Understanding Cross-Country Differences in Valuation Ratios: A Variance Decomposition Approach*

TIMOTHY K. CHUE, *Hong Kong Polytechnic University*

Abstract

We use a variance decomposition approach to examine why aggregate valuation ratios differ across countries. In a cross section of 22 developed countries from 1980 to 2009, we find that 50% of all cross-country differences in the aggregate price-to-book ratio (P/B) can be explained by cross-country differences in expected future five-year profitability. In the second half of our sample period, this percentage exceeds that of the first half, rising to almost 64%. Although international differences in accounting standards and conventions may have made earnings from different countries more difficult to compare relative to dividends, we find that it is still cross-country differences in expected future profitability, rather than dividend growth rates, that are more closely related to international differences in valuation ratios. Even among 25 emerging markets, we find that expected future profitability at the five-year horizon can account for 29% of all cross-country P/B variations. Our results show that international investors are able to identify substantial cross-country differences in future earnings prospects and incorporate them into stock market valuations.

Keywords: International valuation ratios; Cross-sectional variance decomposition; Price-to-book ratio; Price-to-dividend ratio.

JEL Descriptors: M41, G15

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1. Introduction

When a country's current price-to-book ratio (P/B) is high relative to those in other countries, will the country's future relative returns be low or future relative profitability be high—as its P/B moves closer to the world average—or will its P/B just stay high relative to those in other countries? The basic contribution of this study is to empirically quantify the relative importance of these possibilities by examining the extent to which cross-country differences in P/B reflect cross-country differences in expected future returns, expected future profitability, and expected future P/B.

In addition to analyzing cross-country differences in valuation ratios, this study contributes to a long literature that examines the link between current stock prices and future earnings.[1] By quantifying the informativeness of stock prices for future earnings, this literature measures the extent to which value-relevant information about firms' earnings prospects are available to investors and are incorporated into stock prices. However, the findings of these U.S.-based studies may not extend internationally. First, differences in accounting information across countries and the implications of that information for international relative valuations may be costly.[2] Second, to the extent that the information contained in country-specific accounting numbers has been analyzed and understood, investors must trade in order to incorporate that information into international relative valuations. For such trading activities to take place, in turn, financial markets need to be reasonably free from barriers to international capital flows.[3]

The motivation of our study goes beyond pure academic interest. By examining the information contained in international relative valuations, our analysis addresses a practical concern faced by international investors.

[1]See, for example, the works of Beaver, Lambert, and Morse (1980), Collins, Kothari, and Rayburn (1987), Kothari and Sloan (1992), Warfield and Wild (1992), Collins, Kothari, Shanken, and Sloan (1994), Lundholm and Myers (2002), Durnev, Morck, Yeung, and Zarowin (2003), and Sadka (2007).

[2]Ball, Kothari, and Robin (2000) document significant cross-country accounting differences along the dimensions of timeliness and conservatism. Bae, Tan, and Welker (2008) show that international accounting differences lower both foreign analyst following and foreign analysts' forecast accuracy.

[3]As discussed by Bekaert (1995), in addition to formal restrictions on foreign ownership and taxes on foreign investment, such barriers can also take on more indirect forms, such as currency, liquidity, and policy risks, and the lack of investor protection.

Country-specific accounting conventions can create persistent differences in the valuation ratios (such as P/B or price-to-earnings (P/E)) across countries. For example, valuation ratios of companies in a country with conservative accounting may stay persistently higher than those of companies in other countries. In this case, a valuation that is now high relative to valuations in other countries may simply forecast a high relative valuation in the future, rather than high future relative earnings or low future relative returns. In view of these concerns, even the financial press advises investors to refrain from carrying out cross-country valuation comparisons—"international comparisons can be blurred by different accounting conventions. It is better to compare a country's P/E ratio with its own track record."[4]

To address these concerns, we empirically investigate the extent to which international differences in valuation ratios are associated with future profitability and equity returns. Among 22 developed markets over the 1980-2009 period, we find that future profitability and future returns at the five-year horizon account for 50% and 20%, respectively, of all cross-country variations in P/B, and the variation in future relative valuations is responsible for the remaining 30%. In the second half of our sample period, this percentage exceeds that of the first half, rising to almost 64%. From a forecasting perspective, we find that financial market participants are able to anticipate a large fraction (34% for the full sample period, 54% in the second half) of all cross-country differences in future profitability at the five-year horizon and incorporate these differences into stock market valuations. Our finding that cross-country variations in P/B are driven predominantly by cross-country differences in future profitability and stock returns suggests that the bulk of the cross-country valuation differences contains useful information, and the worry that it only reflects persistent, country-specific differences in valuation is not supported by the data.

