output and consumption and dividends, as well as a relationship between consumption growth and the dividend yield. Furthermore, macroeconomic models (e.g. Friedman (1957)) describe a similar cointegrating relationship between output and consumption (see also, Cochrane (1994)). As such, we could also, therefore, expect a long-run relationship between prices and consumption (as well as other combinations not mentioned). Indeed, Menzly et al. (2004) include the price-consumption ratio in their predictive regression models for stock returns (they also note a cointegrating relationship between dividends and consumption). Specifically, they include this ratio in trying to improve the fit of the usual dividend yield predictability regression, the effectiveness of which, they argue, is masked by time variation in expected dividend growth rates that can offset the dividend yield returns relation.

With respect to empirical evidence regarding the above relationships, the price-dividend relation has been studied extensively. The presence of a predictive relationship for returns from the dividend yield dates back to Fama and French (1988) and Campbell and Shiller (1988a), Campbell and Shiller (1988b), and has since been a source of controversy. Campbell et al. (1997), Campbell and Shiller (2005), Campbell and Yogo (2006), Campbell and Thompson (2008), Cochrane (2008), Cochrane (2011), Kellard et al. (2010) and Henkel et al. (2011) have provided further supportive evidence. While several authors have argued against such predictability, due to econometric issues relating to persistence in the regressor or small sample bias (see for example, Nelson and Kim (1993), Wolf (2000), Lanne (2002), Valkanov (2003), Ang and Bekaert (2007), Welch and Goyal (2008)), more recently Chen (2009), Engsted and Pedersen (2010), Rangvid and Schrimpf (2012) and Ang (2012) have reported evidence in favour of dividend growth predictability.

With respect to the remaining relationships identified above, there has been less empirical assessment. Notwithstanding that, Rangvid (2006) reported that the price-output ratio performs better than the price-dividend ratio in predicting future returns and at least as well as the *cay* ratio (Lettau and Ludvigson (2001)) while being simpler in construction. In examining the relationship between the stock market variables and consumption, Bansal et al. (2007) support the finding of cointegration between dividends and consumption. In a different tack, Campbell (2003) for multiple countries, but on an individual basis, Bansal and Yaron (2004) and Beeler and Campbell (2012), both for the U.S., report only limited evidence that the dividend yield predicts consumption growth. Finally, Menzly et al. (2004) report empirical evidence supporting the use of the price/consumption ratio in the predictive regression for U.S. data. As can be seen, there is less empirical evidence examining both the relationship between, and the returns forecast ability of ratios comprising of, stock market and macroeconomic variables, for a recent example, see Constantinides and Ghosh (2011). These issues are thus considered below.

3. Data

We use data sampled quarterly for twenty nine markets and annually for seventeen markets. The quarterly stock price, dividend, dividend yield and Treasury bill rate data are from Thomson Reuters Datastream with quarterly gross domestic product and private consumption from the Organisation for Economic Cooperation and Development (OECD). The annual stock price data are from Morgan Stanley Capital International (MSCI) with macroeconomic data from the International Monetary Fund (IMF) and annual Treasury bill rates from the Dimson-Marsh-Staunton global returns data set

Summary statistics are presented in Tables 1 and 2. The quarterly data are from 1973 to 2010 for fifteen countries with the remaining fourteen having shorter sample periods. The unbalanced start dates are retained in order to maximise the amount of data available. All series have a positive mean over the sample period with stock returns showing the greatest volatility as measured by the standard deviation. In contrast, the two macroeconomic series are noticeably more stable than the stock market series. Excepting Ireland and New Zealand, annual stock market data (Table 2) are available for all countries between 1970 and 2010. For some countries, gross domestic product and private consumption are available for a shorter time period. Again, we retain the unbalanced start dates to maximise the data set. Annual mean stock market total rates of return range from 2.5 percent for Ireland to 14.1 percent for Sweden with a standard deviation ranging between 16.7 percent (for Canada) and 36 percent (for Ireland). As expected, the macroeconomic data are less volatile than the stock market data.

[*Insert Tables 1 and 2 about here*]

4. Predicting stock returns

As noted in section 2 each of the variables, dividends, output and consumption as a ratio with prices are argued to have predictive power for stock returns. In this section we re-consider that predictive power for twenty-nine markets (sampled quarterly) and seventeen markets (sampled annually).

4.1. Dividend yield

As noted above, there is an extensive body of work examining the predictive power of the dividend yield for stock returns. This lineage of research breaks down into several strands, including those who argue for predictability (e.g. Cochrane (2008)), those who argue that econometric problems mean the finding of predictability maybe spurious (e.g. Ang and Bekaert (2007)) and those who argue such predictability is just not present (e.g. Goyal and Welch (2003)). The citations here and in the introduction are just the tip of an expanding debate, which remains unresolved. For example, some recent work has argued that greater evidence for predictability is found when allowing for non-linear dynamics, as the strength of the predictive relationship varies across regimes (e.g. Psaradakis et al. (2004), Rapach and Wohar (2005), McMillan and Wohar (2010)).

Table 3 presents the usual predictive regression for the twenty-nine quarterly markets in our sample, as such:

$$r_t = \alpha + \beta dy_{t-1} + \varepsilon_t \tag{10}$$

where r_t is the log stock market return and dy_{t-1} is the log dividend yield. The results for the individual markets using quarterly data are not convincing in terms of favourable predictive power. Of the twenty-nine markets considered, statistically significant t-values are reported for only six markets at the 5 percent significance level (Australia, Czech Republic, Indonesia, Mexico, Turkey and the U.K.) with a further one market (Norway) significant at the 10% significance level.

[*Table 3 about here*]

However, the evidence supporting predictability for individual markets using annual data, presented in Table 4, is more compelling. For the seventeen countries analysed, there are statistically significant t-values at the 5 percent level for eight markets (Australia, Belgium, Denmark, Japan, Netherlands, Norway, U.K. and the U.S.) and three markets at the 10 percent level (Canada, New Zealand and Spain). Nevertheless, this means that there are also six markets that do not display any evidence of return predictability.

[*Table 4 about here*]

These results, although mixed in terms of significance, are not unusual in the context of the predictive model literature. In particular, past research has argued that predictive power is time-varying (e.g. Campbell and Yogo (2006), Park (2010)) and hence the finding (or not) of predictability depends upon the sample analysed. Equally, others have argued that small samples inherent in this type of data may lead to the non-finding of predictability (e.g. Nelson and Kim (1993)).

This latter argument motivates the use of panel estimation techniques, which increases the degrees of freedom and hence statistical accuracy. Panel methods were considered by Nagayasu (2007), who tested dividend yield stationarity for eleven markets, Hjalmarsson (2010), who examined predictability for forty markets using both equity yield and interest rate measures and McMillan and Wohar (2010), who reported time-varying returns and dividend growth predictability for eight markets. Therefore, we consider the following panel regression model:

$$r_{i,t} = \alpha + \beta dy_{i,t-1} + \theta_i + \gamma_t + \varepsilon_{i,t} \tag{11}$$

where i indexes the market and the terms θ_i and γ_t refer to the cross-section and period-specific fixed effects. Such fixed effects effectively estimate the cross-sectional and period-specific means.

We estimate equation 11 first with cross-sectional fixed effects only, as in Hjalmarsson (2010) and, second, including both cross-sectional and period fixed effects, as in McMillan and Wohar (2012). In particular, the fixed effects allow each market in the panel to have a different constant term (and in a two-way fixed effects model, to allow that constant to vary over time), as the assumption of a common intercept is hard to defend across this wide range of markets. Equally, in the panel regression the beta slope term is common for all markets; however, the claim here is not that beta is indeed common to all markets, but that it represents the average response and the increase in the degrees of freedom allows for more accurate inference.

The panel regressions are included in the last rows of Tables 3 and 4 (for quarterly and annual data respectively). The estimates support dividend yield predictability for data sampled at both frequencies, with relatively strong significance (the high adjusted R-squared in the two-way fixed effects model largely arises from capturing time-varying movement in the constant).

The net effect from the above results is that evidence in favour of dividend yield predictability for individual stock market returns is not overwhelming. As noted in the literature, this may be due to small sample sizes and the panel regression, which overcomes that problem, is more supportive. However, the absence of greater evidence for predictive power at the individual market level may arise because it is not present in the relevant samples of data.

4.2. Price-output ratio

Rangvid (2006) argued that the price-output ratio provides greater predictive power for returns than the dividend yield. This finding is based on evidence from annual U.S. data over the period 1929 to 2003 and the G7 countries over a shorter time period extending from the 1960s to 2003 (the exact start date differs between markets). Thus, in addition to making a contribution to our understanding of the relationship between prices and output and its implications for modelling time-varying risk premium, this section will serve as a robustness check on the results of Rangvid over a different sample period. Furthermore, this updated sample period includes turbulent market conditions, a greater number of markets and a different sampling frequency.

Tables 5 and 6 (for quarterly and annual data respectively) thus provide the key estimates of:

$$r_t = \alpha + \beta py_{t-1} + \varepsilon_t \tag{12}$$

where py_t is the price-output ratio of Rangvid (2006), although note for consistency purposes with the dividend-price ratio we estimate this as an output-price ratio, yp_t. The results of this predictive regression are similar to the findings for the dividend yield in terms of significance. Of the twenty-nine markets considered (with quarterly sampled data), there is only evidence of statistical significance at the 5 percent level for four markets (Greece, Korea, New Zealand and Poland), with weaker 10 percent statistical evidence for a further four markets (Luxembourg, Mexico, Sweden and Turkey). These results contrast with the greater significance found in Rangvid (2006). However, the results using annual data, reported in Table 6, are more supportive of predictability at the individual market level (eleven out of sixteen markets are statistically significant at the 5 percent level).

We also consider panel estimation through both fixed effects and two-way fixed effects, with the results presented in Tables 5 and 6, respectively. These panel results support a significant and positive relationship between returns and the output-price ratio using both quarterly and annual data, whereby a higher level of output relative to stock price (lower stock price) predicts higher future returns. Again, the two-way fixed effects model provides a stronger result in terms of adjusted R-squared.

[*Tables 5 and 6 about here*]

4.3. Price-consumption ratio

Menzly et al. (2004) presented a model linking consumption and stock prices and included the price-consumption ratio in their predictive regression models for stock returns (see also Bansal et al. (2007) for a discussion on a cointegrating relationship between consumption and dividends). Within the predictive regression, Menzly et al. (2004) argue that including the price-consumption ratio together with the dividend yield, improves the model fit. They argue that the effectiveness of the usual dividend yield predictability regression is obscured by time-variation in expected dividend growth, which offsets the dividend yield predictability and that including the price-consumption ratio helps disentangle these two offsetting effects. Specifically, they argue that whether the price-dividend or price-consumption ratio is more prominent in the predictive regression depends on the mean reverting properties of dividend growth, such that slower mean reversion results in a stronger role for the dividend yield. Thus, we estimate the following predictive regression:

$$r_t = \alpha + \beta dy_{t-1} + \delta cp_{t-1} + \varepsilon_t \tag{13}$$

where cp_t is the log consumption-price ratio.

The results from equation 13 are presented in Tables 7 and 8. For the quarterly data (Table 7) the dividend yield coefficient is significant for four markets at the 5 percent level (Indonesia, Turkey, the U.K. and U.S.), which is less than the dividend yield only predictive regression (where six markets were significant, reported in Table 3). With respect to the consumption-price ratio, this is statistically significant for two markets at the 5 percent level (New Zealand and Poland) with a further two markets significant at the 10 percent level (the U.K. and the U.S.).

The results for the U.K. and U.S. are similar to the one-year horizon results of Menzly et al. (2004) with a positive coefficient on the dividend yield and a negative coefficient on the consumption-price ratio, although they reported statistically non-significant results. A further comment for the U.K. and U.S., is that the dividend yield regressor is both larger in magnitude and statistically stronger, supporting the view that this ratio is the stronger predictor. However, these results do not appear to generalise to other markets.

[*Insert Table 7 about here*]

We find greater evidence that the consumption-price ratio has predictive power over the sample period with annual data, as reported in Table 8. Eight of the eleven markets analysed have significant coefficients for the consumption-price ratio with the dividend yield and the consumption-price ratio being significant together for the U.K. We note that the dividend yield is not significant for the U.S., unlike the results presented in Table 4, whereas the consumption-price ratio is significant.

Panel based results provide support for both the dividend yield and the consumption-price ratio where both coefficients are significantly positive with the magnitude of the dividend yield coefficient being larger. These findings hold for both quarterly and annual data. The significance of both coefficients supports the view that return predictability arises from both time-variation in expected returns as well as time-variation in dividend growth.

[*Insert Table 8 about here*]

Overall, the above results using the dividend yield, the price-output ratio and the consumption-price ratio present relatively mixed individual market results in terms of stock return predictability with stronger evidence in support of predictability when observing annual returns and the panel estimates.

5. Predicting dividend growth, output growth and consumption growth

As noted in the introduction, there is a growing literature that examines predictability on the other side of the returns predictability equation. For instance, with respect to the dividend yield predictive equation, the issue has arisen as to whether dividend growth is predictable. Equally, in the model of Rangvid (2006), whether the price-output ratio has predictive power for output growth. Typically, it has been argued that the evidence of such predictability is limited (Campbell et al. (1997), Cochrane (2008)). However, more recent work has questioned this absence of predictability. In particular, Chen (2009), Engsted and Pedersen (2010), Ang (2012), and McMillan and Wohar (2012) have all provided evidence in favour of dividend growth predictability. As such, this section reconsiders evidence for both dividend growth predictability and output growth predictability.

Furthermore, a related (but distinct) line of research has examined the nature of a relationship between consumption and the dividend yield. In particular, by arguing that dividend yields may have predictive power for future consumption growth whereby they are linked through future expected economic performance. However, the exact nature of the relationship is debated. Campbell (2003) argues that where the dividend yield embodies the rational forecasts of future dividend growth and stock returns, a negative relationship with consumption may arise through increased future dividends and prices, while a positive relationship may arise through increased future discount rates.

Table 9 presents the results of the dividend growth predictive regressions using quarterly data, that is equation 10, but where stock returns are replaced on the left-hand side by dividend growth. The results here contrast substantially with those for the stock returns reported in Table 3. With regard to stock returns, six markets were significant at the 5 percent level, with a further one market significant at the 10 percent level, here eighteen markets are statistically significant at the 5 percent level, with a further market significant at the 10 percent level. Furthermore, for all markets, except the U.K. and the U.S., the coefficients are of the correct sign, while coefficient magnitudes are on the whole reasonable, supporting economic significance in the regression. Panel results also provide strong support for dividend growth predictability with statistically significant negative coefficients.

[*Table 9 about here*]

In contrast, the results using annual data, as reported in Table 10 show little evidence of predictability for dividend growth. One market, Italy, is significant at the 5 percent level and two markets (Netherlands and the U.K.) are significant at the 10 percent level. Likewise, the panel estimation presents inconclusive results with respect to dividend growth predictability. The coefficient is not significant when the model is estimated using cross section fixed effects. However, the two way fixed effects model is significant and suggests there is time variation in the predictability of dividend growth. The differences between the quarterly and annual results could be due to seasonal effects in dividends, therefore it is useful to compare different frequencies.

[*Table 10 about here*]

Table 11 presents the results for the output growth predictive regression. That is, running equation 12 but replacing stock returns on the left-hand side with output growth. Across the twenty-nine quarterly sampled markets, the predictive coefficient is statistically significant at the 5 percent level for three markets (Finland, Italy and Switzerland), with a further two markets (Ireland and New Zealand) significant at the 10 percent level. The significance level for the U.K. is slightly weaker than 10 percent. Thus, these results are not supportive of the price-output ratio in predicting either stock returns or output growth for a wide range of markets. The results for the panel regressions are more supportive, having the correct sign and being statistically significant, and thus may suggest that the increase in degrees of freedom compared to the individual markets leads to an improved fit. But equally, of course, the panel approach can mask the cross-sectional variation for the individual markets.

The results using annual data, reported in Table 12, are more supportive of output-price predictability, with seven markets showing statistical significance at the 5 percent level with one additional market (the U.S.) significant at the 10 percent level. The panel regression results also support predictability (noting that, like the quarterly sampled markets, the two way fixed effects has a negative coefficient).

[*Insert Tables 11 and 12 about here*]

Finally, in this section, Tables 13 and 14 report the results from regressing the change in logged private consumption on the previous value for the dividend yield. As noted above, Campbell (2003) argues that where the dividend yield embodies rational forecasts of future dividend growth and stock returns, a negative relationship with consumption may arise through increased future dividends and prices, while a positive relationship may arise through increased future discount rates. However, Bansal and Yaron (2004) argue the relationship should be negative because a lower dividend yield (higher price) is associated with improved future economic performance and hence higher expected future consumption growth. Using the twenty-nine markets sampled quarterly only three report a positive coefficient and for all of these markets (Indonesia, Norway and Turkey) the coefficient is statistically non-significant, even allowing up to the 10 percent level. For eleven of the twenty-six markets that report a negative coefficient that coefficient is significant at the 5 percent level, while for a further five markets, the coefficient is significant at around the 10 percent level. Thus, for ten markets, the negative coefficient is non-significant.