The predictive relationship between current P/B and future stock returns can be used to form portfolios with different expected returns. We find that a portfolio that goes long on low P/B ("value") and short on high P/B ("growth") countries earns an average annualized return of 5.5%, 6.7%, and 6.8% over the next one, three, and five years, respectively.[5] However, we also find that this value-minus-growth portfolio has significantly *negative*

[4]"Dizzy in Boomtown," *The Economist*, November 17, 2007.

[5]The one-year average return is comparable in size with the Fama-French (1992, 1993) HML premium within the U.S. over the same sample period. Asness, Moskowitz, and Pedersen (2013) sort 18 developed markets by their aggregate book-to-market ratios and examine the returns on a long-short, value strategy on their equity index futures. Over a sample period similar to ours, they report a mean return of 5.7% at the one-year horizon, close to the

profitability over the next one to five years—suggesting that those countries with relatively high expected stock returns also tend to experience relatively low profitability in the future.

Building on Shiller's (1981) seminal paper , Campbell and Shiller (1988), Cochrane (1992, 2008), and van Binsbergen and Koijen (2010), among others, have shown that variations in future cash flows can only explain a small fraction of all time-series variations in U.S. aggregate stock prices—when cash flows are measured by aggregate dividends. In contrast, Sadka (2007) and Chen, Da, and Priestley (2012) show that the relationship between stock prices and future cash flows strengthens substantially, when cash flows are proxied by aggregate earnings instead. We investigate whether the relationship of aggregate stock prices with earnings is still stronger than that with dividends in a *cross-sectional* setting. The answer to this question is not obvious. In particular, if accounting numbers are difficult to compare across countries due to international differences in accounting standards, their impact on the relative valuations of international assets will be limited. By contrast, since dividends are actual cash distributions made to shareholders, they are less subject to the influence of accounting conventions and are potentially more closely linked with cross-country differences in stock market valuation. In the data, we find that this is *not* the case—aggregate stock market valuations remain more strongly related with aggregate earnings than with aggregate dividends—lending support to Miller and Modigliani's (1961) dividend irrelevance hypothesis, albeit from an international, cross-sectional perspective.

Our variance decomposition approach in identifying possible sources of stock price variations, first introduced by Campbell and Shiller (1988), has been used by many authors to account for time-series variations in stock price at the aggregate market level. Vuolteenaho (2002) is the first to apply this methodology to the firm level and Cohen, Polk, and Vuolteenaho (2003) carry out a cross-sectional variance decomposition on U.S. equity portfolios. Chaves (2009) further shows that the relative importance of cash flows versus discount rates in the variance decomposition depends on whether a time-series or cross-sectional analysis is performed. To our knowledge, cross-sectional variance decompositions of stock prices at the country-aggregate level have not been studied.

Ammer and Mei (1996) and Dumas, Harvey, and Ruiz (2003) study the extent to which comovements in international equity returns can be explained by comovements in cash flows and discount rates. These studies differ from ours in two important respects. First, while they identify factors that cause international equity returns to *move*

5.5% that we find.

together, we decompose the component of international equity prices that is *country-specific* (the fraction that does *not* move together). Second, while Ammer and Mei (1996) and Dumas, Harvey, and Ruiz (2003) analyze the comovement of *flows* (i.e. returns, or the innovations to the price levels) over time—to understand how monthly *revisions* in cash flows and discount rates affect international return comovement, we study the determinants of the *stock* (i.e. the price levels themselves)—to use *long-run levels* of country-specific cash flows and returns to justify the dispersion in prices across countries. To see the difference between the flow and level perspectives, consider the case of two countries whose discount rates are much more volatile than their cash flows. In this case, discount rate shocks will be the primary cause of their return innovations and comovements. Yet, cash flows can still be the main driver behind the cross-sectional difference in their price levels—as long as the levels of their future cash flows, though smooth, are very different from each other.