[*Insert Table 13 about here*]

The findings for annual data offer an interesting comparison. Five markets demonstrate a significant and positive coefficient for the dividend yield (Canada, France, Switzerland, U.K. and U.S.) although the two way fixed effect panel estimation supports a negative relationship. Overall, therefore, the results would generally suggest that at the shorter horizon (quarterly) there appears a negative relationship between consumption growth and the dividend yield and as such, a low yield (high price) is consistent with increased future consumption growth, in accordance with the view that the low yield is associated with improved expectations about future economic performance. However, the longer horizon (annual data) suggests a positive relationship perhaps because future discount rates have a greater impact on the longer term view. This motivates greater analysis of the variables from a long horizon perspective.

[*Insert Table 14 about here*]

Overall, the results in this section highlight the nature of some of the linkages between stock prices, dividends and macroeconomic data. In particular, while the previous section sought to examine whether these variables could predict stock returns, what we see in this section is that there is greater evidence for the ratio between prices and dividends or output to predict dividend, output and consumption growth. This, therefore, supports the belief that there is a long-run relationship between these variables but that it should not just be looked at in terms of predicting stock returns.

6. Long-run horizon

The above results are all based on one-step ahead predictability, however, even these results suggest differences in horizon, with greater evidence of stock return predictability obtained using the annual data. Further to this, Cochrane (2011) argues that long-horizon regressions reveal the nature of price movements and importantly their source, i.e., expected cash flow or risk. To investigate the source of predictability at the long horizon we again refer to the methodological approach of Campbell and Shiller (1988b) following the operational outline adopted in Cochrane (2011). We report the results using the annual data as previously described. Recalling the Campbell and Shiller (1988a) approximate present value identity:

$$dy_t \approx \sum_{j=1}^{k} \rho^{j-1} r_{t+j} - \sum_{j=1}^{k} \rho^{j-1} \Delta d_{t+j} + \rho^k dy_{t+k} \tag{14}$$

where dy denotes the dividend yield, Δd denotes dividend growth and $\rho \approx 0.96$ is a constant of approximation the following expressions describe regressions of weighted long-run returns and dividend growth on dividend yields:

$$\sum_{j=1}^{k} \rho^{j-1} r_{t+j} = \alpha_0 + \beta^{(k)} dy_t + \varepsilon^0_{t+k} \tag{15}$$

$$\sum_{j=1}^{k} \rho^{j-1} \Delta d_{t+j} = \alpha_1 + \delta^{(k)} dy_t + \varepsilon^1_{t+k} \tag{16}$$

$$dy_{t+k} = \alpha_2 + \gamma^{(k)} dy_t + \varepsilon^2_{t+k} \tag{17}$$

The present value identity, equation 14, implies that the long run coefficients sum to one:

$$1 \approx \beta^{(k)} - \delta^{(k)} + \rho^k \gamma^{(k)} \tag{18}$$

Table 15 shows long run regression coefficients, for example, $\beta^{(k)}$ in $\sum_{j=1}^{k} \rho^{j-1} r_{t+j} = \alpha_0 + \beta^{(k)} dy_t + \varepsilon^{r}_{t+k}$ using direct regression estimates calculated for 15-year ex post return, dividend growth and dividend yields as left hand variables.

The results for the U.S. are very similar to the estimates reported in Cochrane (2011). The long run return coefficient, β, is near one, the dividend growth forecasts are small and statistically non-significant, while the 15 year dividend yield forecast is also small and non-significant. This can be compared to the U.K. where both the dividend yield and dividend growth are statistically significant with the coefficient on dividend growth being positive (rather than negative which is hypothesised). Other countries with this feature are Japan and the Netherlands. However, with the exception of Switzerland and Ireland every market demonstrates that dividend yields predict long horizon returns, and for dividend growth seven markets report a 5 percent statistically significant negative coefficient, as do the panel regressions.

While not reported, we found similar findings using the quarterly data for a five year long horizon return (the results are available upon request). This can be compared to the evidence for predicting annual returns where we reported eight markets that were significant at the 5 percent level (table 4) and one significant coefficient for the dividend yield in predicting dividend growth (table 10). Overall, therefore, these results suggest strong support for dividend growth predictability at the long horizon, although we note that there are fewer markets indicating dividend growth predictability than stock return predictability.

[*Insert Table 15 about here*]

We adopt a similar methodological approach replacing the dividend yield with the output-price and consumption-price ratios, where these results are reported in tables 16 and 17, respectively. Fourteen markets demonstrate 15 year long horizon return predictability using the output-price ratio at the 5 percent level of significance, while the panel estimates indicate that the coefficient on the output-price ratio for predicting output growth is both negative and significant (this result does not generalise, on an individual basis, to all markets but is evident for Australia, Canada, Norway, and Spain). The consumption-price ratio predicts 15 year long horizon returns for nine markets (including the U.S.) and consumption growth for seven markets at the 5 percent level of significance (with six of these markets showing a negative coefficient). Once more, the panel estimates support predictability of returns and consumption growth using the consumption-price ratio.

[*Insert Tables 16 and 17 about here*]

7. Discussion

In this paper we have attempted to address the two broad issues surrounding stock return predictability. The first questions whether such predictability exists. For example, Welch and Goyal (2008) argue that returns are not predictable, while Kellard et al. (2010), using the same methodological approach provide evidence that they are predictable. The second question considers the possible sources of predictability. Here, in particular, Cochrane (2008) has argued that changes in expected returns (risk appetite) is the main driver for predictability, while others have argued in favour of a role for cash flow and that cash flows are predictable (for example, Ang (2012)). Our results add to the discussion with respect to both questions. With regard to whether stock return predictability exists, the answer from the usual ratios is that evidence of such predictability is mixed. Across the dividend yield, price-output ratio and consumption-price ratio only approximately one-third of markets exhibit significant predictability on at least one measure. In contrast, there is substantial evidence of dividend growth predictability for the quarterly horizon data. However, there was less evidence with the annual data but stronger support using 15 year long horizon data. Equally, there is evidence of significant consumption growth predictability arising from stock market behaviour. Thus, we can accept that returns predictability exists; however, it is still far from ubiquitous across markets. Furthermore, there is still greater evidence of predictability in both dividend and consumption growth.

With regard to the second issue, perhaps Cochrane (2008), and Cochrane (2011), have argued most forcibly against the traditional view of cash flow being the source of predictability, and in favour of variation in risk appetite and expected returns. To provide evidence in support of this view, we would expect to see dividend yields predicting returns but not dividend growth. As noted above, the results here provide evidence in favour of dividend growth predictability compared to returns predictability, but nonetheless, support both. However, to consider this issue in greater depth we follow Cochrane (2008), Cochrane (2011), Ang (2012) and Menzly et al. (2004) by considering longer horizon regressions. Cochrane has argued that any predictability for dividend growth disappears over a longer horizon, while Ang has suggested the opposite. Menzly et al. (2004) argue that in the context of their regression, greater evidence for cash flow as the main source of predictability will arise if the consumption-price ratio exhibits a stronger relationship with future returns.

The reported results from the long horizon returns demonstrate that there is significant evidence of stock return predictability arising from both cash flow and time-varying discount rates. In terms of the literature, Cochrane (2008), and Cochrane (2011) has argued that stock return predictability arises primarily from changes in risk appetites. Our results here do provide support for this view as it relates to the U.S. analysis presented in Cochrane (2011) using U.S. data and the tests here for the U.S. show that the dividend yield only predicts returns and not dividend growth. However, once we expand this to international markets, our results provide support for Ang (2012) that cash flow predictability remains. In determining the source of returns predictability, the results here suggest that both elements of the Campbell-Shiller model, time-varying discount rates and cash flow growth, are important.

8. Summary and conclusion

This paper seeks to examine the degree of predictability for stock returns that arise from several variables that are used to construct ratios, and are believed to exhibit a long-run relationship, with prices. In particular, a debate has arisen regarding whether these ratios provide predictive power, which ratios provide greater predictive power and the source of such predictability. Using dividend, output and consumption data from twenty nine markets with quarterly data and seventeen markets with annual data (sourced from different organisations) this paper contributes to the literature by considering the ratio of each of these variables with prices. Furthermore, by considering both long-horizon and cash flow related predictability, we can comment on whether predictability arises through changes in risk or cash-flows.

The results here suggest that on the basis of dividend-, output- and consumption-price ratios there is mixed predictive power for returns. However, evidence of predictability is increased through two further exercises. First, using panel regressions and second, through long-horizon regressions. In addition to returns predictability, we also consider dividend, output and consumption growth predictability and notably find evidence for both dividend and consumption growth. Furthermore, the use of long-horizon regressions allows us to comment on the source of predictability. Indeed, a recent debate has developed as to whether returns predictability arises from time-varying risk or cash flow. Our results suggest that while the dominant source may be time-varying risk, both are important.

The implications and contribution of this paper can be summarised as thus. First, with respect to the debate regarding the presence of returns predictability, the evidence here suggests that while it may be inconclusive when looking at a ratio with dividend, output or consumption, as a system there is substantial evidence of predictability. Second, with regard to the growing debate on cash flow predictability, the results here provide evidence for dividend growth predictability. There is also evidence of consumption growth predictability arising from expectations of future economic performance. Third, and finally, regarding the debate concerning the source of returns predictability, the results here suggest that both time-varying risk and cash flow are important factors, although perhaps more so from the former.