A number of recent studies, such as the works of Kothari, Lewellen, and Warner (2006), Ball, Sadka, and Sadka (2009), Hirshleifer, Hou, and Teoh (2009), Sadka and Sadka (2009), and He and Hu (2012), also examine the relationship between aggregate earnings and stock prices. The focus of these papers is on the *contemporaneous* relationship between the two variables—whether the positive contemporaneous link at the firm level carries over to the market level. By contrast, we examine the *predictive* relationship between current stock market valuation and future profitability.

The remainder of the paper is organized as follows. Section 2 derives the cross-sectional variance decomposition of P/B and discusses how we implement the decomposition as pooled OLS panel regressions. Section 3 discusses the sources and construction of our data. Section 4 carries out the variance decomposition for P/B—in both developed and emerging markets, and over two subperiods. Section 5 evaluates whether aggregate valuations have a stronger relationship with dividends than with earnings. Section 6 uses portfolio-level tests to illustrate the predictive power of relative P/B for future relative returns and profitability. Section 7 reports a series of robustness checks on our main results. Section 8 concludes.

2. The Information Content of P/B

This section makes use of the time-series properties of the price-to-book ratio, as presented in Vuolteenaho (2002) and Callen (2009), to derive a cross-sectional link between current P/B, future stock returns, future profitability, and

future P/B.

The Cross-Sectional Relationship

To see how current P/B is related to future variables, we begin with the clean-surplus relation, which ties the book value of equity (BE), dividends (D), and earnings (X) together, as follows:

$$BE_t - BE_{t-1} = X_t - D_t. \tag{1}$$

Since reported book values, dividends, and earnings do not necessarily satisfy (1), we construct clean-surplus earnings as $X_t = BE_t - BE_{t-1} + D_t$.[6] We then calculate clean-surplus return on equity (ROE) and log clean-surplus ROE, respectively, as

$$ROE_t = X_t/BE_{t-1}, \text{ and}$$
$$roe_t = \log(1 + ROE_t). \tag{2}$$

Defining pb_t as the log price-to-book ratio, $pb_t = \log(ME_t/BE_t)$, and r_t as the log stock return, $r_t = \log(1 + R_t)$, Callen (2009) shows that, to a close approximation,

$$pb_{t-1} = \sum_{j=0}^{N} \rho^j roe_{t+j} - \sum_{j=0}^{N} \rho^j r_{t+j} + \rho^{N+1} pb_{t+N}, \tag{3}$$

where ρ is a discount coefficient that satisfies $\rho \leq 1$, with the strict inequality holding as long as some dividends are paid. Section 2 below discusses our choice of ρ in detail.[7]

[6]Since the index-level data from Datastream have already been adjusted for equity offerings, no further adjustment is necessary here. Aside from being consistent with the analysis in Cohen, Polk, and Vuolteenaho (2003), our use of clean-surplus earnings is also motivated by necessity—as even in countries for which Datastream does report a net profits series, the series' internal consistency with the P/B series (at the country index level) is suspect. In particular, the accuracy of the approximation in equation (4) below deteriorates by almost 50% when these net profits series are used.

[7]Equation (3) corresponds to equation (5) in Callen (2009). The log price-to-book ratio (pb_t) defined here is equal to minus the log book-to-market ratio ($-bm_t$) defined in Callen (2009). This approximation is the finite-horizon

Since equation (3) holds for all countries, it also holds when all variables are measured as deviation from the world average. Using tildes to denote cross-sectionally demeaned quantities, we can rewrite equation (3) as a relationship between the current relative pb, future relative profitability, future relative stock returns, and future relative pb:

$$\widetilde{pb}_{t-1} = \sum_{j=0}^{N} \rho^j \, \widetilde{roe}_{t+j} - \sum_{j=0}^{N} \rho^j \, \tilde{r}_{t+j} + \rho^{N+1} \widetilde{pb}_{t+N}. \tag{4}$$

Equation (4) presents the cross-sectional link between current stock prices and future earnings, both being scaled by the book value of equity. But equation (4) also shows that movements in future earnings is only one of three possible sources of pb variations. Even when equation (4) holds, current $\widetilde{pb}$ and future $\widetilde{roe}$ may still not be closely related—most cross-country variations in current $\widetilde{pb}$ can still be associated with country-specific differences in future $\tilde{r}$ and/or persistent cross-country $\widetilde{pb}$ differences.