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Table 1: This table shows the sample mean and the standard deviation for quarterly sampled data, including: total rates of return denoted as r where $r_t \equiv \log(1 + R_t)$ and R_t is the net return; dividend growth, denoted by Δd_t, where d_t are logged dividends paid between $t-1$ and t; output growth, which is Δy_t, where y_t is logged gross domestic product; and consumption growth, Δc_t, where c_t is logged private consumption. These data are collected from Thomson Reuters Datastream and the Organisation for Economic Co-operation and Development.

		r_t		Δd_t		Δy_t		Δc_t	
	Sample	Mean	S.D.	Mean	S.D.	Mean	S.D.	Mean	S.D.
Australia	73:1-10:12	0.019	0.108	0.021	0.046	0.008	0.010	0.008	0.008
Austria	73:1-10:12	0.015	0.126	0.016	0.102	0.006	0.009	0.005	0.013
Belgium	73:1-10:12	0.013	0.103	0.015	0.097	0.005	0.008	0.005	0.005
Canada	73:1-10:12	0.018	0.093	0.015	0.048	0.007	0.008	0.007	0.008
Czech Republic	95:1-10:12	0.022	0.143	0.047	0.251	0.007	0.010	0.007	0.010
Denmark	73:1-10:12	0.024	0.107	0.020	0.096	0.004	0.012	0.004	0.019
Finland	88:2-10:12	0.017	0.184	0.022	0.150	0.005	0.013	0.005	0.009
France	73:1-10:12	0.018	0.109	0.020	0.061	0.005	0.005	0.006	0.006
Germany	73:1-10:12	0.013	0.094	0.011	0.054	0.005	0.010	0.004	0.010
Greece	90:1-10:12	0.015	0.181	0.028	0.137	0.005	0.020	0.006	0.013
Indonesia	90:2-10:12	0.019	0.171	0.050	0.228	0.012	0.019	0.013	0.037
Ireland	73:1-10:12	0.017	0.133	0.014	0.091	0.011	0.015	0.008	0.014
Italy	73:1-10:12	0.018	0.128	0.022	0.093	0.005	0.009	0.005	0.008
Japan	73:1-10:12	0.007	0.095	0.007	0.035	0.006	0.011	0.006	0.011
Korea	88:1-10:12	0.018	0.168	0.011	0.165	0.014	0.016	0.013	0.020
Luxemburg	92:1-10:12	0.022	0.113	0.017	0.134	0.010	0.018	0.007	0.013
Mexico	89:2-10:12	0.053	0.143	0.038	0.168	0.007	0.015	0.007	0.020
Netherlands	73:1-10:12	0.014	0.102	0.011	0.050	0.006	0.012	0.005	0.010
New Zealand	88:1-10:12	0.010	0.085	0.005	0.092	0.006	0.010	0.006	0.017
Norway	80:1-10:12	0.023	0.149	0.024	0.133	0.006	0.013	0.006	0.013
Poland	95:1-10:12	0.026	0.153	0.043	0.242	0.011	0.011	0.011	0.012
Portugal	90:1-10:12	0.007	0.108	0.017	0.104	0.005	0.009	0.00	0.008
South Africa	73:1-10:12	0.034	0.120	0.034	0.066	0.006	0.009	0.008	0.013
Spain	87:1-10:12	0.014	0.112	0.022	0.060	0.007	0.008	0.007	0.007
Sweden	82:1-10:12	0.030	0.130	0.030	0.106	0.060	0.011	0.005	0.010
Switzerland	73:1-10:12	0.014	0.087	0.017	0.057	0.004	0.008	0.003	0.005
Turkey	89:3-10:12	0.103	0.247	0.082	0.217	0.010	0.027	0.011	0.030
UK	73:1-10:12	0.020	0.106	0.018	0.035	0.005	0.009	0.006	0.011
US	73:1-10:12	0.017	0.088	0.014	0.022	0.007	0.008	0.007	0.007

Table 2: This table shows the sample mean and the standard deviation for annual sampled data, including: total rates of return denoted as r where $r_t \equiv \log(1 + R_t)$ and R_t is the net return; dividend growth, denoted by Δd_t, where d_t are logged dividends paid between $t - 1$ and t; output growth, which is Δy_t, where y_t is logged gross domestic product; and consumption growth, Δc_t, where c_t is logged private consumption. These data are collected from Morgan Stanley Capital International and the International Monetary Fund. The data for private consumption for the Netherlands is from 1978-2010. There are no entries where data were unavailable.

Annual Sample		r_t		Δd_t		Δy_t		Δc_t	
	Sample	Mean	S.D.	Mean	S.D.	Mean	S.D.	Mean	S.D.
Australia	1970-2010	0.096	0.221	0.077	0.193	0.094	0.043	0.094	0.043
Belgium	1970-2010	0.095	0.270	0.026	0.222	0.064	0.036	-	-
Canada	1970-2010	0.099	0.167	0.059	0.143	0.075	0.046	0.075	0.038
Denmark	1970-2010	0.119	0.275	0.048	0.257	0.071	0.043	-	-
France	1970-2010	0.096	0.247	0.065	0.202	0.074	0.050	0.072	0.049
Germany	1970-2010	0.074	0.255	0.049	0.274	0.053	0.041	0.042	0.097
Italy	1970-2010	0.078	0.281	0.061	0.267	0.107	0.081	0.103	0.075
Ireland	1988-2010	0.025	0.360	-0.007	0.287	-	-	-	-
Japan	1970-2010	0.057	0.251	0.024	0.187	0.053	0.061	0.055	0.061
Netherlands	1970-2010	0.099	0.225	0.044	0.159	0.062	0.037	0.024	0.099
New Zealand	1988-2010	0.045	0.216	-0.005	0.207	0.093	0.061	-	-
Norway	1970-2010	0.108	0.337	0.082	0.279	0.093	0.058	-	-
Spain	1970-2010	0.105	0.247	0.069	0.187	0.112	0.060	0.109	0.064
Sweden	1970-2010	0.141	0.273	0.105	0.262	0.079	0.044	-	-
Switzerland	1970-2010	0.075	0.221	0.061	0.228	0.048	0.039	0.046	0.032
U.K.	1970-2010	0.111	0.244	0.067	0.173	0.088	0.053	0.090	0.049
U.S.	1970-2010	0.092	0.179	0.040	0.219	0.068	0.031	0.071	0.028

Table 3: Return - Dividend yield predictive coefficients using quarterly data. Entries are the predictive coefficient, β, accompanying Newey-West t-statistic (absolute value) and adjusted R^2 from the regression given below, where r_t is the log stock market total rate of return and dy_t is the log dividend yield. In the cross section fixed effects model and a two-way (cross-section and period) fixed effects model, given below, the terms θ_i and γ_t refer to the cross-section and period-specific fixed effects, which estimate the cross-sectional and period-specific means. In the panel estimation there are 29 cross-sections and 3491 observations.

Single market regressions: $r_t = \alpha + \beta dy_{t-1} + \varepsilon_t$

	β	t-stat	$\overline{R}^2$		β	t-stat	$\overline{R}^2$
Australia	0.096	(2.39)	0.01	Luxemburg	0.050	(1.05)	0.03
Austria	0.018	(0.53)	0.00	Mexico	0.103	(3.33)	0.02
Belgium	0.012	(0.57)	0.00	Netherlands	0.014	(0.65)	0.00
Canada	0.015	(0.64)	0.00	New Zealand	0.008	(0.18)	0.09
Czech Republic	0.075	(2.42)	0.00	Norway	0.071	(1.66)	0.00
Denmark	0.018	(0.81)	0.00	Poland	0.071	(1.54)	0.11
Finland	-0.027	(-0.56)	0.00	Portugal	0.008	(0.14)	0.01
France	0.039	(1.33)	0.00	South Africa	0.035	(1.40)	0.00
Germany	-0.001	(-0.02)	0.00	Spain	0.025	(0.87)	0.01
Greece	0.012	(0.25)	0.04	Sweden	0.049	(0.96)	0.02
Indonesia	0.085	(3.47)	0.01	Switzerland	-0.005	(-0.23)	0.00
Ireland	0.030	(1.48)	0.00	Turkey	0.118	(2.65)	0.02
Italy	-0.007	(-0.23)	0.01	U.K.	0.095	(2.45)	0.00
Japan	0.014	(0.90)	0.01	U.S.	0.020	(1.41)	0.00
Korea	0.079	(1.12)	0.04				

Panel regressions: $r_{i,t} = \alpha + \beta dy_{i,t-1} + \theta_i + \gamma_t + \varepsilon_{i,t}$

	β	t-stat	$\overline{R}^2$		β	t-stat	$\overline{R}^2$
Fixed effects	0.038	(7.36)	0.03	Two way fixed effects	0.045	(8.86)	0.50

Table 4: Return - Dividend yield predictive coefficients using annual data. Entries are the predictive coefficient, β, accompanying Newey-West t-statistic (absolute value) and adjusted R^2 from the regression given below, where r_t is the log stock market total rate of return and dy_t is the log dividend yield. In the cross section fixed effects model and a two-way (cross-section and period) fixed effects model, given below, the terms θ_i and γ_t refer to the cross-section and period-specific fixed effects, which estimate the cross-sectional and period-specific means. In the panel estimation there are 17 cross-sections and 644 observations.