In each time period, one can quantify the relative contribution of the three terms on the right-hand-side of equation (4) to current $\widetilde{pb}_{i,t-1}$ variations by regressing each of them on current $\widetilde{pb}_{i,t-1}$, as follows:

$$\begin{aligned}
&\sum_{j=0}^{N-1} \rho^j \, \widetilde{roe}_{i,t+j} = \beta_{t-1}(\widetilde{roe}, N)\widetilde{pb}_{i,t-1} + \varepsilon(\widetilde{roe}, N, i, t+N-1) \\
&\sum_{j=0}^{N-1} \rho^j \, (-\tilde{r}_{i,t+j}) = \beta_{t-1}(-\tilde{r}, N)\widetilde{pb}_{i,t-1} + \varepsilon(-\tilde{r}, N, i, t+N-1) \\
&\rho^N \widetilde{pb}_{i,t+N-1} = \beta_{t-1}(\widetilde{pb}, N)\widetilde{pb}_{i,t-1} + \varepsilon(\widetilde{pb}, N, i, t+N-1),
\end{aligned} \tag{5}$$

where i is a country subscript. Since the cross-sectional variance of $\widetilde{pb}_{t-1}$ can be written as

$$var_{t-1}(\widetilde{pb}_{t-1}) = cov_{t-1}(\widetilde{pb}_{t-1}, \widetilde{pb}_{t-1})$$

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counterpart to the infinite-horizon relationship derived by Vuolteenaho (2002, equation 2), and has been used by Callen and Segal (2004), Callen, Hope, and Segal (2005), Callen, Livnat, and Segal (2006), and Sadka (2007) in accounting research.

$$= \sum_{j=0}^{N} \rho^j \, cov_{t-1}(\widetilde{roe}_{t+j}, \widetilde{pb}_{t-1}) - \sum_{j=0}^{N} \rho^j \, cov_{t-1}(\tilde{r}_{t+j}, \widetilde{pb}_{t-1}) + \rho^{N+1} cov_{t-1}(\widetilde{pb}_{t+N}, \widetilde{pb}_{t-1}), \tag{6}$$

it follows that

$$1 = \frac{\sum_{j=0}^{N} \rho^j \, cov_{t-1}(\widetilde{roe}_{t+j}, \widetilde{pb}_{t-1})}{var_{t-1}(\widetilde{pb}_{t-1})} - \frac{\sum_{j=0}^{N} \rho^j \, cov_{t-1}(\tilde{r}_{t+j}, \widetilde{pb}_{t-1})}{var_{t-1}(\widetilde{pb}_{t-1})} + \frac{\rho^{N+1} cov_{t-1}(\widetilde{pb}_{t+N}, \widetilde{pb}_{t-1})}{var_{t-1}(\widetilde{pb}_{t-1})}, \tag{7}$$

or, $\beta_{t-1}(\widetilde{roe}, N) + \beta_{t-1}(-\tilde{r}, N) + \beta_{t-1}(\widetilde{pb}, N) = 1$.

Estimation Method

Note that the pooled OLS estimates of the β in regressions (5) are simply weighted averages of the cross-sectional estimates β_{t-1} in each time period, where the weights are given by the cross-sectional variance $var_{t-1}(\widetilde{pb}_{i,t-1})$. To see this, consider as an example the pooled OLS estimate of $\beta(\widetilde{roe}, 1)$. For ease of exposition, we suppress the arguments $(\widetilde{roe}, 1)$ and write

$$\beta \equiv \beta(\widetilde{roe}, 1) = \frac{cov(\widetilde{roe}_{i,t}, \widetilde{pb}_{i,t-1})}{var(\widetilde{pb}_{i,t-1})}, \tag{8}$$

where the covariance and variance are pooled estimates over the whole panel. But since the variables are all cross-sectionally demeaned, their pooled means are also zero. This implies that $cov\left(\widetilde{roe}_{i,t}, \widetilde{pb}_{i,t-1}\right) = \frac{1}{T-1}\sum_{t=2}^{T} cov_{t-1}\left(\widetilde{roe}_{i,t}, \widetilde{pb}_{i,t-1}\right)$ and $var(\widetilde{pb}_{i,t-1}) = \frac{1}{T-1}\sum_{t=2}^{T} var_{t-1}(\widetilde{pb}_{i,t-1})$, where cov_{t-1} and var_{t-1} denote cross-sectional moments taken at time $t-1$. Substituting this result back into equation (8), we can write

$$\begin{aligned} \beta &= \frac{\sum_{t=2}^{T} cov_{t-1}(\widetilde{roe}_{i,t}, \widetilde{pb}_{i,t-1})}{\sum_{t=2}^{T} var_{t-1}(\widetilde{pb}_{i,t-1})} \\ &= \frac{\sum_{t=2}^{T} \frac{cov_{t-1}(\widetilde{roe}_{i,t}, \widetilde{pb}_{i,t-1})}{var_{t-1}(\widetilde{pb}_{i,t-1})} var_{t-1}(\widetilde{pb}_{i,t-1})}{\sum_{t=2}^{T} var_{t-1}(\widetilde{pb}_{i,t-1})} \\ &= \frac{\sum_{t=2}^{T} \beta_{t-1} var_{t-1}(\widetilde{pb}_{i,t-1})}{\sum_{t=2}^{T} var_{t-1}(\widetilde{pb}_{i,t-1})}. \end{aligned}$$

The pooled OLS estimates using cross-sectionally demeaned variables are thus equivalent to estimates obtained from a model with time fixed effects, and is often referred to as "within-group" estimation—where the "group" under consideration here is a particular time period.

We run pooled OLS panel regressions of equation (5) above at the one-, three-, and five-year horizons. Relying on results derived in the previous paragraph, these pooled coefficient estimates are weighted averages of the cross-sectional coefficients for each time period. The cross-sectional coefficients, in turn, correspond to the fraction of cross-sectional P/B variance that is attributable to future ROE, future returns, and future P/B variations. For each coefficient estimate, we report two t-statistics, the first of which is obtained from the use of Rogers (1983) standard errors with time clustering (i.e. White (1980) standard errors adjusted for possible correlation across countries within the same time period), and the second of which corresponds to the use of double-clustered standard errors (i.e. White (1980) standard errors adjusted for possible correlation both across countries and over time) as proposed by Thompson (2011). However, we do not consider further corrections for persistent common shocks, as Thompson's (2011) simulations show that such corrections require a minimum of 50 time-series observations for them to work well.

The Choice of the Discount Coefficient ρ

We use Vuolteenaho's (2002) methodology, as described in Vuolteenaho (2002) Appendix A, to choose an optimal value for the discount coefficient ρ. In our notation, this procedure calls for the regression of $roe_t - r_t - pb_{t-1}$ on $-pb_t$ and a constant term, where the discount coefficient ρ is given by the estimated slope in the regression. The value we obtain for our developed markets panel is 0.964, which is very close to the value of 0.967 in Vuolteenaho's (2002) sample. Section 7 below shows that our results are not sensitive to whether we use a country-specific ρ, or a common value for the whole panel. Our empirical finding that the three predictive coefficients in equation (5) sum very close to one suggests that our choice of ρ supports an accurate loglinear relationship between the variables.

3. Data

We obtain country-index-level data from Datastream. We need the price index (i.e., excluding dividends), return

index, market value of equity, and the price-to-book ratio for our analysis. A country enters our sample if all of these series are available and has at least ten years of data within our sample period. We then use the price and return indexes and the market value of equity to calculate the total value of dividends paid, and the price-to-book ratio and the market value to obtain the book value of equity. To allow for a lag of up to six months after a fiscal year-end in the reporting of financial statements, we use the book value at the end of year t as BE_t, the market value at the end of June, year $t+1$ as ME_t, and the stock return from the end of June, year t to the end of June, year $t+1$ as R_t. Finally, we construct clean-surplus earnings as given by equation (1) and clean-surplus ROE as given by equation (2). Our sample spans 1980-2009 and covers 22 developed and 25 emerging markets. Our developed/emerging classification follows the convention of Standard and Poor's Emerging Markets Database. We first conduct our analysis with all variables measured in US dollars. In Section 7 below, we examine the robustness of our findings to the use of local-currency variables.