Single market regressions: $r_t = \alpha + \beta dy_{t-1} + \varepsilon_t$

	β	t-stat	$\overline{R}^2$		β	t-stat	$\overline{R}^2$
Australia	0.460	(3.91)	0.21	Netherlands	0.189	(2.02)	0.08
Belgium	0.216	(2.35)	0.07	Norway	0.303	(2.92)	0.09
Canada	0.108	(1.85)	0.03	New Zealand	0.240	(1.77)	0.00
Denmark	0.121	(2.02)	0.04	Spain	0.105	(1.88)	0.04
France	0.078	(1.31)	0.00	Sweden	0.016	(1.42)	0.04
Germany	0.071	(0.74)	0.00	Switzerland	0.091	(0.92)	0.00
Ireland	0.294	(0.85)	0.00	U.K.	0.383	(3.10)	0.21
Italy	0.070	(0.58)	0.00	U.S.	0.113	(2.31)	0.06
Japan	0.154	(2.63)	0.11				

Panel regressions: $r_{i,t} = \alpha + \beta dy_{i,t-1} + \theta_i + \gamma_t + \varepsilon_{i,t}$

	β	t-stat	$\overline{R}^2$		β	t-stat	$\overline{R}^2$
Fixed effects	0.144	(6.29)	0.05	Two way fixed effects	0.147	(6.29)	0.62

Table 5: Return - Price-output predictive coefficients using quarterly data. Entries are the predictive coefficient, β, accompanying Newey-West t-statistic (absolute value) and adjusted R^2 from the regression given below, where r_t is the log stock market total rate of return and yp_t is the log output-price ratio. In the cross section fixed effects model and a two-way (cross-section and period) fixed effects model, given below, the terms θ_i and γ_t refer to the cross-section and period-specific fixed effects, which estimate the cross-sectional and period-specific means. In the panel estimation there are 29 cross-sections and 3491 observations.

Single market regressions: $r_t = \alpha + \beta yp_{t-1} + \varepsilon_t$

	β	t-stat	$\overline{R}^2$		β	t-stat	$\overline{R}^2$
Australia	0.012	(0.96)	0.01	Luxemburg	0.075	(1.90)	0.03
Austria	0.010	(0.78)	0.00	Mexico	0.023	(1.74)	0.02
Belgium	0.009	(0.78)	0.00	Netherlands	0.009	(0.86)	0.00
Canada	0.007	(0.56)	0.00	New Zealand	0.166	(3.16)	0.09
Czech Republic	0.037	(1.02)	0.00	Norway	0.020	(1.18)	0.00
Denmark	0.005	(0.62)	0.00	Poland	0.177	(2.89)	0.11
Finland	0.024	(0.97)	0.00	Portugal	0.045	(1.32)	0.01
France	0.010	(1.01)	0.00	South Africa	0.002	(0.31)	0.00
Germany	0.012	(0.89)	0.00	Spain	0.033	(1.32)	0.01
Greece	0.056	(2.27)	0.04	Sweden	0.029	(1.94)	0.02
Indonesia	0.060	(1.26)	0.01	Switzerland	0.002	(0.23)	0.00
Ireland	0.015	(1.08)	0.00	Turkey	0.015	(1.66)	0.02
Italy	0.015	(1.50)	0.01	U.K.	0.011	(0.26)	0.00
Japan	0.024	(1.33)	0.01	U.S.	0.006	(0.53)	0.00
Korea	0.122	(2.19)	0.04				

Panel regressions: $r_{i,t} = \alpha + \beta yp_{i,t-1} + \theta_i + \gamma_t + \varepsilon_{i,t}$

	β	t-stat	$\overline{R}^2$		β	t-stat	$\overline{R}^2$
Fixed effects	0.014	(6.03)	0.02	Two way fixed effects	0.018	(6.25)	0.50

Table 6: Return - Price-output predictive coefficients using annual data. Entries are the predictive coefficient, β, accompanying Newey-West t-statistic (absolute value) and adjusted R^2 from the regression given below, where r_t is the log stock market total rate of return and yp_t is the log output-price ratio. In the cross section fixed effects model and a two-way (cross-section and period) fixed effects model, given below, the terms θ_i and γ_t refer to the cross-section and period-specific fixed effects, which estimate the cross-sectional and period-specific means. In the panel estimation there are 16 cross-sections and 623 observations.

Single market regressions: $r_t = \alpha + \beta yp_{t-1} + \varepsilon_t$

	β	t-stat	$\overline{R}^2$		β	t-stat	$\overline{R}^2$
Australia	0.440	(3.96)	0.32	Netherlands	0.133	(1.88)	0.07
Belgium	0.228	(2.04)	0.23	Norway	0.457	(9.72)	0.24
Canada	0.225	(2.66)	0.11	New Zealand	0.164	(1.56)	0.02
Denmark	0.174	(2.36)	0.08	Spain	0.108	(1.65)	0.09
France	0.196	(3.05)	0.15	Sweden	0.084	(1.52)	0.05
Germany	0.257	(2.36)	0.13	Switzerland	0.098	(1.92)	0.04
Ireland	-	-	-	U.K.	0.368	(4.23)	0.37
Italy	0.281	(4.01)	0.19	U.S.	0.177	(2.53)	0.12
Japan	0.269	(2.15)	0.11				

Panel regressions: $r_{i,t} = \alpha + \beta yp_{i,t-1} + \theta_i + \gamma_t + \varepsilon_{i,t}$

	β	t-stat	$\overline{R}^2$		β	t-stat	$\overline{R}^2$
Fixed effects	0.177	(9.14)	0.11	Two way fixed effects	0.121	(6.68)	0.62

Table 7: Return - Dividend yield and price-consumption predictive coefficients using quarterly data. Entries are the predictive coefficients, β, and δ, plus accompanying Newey-West t-statistic (absolute value) and adjusted R^2 from the regression given below, where r_t is the log stock market total rate of return, dy_t is the log dividend yield and cp_t is the log consumption-price ratio. In the cross section fixed effects model and a two-way (cross-section and period) fixed effects model, given below, the terms θ_i and γ_t refer to the cross-section and period-specific fixed effects, which estimate the cross-sectional and period-specific means. In the panel estimation there are 29 cross-sections and 3491 observations.

Single market regressions: $r_t = \alpha + \beta dy_{t-1} + \delta cp_{t-1} + \varepsilon_t$

	β	δ	$\overline{R}^2$		β	δ	$\overline{R}^2$
Australia	0.099 (1.84)	-0.003 (0.14)	0.02	Luxemburg	0.001 (0.01)	0.069 (1.37)	0.02
Austria	0.009 (0.24)	0.009 (0.48)	0.00	Mexico	0.086 (1.45)	0.011 (0.39)	0.06
Belgium	0.001 (0.02)	0.009 (0.35)	0.00	Netherlands	-0.024 (0.26)	0.019 (0.42)	0.00
Canada	0.017 (0.34)	-0.001 (0.05)	0.00	New Zealand	-0.085 (1.54)	0.209 (3.63)	0.10
Czech Republic	0.053 (1.94)	0.050 (1.37)	0.02	Norway	0.063 (1.24)	0.010 (0.44)	0.01
Denmark	0.018 (0.48)	-0.001 (0.01)	0.00	Poland	0.036 (0.92)	0.189 (3.73)	0.11
Finland	-0.028 (0.61)	0.024 (0.76)	0.00	Portugal	-0.280 (0.34)	0.058 (0.99)	0.00
France	0.041 (0.86)	-0.001 (0.07)	0.00	South Africa	0.065 (1.73)	-0.011 (1.09)	0.01
Germany	-0.036 (0.79)	0.028 (0.99)	0.00	Spain	0.001 (0.01)	0.032 (0.94)	0.00
Greece	-0.015 (0.27)	0.072 (1.47)	0.02	Sweden	0.031 (0.65)	0.025 (1.36)	0.02
Indonesia	0.083 (3.21)	0.058 (1.08)	0.10	Switzerland	-0.022 (0.52)	0.008 (0.51)	0.00
Ireland	0.048 (0.80)	-0.012 (0.31)	0.00	Turkey	0.153 (2.97)	-0.012 (0.60)	0.09
Italy	-0.009 (0.28)	0.016 (1.25)	0.00	U.K.	0.192 (2.71)	-0.040 (1.67)	0.08
Japan	-0.038 (0.58)	0.063 (0.87)	0.00	U.S.	0.099 (2.26)	-0.059 (1.92)	0.02
Korea	0.046 (0.56)	0.088 (1.23)	0.03				

Panel regressions: $r_{i,t} = \alpha + \beta dy_{i,t-1} + \delta cp_{i,t-1} + \theta_i + \gamma_t + \varepsilon_{i,t}$

	β	δ	$\overline{R}^2$		β	δ	$\overline{R}^2$
Fixed effects	0.024 (3.55)	0.010 (3.35)	0.02	Two way fixed effects	0.027 (4.87)	0.019 (5.41)	0.51

Table 8: Return - Dividend yield and price-consumption predictive coefficients using annual data. Entries are the predictive coefficients, β, and δ, plus accompanying Newey-West t-statistic (absolute value) and adjusted R^2 from the regression given below, where r_t is the log stock market total rate of return, dy_t is the log dividend yield and cp_t is the log consumption-price ratio. In the cross section fixed effects model and a two-way (cross-section and period) fixed effects model, given below, the terms θ_i and γ_t refer to the cross-section and period-specific fixed effects, which estimate the cross-sectional and period-specific means. In the panel estimation there are 11 cross-sections and 433 observations.

Single market regressions: $r_t = \alpha + \beta dy_{t-1} + \delta cp_{t-1} + \varepsilon_t$

	β	δ	$\overline{R}^2$		β	δ	$\overline{R}^2$
Australia	0.115 (0.91)	0.362 (3.84)	0.30	Netherlands	-0.043 (0.21)	0.132 (1.41)	0.12
Belgium	-	-	-	Norway	-	-	-
Canada	0.028 (0.39)	0.214 (1.99)	0.09	New Zealand	-	-	-
Denmark	-	-	-	Spain	0.052 (0.75)	0.023 (1.18)	0.05
France	-0.011 (0.18)	0.071 (2.53)	0.07	Sweden	-	-	-
Germany	-0.045 (0.45)	0.163 (2.53)	0.08	Switzerland	-0.116 (0.92)	0.147 (2.71)	0.02
Ireland				U.K.	0.146 (2.15)	0.283 (3.64)	0.23
Italy	0.183 (1.54)	0.029 (2.33)	0.08	U.S.	-0.038 (1.16)	0.236 (3.45)	0.11
Japan	0.102 (1.33)	0.131 (0.99)	0.10				

Panel regressions: $r_{i,t} = \alpha + \beta dy_{i,t-1} + \delta cp_{i,t-1} + \theta_i + \gamma_t + \varepsilon_{i,t}$

	β	δ	$\overline{R}^2$		β	δ	$\overline{R}^2$
Fixed effects	0.107 (4.08)	0.032 (4.07)	0.07	Two way fixed effects	0.117 (4.73)	0.016 (2.63)	0.64

Table 9: Dividend Growth - Dividend yield predictive coefficients using quarterly data. Entries are the predictive coefficient, β, accompanying Newey-West t-statistic (absolute value) and adjusted R^2 from the regression given below, where Δd_t is logged dividend growth, dy_t is the log dividend yield. In the cross section fixed effects model and a two-way (cross-section and period) fixed effects model, given below, the terms θ_i and γ_t refer to the cross-section and period-specific fixed effects, which estimate the cross-sectional and period-specific means. In the panel estimation there are 29 cross-sections and 3491 observations.

Single market regressions: $\Delta d_t = \alpha + \beta dy_{t-1} + \varepsilon_t$

	β	t-stat	$\overline{R}^2$		β	t-stat	$\overline{R}^2$
Australia	-0.052	(3.02)	0.05	Luxemburg	-0.150	(2.90)	0.09
Austria	-0.115	(4.57)	0.12	Mexico	-0.073	(1.55)	0.02
Belgium	-0.061	(1.00)	0.06	Netherlands	-0.031	(2.93)	0.05
Canada	-0.030	(2.70)	0.04	New Zealand	-0.205	(4.16)	0.15
Czech Republic	-0.060	(1.00)	0.00	Norway	-0.129	(3.72)	0.10
Denmark	-0.048	(2.34)	0.03	Poland	-0.050	(1.12)	0.01
Finland	-0.098	(3.49)	0.11	Portugal	-0.129	(3.60)	0.13
France	-0.029	(1.97)	0.02	South Africa	-0.021	(1.64)	0.01
Germany	-0.049	(4.01)	0.09	Spain	-0.024	(1.40)	0.01
Greece	-0.107	(3.82)	0.14	Sweden	-0.087	(2.86)	0.06
Indonesia	-0.082	(2.12)	0.04	Switzerland	-0.048	(3.38)	0.06
Ireland	-0.013	(0.95)	0.00	Turkey	-0.019	(0.57)	0.00
Italy	-0.087	(4.71)	0.12	U.K.	0.014	(1.35)	0.01
Japan	-0.004	(0.78)	0.00	U.S.	0.005	(1.30)	0.00
Korea	-0.245	(5.07)	0.21				

Panel regressions: $\Delta d_{i,t} = \alpha + \beta dy_{i,t-1} + \theta_i + \gamma_t + \varepsilon_{i,t}$

	β	t-stat	$\overline{R}^2$		β	t-stat	$\overline{R}^2$
Fixed effects	-0.052	(11.58)	0.04	2 way fixed effects	-0.068	(11.55)	0.12

Table 10: Dividend Growth - Dividend yield predictive coefficients using annual data. Entries are the predictive coefficient, β, accompanying Newey-West t-statistic (absolute value) and adjusted R^2 from the regression given below, where Δd_t is logged dividend growth, dy_t is the log dividend yield. In the cross section fixed effects model and a two-way (cross-section and period) fixed effects model, given below, the terms θ_i and γ_t refer to the cross-section and period-specific fixed effects, which estimate the cross-sectional and period-specific means. In the panel estimation there are17 cross-sections and 644 observations.

Single market regressions: $\Delta d_t = \alpha + \beta dy_{t-1} + \varepsilon_t$

	β	t-stat	$\overline{R}^2$		β	t-stat	$\overline{R}^2$
Australia	0.007	(0.08)	0.00	Netherlands	0.075	(1.73)	0.01
Belgium	0.099	(1.49)	0.00	Norway	0.072	(0.94)	0.00
Canada	-0.030	(0.56)	0.00	New Zealand	-0.022	(1.46)	0.00
Denmark	-0.003	(0.08)	0.00	Spain	-0.018	(0.07)	0.00
France	-0.026	(0.64)	0.00	Sweden	-0.058	(0.81)	0.00
Germany	-0.107	(1.65)	0.00	Switzerland	-0.061	(0.68)	0.00
Ireland	-0.114	(0.29)	0.00	U.K.	0.168	(1.81)	0.06
Italy	-0.234	(3.35)	0.07	U.S.	-0.045	(0.75)	0.00
Japan	0.022	(1.34)	0.02				

Panel regressions: $\Delta d_{i,t} = \alpha + \beta dy_{i,t-1} + \theta_i + \gamma_t + \varepsilon_{i,t}$

	β	t-stat	$\overline{R}^2$		β	t-stat	$\overline{R}^2$
Fixed effects	-0.013	(0.64)	0.00	Two way fixed effects	-0.075	(3.03)	0.46

Table 11: Output growth - Price-output ratio predictive coefficients using quarterly data. Entries are the predictive coefficient, β, accompanying Newey-West t-statistic (absolute value) and adjusted R^2 from the regression given below, where Δy_t is log output growth and yp_t is the log output-price ratio. In the cross section fixed effects model and a two-way (cross-section and period) fixed effects model, given below, the terms θ_i and γ_t refer to the cross-section and period-specific fixed effects, which estimate the cross-sectional and period-specific means. In the panel estimation there are29 cross-sections and 3491 observations.

Single market regressions: $\Delta y_t = \alpha + \beta yp_{t-1} + \varepsilon_t$

	β	t-stat	$\overline{R}^2$		β	t-stat	$\overline{R}^2$
Australia	-0.113	(1.02)	0.00	Luxemburg	-0.672	(1.03)	0.00
Austria	-0.018	(0.20)	0.00	Mexico	0.070	(0.51)	0.00
Belgium	-0.050	(0.58)	0.00	Netherlands	-0.128	(1.04)	0.00
Canada	0.048	(0.49)	0.00	New Zealand	-1.229	(1.87)	0.03
Czech Republic	-0.270	(1.10)	0.00	Norway	0.029	(0.20)	0.00
Denmark	0.023	(0.34)	0.00	Poland	-0.133	(0.29)	0.00
Finland	-0.467	(2.79)	0.07	Portugal	-0.296	(0.99)	0.00
France	0.065	(1.42)	0.01	South Africa	-0.051	(1.03)	0.00
Germany	0.014	(0.10)	0.00	Spain	-0.095	(0.52)	0.00
Greece	-0.409	(1.42)	0.01	Sweden	-0.123	(0.99)	0.00
Indonesia	-0.232	(0.45)	0.00	Switzerland	-0.147	(2.04)	0.02
Ireland	-0.283	(1.89)	0.02	Turkey	-0.039	(0.38)	0.00
Italy	-0.205	(3.06)	0.05	U.K.	-0.034	(1.63)	0.01
Japan	-0.195	(0.91)	0.00	U.S.	0.017	(0.18)	0.00
Korea	-0.844	(1.56)	0.02				

Panel regressions: $\Delta y_{i,t} = \alpha + \beta yp_{i,t-1} + \theta_i + \gamma_t + \varepsilon_{i,t}$

	β	t-stat	$\overline{R}^2$		β	t-stat	$\overline{R}^2$
Fixed effects	-0.056	(2.52)	0.03	Two way fixed effects	-0.216	(6.16)	0.20

Table 12: Output growth - Price-output ratio predictive coefficients using annual data. Entries are the predictive coefficient, β, accompanying Newey-West t-statistic (absolute value) and adjusted R^2 from the regression given below, where Δy_t is logged output growth and yp_t is the log output-price ratio. In the cross section fixed effects model and a two-way (cross-section and period) fixed effects model, given below, the terms θ_i and γ_t refer to the cross-section and period-specific fixed effects, which estimate the cross-sectional and period-specific means. In the panel estimation there are 16 cross-sections and 629 observations.

Single market regressions: $\Delta y_t = \alpha + \beta yp_{t-1} + \varepsilon_t$

	β	t-stat	$\overline{R}^2$		β	t-stat	$\overline{R}^2$
Australia	-0.017	(0.87)	0.00	Netherlands	0.006	(0.39)	0.00
Belgium	0.001	(0.12)	0.00	Norway	-0.017	(0.61)	0.00
Canada	-0.027	(0.62)	0.00	New Zealand	-0.055	(4.43)	0.24
Denmark	0.039	(4.28)	0.21	Spain	-0.033	(2.68)	0.17
France	0.053	(3.22)	0.33	Sweden	0.032	(7.64)	0.44
Germany	0.026	(3.01)	0.06	Switzerland	0.014	(1.77)	0.03
Ireland	-	-	-	U.K.	0.065	(2.29)	0.19
Italy	0.020	(0.42)	0.00	U.S.	0.022	(1.93)	0.06
Japan	-0.009	(0.43)	0.00				

Panel regressions: $\Delta y_{i,t} = \alpha + \beta yp_{i,t-1} + \theta_i + \gamma_t + \varepsilon_{i,t}$

	β	t-stat	$\overline{R}^2$		β	t-stat	$\overline{R}^2$
Fixed effects	0.011	(2.83)	0.12	Two way fixed effects	-0.013	(4.39)	0.69

Table 13: Consumption growth - Dividend yield predictive coefficients using quarterly data. Entries are the predictive coefficient, β, accompanying Newey-West t-statistic (absolute value) and adjusted R^2 from the regression given below, where Δc_t is logged consumption growth and dy_t is the dividend yield. In the cross section fixed effects model and a two-way (cross-section and period) fixed effects model, given below, the terms θ_i and γ_t refer to the cross-section and period-specific fixed effects, which estimate the cross-sectional and period-specific means. The beta values are multiplied by 100 for ease of reading. In the panel estimation there are29 cross-sections and 3491 observations.

Single market regressions: $\Delta c_t = \alpha + \beta dy_{t-1} + \varepsilon_t$

	β	t-stat	$\overline{R}^2$		β	t-stat	$\overline{R}^2$
Australia	-0.726	(2.52)	0.03	Luxemburg	-0.975	(1.83)	0.03
Austria	-0.068	(0.20)	0.00	Mexico	-0.710	(1.26)	0.01
Belgium	-0.181	(1.72)	0.01	Netherlands	-0.359	(1.63)	0.01
Canada	-0.399	(2.34)	0.03	New Zealand	-2.096	(4.04)	0.15
Czech Republic	-0.545	(2.35)	0.07	Norway	0.253	(0.71)	0.00
Denmark	-0.445	(1.07)	0.00	Poland	-0.358	(1.43)	0.02
Finland	-0.300	(1.61)	0.02	Portugal	-1.158	(3.99)	0.15
France	-0.208	(1.56)	0.01	South Africa	-0.538	(2.14)	0.02
Germany	-0.052	(0.21)	0.00	Spain	-1.067	(5.88)	0.26
Greece	-0.404	(1.44)	0.01	Sweden	-0.814	(2.74)	0.05
Indonesia	0.002	(0.11)	0.00	Switzerland	-0.235	(1.76)	0.01
Ireland	-0.764	(3.54)	0.07	Turkey	0.136	(0.28)	0.00
Italy	-0.213	(1.29)	0.00	U.K.	-0.783	(2.50)	0.03
Japan	-0.073	(0.39)	0.00	U.S.	-0.078	(0.70)	0.00
Korea	-1.956	(3.04)	0.08				

Panel regressions: $\Delta c_{i,t} = \alpha + \beta dy_{i,t-1} + \theta_i + \gamma_t + \varepsilon_{i,t}$

	β	t-stat	$\overline{R}^2$		β	t-stat	$\overline{R}^2$
Fixed effects	-0.356	(6.39)	0.03	Two way fixed effects	-0.339	(4.64)	0.10

Table 14: Consumption growth - Dividend yield predictive coefficients using annual data. Entries are the predictive coefficient, β, accompanying Newey-West t-statistic (absolute value) and adjusted R^2 from the regression given below, where Δc_t is log consumption growth and dy_t is the log dividend yield. In the cross section fixed effects model and a two-way (cross-section and period) fixed effects model, given below, the terms θ_i and γ_t refer to the cross-section and period-specific fixed effects, which estimate the cross-sectional and period-specific means. In the panel estimation there are11 cross-sections and 429 observations.

Single market regressions: $\Delta c_t = \alpha + \beta dy_{t-1} + \varepsilon_t$

	β	t-stat	$\overline{R}^2$		β	t-stat	$\overline{R}^2$
Australia	0.168	(0.57)	0.00	Netherlands	-0.004	(0.37)	0.00
Belgium	-	-	-	Norway	-	-	-
Canada	0.058	(4.14)	0.33	New Zealand	-	-	-
Denmark	-	-	-	Spain	0.019	(0.99)	0.01
France	0.063	(4.98)	0.52	Sweden	-	-	-
Germany	0.033	(1.30)	0.04	Switzerland	0.040	(4.13)	0.15
Ireland	-	-	-	U.K.	0.086	(3.16)	0.31
Italy	-0.038	(0.49)	0.00	U.S.	0.032	(3.27)	0.31
Japan	0.053	(1.38)	0.30				

Panel regressions: $\Delta c_{i,t} = \alpha + \beta dy_{i,t-1} + \theta_i + \gamma_t + \varepsilon_{i,t}$

	β	t-stat	$\overline{R}^2$		β	t-stat	$\overline{R}^2$
Fixed effects	0.036	(7.34)	0.25	Two way fixed effects	-0.011	(2.25)	0.70

Table 15: This table shows long-run regression coefficients as specified where r_t is the log stock market total rate of return and dy_t is the log dividend yield. Entries accompanying the coefficients are Newey-West t-statistics (absolute value) and adjusted R^2 from the regressions. These estimates use annual data, collected from Morgan Stanley Capital International, 1970-2010. The estimates are calculated using 15-year ex-post returns, dividend growth and dividendyield. The panel estimates include cross sectional fixed effects and for the two way fixed effects, both cross-sectional and period-specific fixed effects. ρ is a constant of approximation (0.96). In the panel estimation there are17 cross-sections and 406 observations.

Regression for returns	$\sum_{j=1}^{k} \rho^{j-1} r_{t+j} = \alpha_0 + \beta^{(k)} dy_t + \varepsilon^0_{t+k}$
Regression for dividend growth	$\sum_{j=1}^{k} \rho^{j-1} \Delta d_{t+j} = \alpha_1 + \delta^{(k)} dy_t + \varepsilon^1_{t+k}$
Regression for dividend yield	$dy_{t+k} = \alpha_2 + \gamma^{(k)} dy_t + \varepsilon^2_{t+k}$

	$\beta^{(k)}$	t-stat	$\overline{R}^2$	$\delta^{(k)}$	t-stat	$\overline{R}^2$	$\rho^k\gamma^{(k)}$	t-stat	$\overline{R}^2$
Australia	0.829	(3.54)	0.32	-0.084	(0.40)	0.00	0.079	(1.06)	0.41
Belgium	1.447	(6.99)	0.77	0.493	(1.21)	0.19	0.000	(0.00)	0.25
Canada	0.508	(2.54)	0.33	-0.179	(0.44)	0.00	0.161	(0.66)	0.00
Denmark	0.295	(4.81)	0.36	-0.579	(10.40)	0.74	0.053	(0.64)	0.82
France	0.689	(8.24)	0.68	-0.336	(5.84)	0.47	-0.009	(0.37)	0.57
Germany	0.410	(3.15)	0.26	-0.654	(5.07)	0.49	-0.191	(1.18)	0.40
Ireland	-0.460	(0.78)	0.00	-1.883	(1.42)	0.02	0.018	(0.17)	0.00
Italy	0.908	(1.99)	0.21	-0.123	(0.32)	0.00	-0.062	(0.39)	0.00
Japan	1.191	(15.59)	0.92	0.116	(2.25)	0.12	-0.195	(0.53)	0.67
Netherlands	1.343	(10.77)	0.79	0.511	(4.11)	0.47	0.079	(0.54)	0.15
Norway	0.704	(6.05)	0.55	-0.586	(4.33)	0.42	-0.293	(6.25)	0.68
Spain	0.860	(7.48)	0.84	-0.294	(2.39)	0.28	-0.184	(2.26)	0.52
Sweden	0.836	(6.35)	0.68	-0.265	(2.03)	0.17	-0.151	(1.79)	0.55
Switzerland	0.795	(1.66)	0.18	-0.229	(1.13)	0.01	-0.198	(0.69)	0.00
U.K.	1.738	(7.22)	0.79	0.707	(3.51)	0.38	-0.031	(0.51)	0.57
U.S.	0.905	(6.31)	0.60	-0.019	(0.13)	0.00	-0.022	(0.16)	0.00
Fixed effects	0.845	(21.76)	0.68	-0.194	(5.37)	0.51	-0.094	(4.41)	0.60
Two way fixed effects	0.637	(13.35)	0.76	-0.382	(8.36)	0.62	-0.082	(3.58)	0.78

Table 16: This table shows long-run regression coefficients as specified where r_t is the log stock market total rate of return and yp_t is the log output-price ratio. Entries accompanying the coefficients are Newey-West t-statistics (absolute value) and adjusted R^2 from the regressions. These estimates use annual data, collected from Morgan Stanley Capital International, 1970-2010. The estimates are calculated using 15-year ex-post returns, output growth and the output-price ratio. The panel estimates include cross sectional fixed effects and for the two way fixed effects, both cross-sectional and period-specific fixed effects. ρ is a constant of approximation (0.96). In the panel estimation there are16 cross-sections and 399 observations.

Regression for returns $$\sum_{j=1}^{k} \rho^{j-1} r_{t+j} = \alpha_0 + \beta^{(k)} yp_t + \varepsilon^0_{t+k}$$

Regression for output growth $$\sum_{j=1}^{k} \rho^{j-1} \Delta y_{t+j} = \alpha_1 + \delta^{(k)} yp_t + \varepsilon^1_{t+k}$$

Regression for output-price ratio $$yp_{t+k} = \alpha_2 + \gamma^{(k)} yp_t + \varepsilon^2_{t+k}$$

	$\beta^{(k)}$	t-stat	$\overline{R}^2$	$\delta^{(k)}$	t-stat	$\overline{R}^2$	$\rho^k\gamma^{(k)}$	t-stat	$\overline{R}^2$
Australia	0.675	(3.67)	0.40	-0.355	(2.65)	0.13	-0.045	(1.46)	0.75
Belgium	1.149	(2.77)	0.71	-0.085	(0.38)	0.00	-0.167	(1.04)	0.18
Canada	0.286	(2.34)	0.12	-0.790	(3.55)	0.50	-0.208	(1.20)	0.03
Denmark	0.743	(9.45)	0.65	0.114	(0.35)	0.00	0.203	(0.80)	0.00
France	0.908	(4.56)	0.66	-0.044	(0.15)	0.00	-0.086	(0.69)	0.03
Germany	0.854	(6.83)	0.61	0.007	(0.27)	0.00	0.164	(1.25)	0.00
Ireland	-	-	-	-	-	-	-	-	-
Italy	0.455	(0.81)	0.17	-0.423	(0.74)	0.13	0.092	(1.02)	0.55
Japan	1.764	(5.74)	0.64	0.496	(6.02)	0.23	-0.197	(2.74)	0.25
Netherlands	0.925	(4.88)	0.84	-0.102	(0.86)	0.05	-0.043	(0.28)	0.23
New Zealand	1.308	(5.75)	0.67	0.114	(0.91)	0.01	-0.124	(1.06)	0.18
Norway	0.661	(4.02)	0.47	-0.355	(2.01)	0.25	-0.065	(1.23)	0.66
Spain	0.439	(2.00)	0.58	-0.383	(2.76)	0.75	-0.076	(2.26)	0.87
Sweden	0.783	(16.52)	0.85	0.412	(2.19)	0.52	0.326	(2.89)	0.26
Switzerland	0.956	(3.96)	0.56	0.048	(0.24)	0.00	-0.156	(0.65)	0.00
U.K.	1.196	(1.77)	0.56	0.027	(0.12)	0.00	-0.132	(1.85)	0.69
U.S.	1.102	(5.35)	0.86	-0.225	(0.46)	0.08	-0.351	(1.78)	0.00
Fixed effects	0.730	(20.00)	0.65	-0.152	(4.35)	0.33	-0.032	(1.41)	0.98
Two way fixed effects	0.632	(16.84)	0.80	-0.121	(6.00)	0.88	0.043	(1.97)	0.99

Table 17: This table shows long-run regression coefficients as specified where r_t is the log stock market total rate of return and cp_t is the log consumption-price ratio. Entries accompanying the coefficients are Newey-West t-statistics (absolute value) and adjusted R^2 from the regressions. These estimates use annual data, collected from Morgan Stanley Capital International, 1970-2010. The estimates are calculated using 15-year ex-post returns, consumption growth and the consumption-price ratio. The panel estimates include cross sectional fixed effects and for the two way fixed effects, both cross-sectional and period-specific fixed effects. ρ is a constant of approximation (0.96). In the panel estimation there are11 cross-sections and 279 observations.

Regression for returns	$\sum_{j=1}^{k} \rho^{j-1} r_{t+j} = \alpha_0 + \beta^{(k)} cp_t + \varepsilon^0_{t+k}$
Regression for consumption growth	$\sum_{j=1}^{k} \rho^{j-1} \Delta c_{t+j} = \alpha_1 + \delta^{(k)} cp_t + \varepsilon^1_{t+k}$
Regression for consumption-price ratio	$cp_{t+k} = \alpha_2 + \gamma^{(k)} cp_t + \varepsilon^2_{t+k}$

	$\beta^{(k)}$	t-stat	$\overline{R}^2$	$\delta^{(k)}$	t-stat	$\overline{R}^2$	$\rho^k\gamma^{(k)}$	t-stat	$\overline{R}^2$
Australia	0.614	(3.72)	0.35	-0.391	(3.28)	0.17	-0.028	(0.95)	0.78
Belgium	-	-	-	-	-	-	-	-	-
Canada	0.267	(2.45)	0.09	-0.795	(3.94)	0.53	-0.217	(1.29)	0.04
Denmark	-	-	-	-	-	-	-	-	-
France	0.932	(5.07)	070	-0.545	(2.12)	0.59	0.445	(1.27)	0.00
Germany	0.787	(6.95)	0.54	-0.148	(3.18)	0.42	0.454	(2.40)	0.00
Ireland	-	-	-	-	-	-	-	-	-
Italy	0.455	(0.80)	0.17	-0.50	(0.88)	0.15	-0.214	(0.16)	0.00
Japan	1.672	(6.59)	0.51	0.389	(5.37)	0.16	-0.211	(2.94)	0.22
Netherlands	0.928	(5.16)	0.84	-0.057	(3.76)	0.00	0.414	(2.67)	0.21
New Zealand	-	-	-	-	-	-	-	-	-
Norway	-	-	-	-	-	-	-	-	-
Spain	0.456	(2.21)	0.61	-0.286	(9.96)	0.97	-0.028	(0.95)	0.78
Sweden	-	-	-	-	-	-	-	-	-
Switzerland	0.914	(3.75)	0.55	0.027	(0.13)	0.00	-0.124	(0.48)	0.00
U.K.	1.197	(1.57)	0.51	0.032	(0.16)	0.00	-0.118	(1.84)	0.67
U.S.	1.085	(3.73)	0.81	-0.256	(1.34)	0.13	-0.368	(2.07)	0.09
Fixed effects	0.703	(15.35)	0.57	-0.244	(5.41)	0.48	-0.338	(2.96)	0.71
Two way fixed effects	0.727	(15.62)	0.78	-0.114	(3.85)	0.90	-0.701	(5.24)	0.79