Table 1 provides information on our sample coverage and reports some summary statistics. First, we see that while our coverage on most developed markets begins in the 1980s, most emerging markets enter our sample only in the 1990s. The series associated with emerging markets are generally more volatile than those from developed markets, with the largest difference coming from stock returns. For both developed and emerging markets, stock returns tend to be more volatile than clean-surplus ROE, with the difference being larger for emerging markets.

Insert Table 1 about here

4. Empirical Results

Table 2 reports results from pooled OLS panel regressions of (5) above at the one-, three-, and five-year horizons. As we discuss above, these pooled coefficient estimates are weighted averages of the cross-sectional coefficients for each time period, which can be interpreted as the fraction of cross-sectional P/B variance attributable to future ROE, future returns, and future P/B. As the forecast horizon lengthens, the lead time required in a predictive regression increases. In particular, the last feasible forecast at horizon N requires a lead time of N years before the end of the sample period. As Table 2 shows, when the predictive horizon goes from one to five years, the final observation for

the predictor variable (that has sufficient lead time) goes from year 2008 to 2004, and the number of country-year observations declines from 563 to 475.

Cross-Sectional P/B Decomposition

Table 2 reports the cross-sectional variance decomposition results for 22 developed markets. At the one-year horizon, roughly 18%, 6%, and 76% of the cross-sectional variation in P/B is associated with future ROE, future return, and future P/B variations, respectively. As the horizon lengthens, the future P/B component declines while the other two components grow in importance, with the future ROE component being the most dominant. At the five-year horizon, only 28% of P/B variance can be traced to future P/B variations, while future ROE and future returns make up 50% and 20%, respectively. The accuracy of the loglinear approximation is evident—the sums of the slopes at the one-, three-, and five-year horizons are given by 0.993, 0.988, and 0.986, respectively, all within two percent from one. The fact that half of all variations in relative P/B are associated with future relative ROE movements at the five-year horizon suggests that information on future profitability plays an important role in the determination of international relative valuations. Even though accounting conventions do differ across countries, our results suggest that investors understand these differences to a large extent and are able to incorporate them into prices.

We can also quantify the cross-sectional relationship between current P/B and future ROE from a forecasting perspective. The adjusted R^2 of the predictive regression of future relative ROE on current relative P/B measures the fraction of all variations in future profitability that can be explained by current relative valuations. This number rises from 14% at the one-year horizon to 34% at the five-year horizon, suggesting that stock prices are highly informative for future profitability.

Insert Table 2 about here

P/B Decomposition Over Time

To see how the cross-sectional decomposition changes over time, we split our full sample (start year of 1980 to 2004, at the five-year horizon) into two halves (1980-1992; 1993-2004) and then examine if there is any marked difference between them. Table 3, Panels A and B report the estimates for the first and second half of our sample, respectively. In terms of the fraction of all cross-sectional variations in current P/B that can be explained by movements in future relative profitability, we see a substantial increase over time—from 35.7% in the first half to 63.9% in the second half. To see if this difference across the two periods is statistically significant, we add a dummy variable to interact with the slopes of the original regressions (5), and estimate the following specification:

$$\begin{aligned}
\sum_{j=0}^{N-1} \rho^j \widetilde{roe}_{i,t+j} &= \beta_1(\widetilde{roe}, N)\widetilde{pb}_{i,t-1} + \beta_2(\widetilde{roe}, N)D_{t-1}\widetilde{pb}_{i,t-1} + u(\widetilde{roe}, N, i, t+N-1) \\
\sum_{j=0}^{N-1} \rho^j \left(-\tilde{r}_{i,t+j}\right) &= \beta_1(-\tilde{r}, N)\widetilde{pb}_{i,t-1} + \beta_2(-\tilde{r}, N)D_{t-1}\widetilde{pb}_{i,t-1} \\
&\quad + u(-\tilde{r}, N, i, t+N-1) \\
\rho^N \widetilde{pb}_{i,t+N-1} &= \beta_1(\widetilde{pb}, N)\widetilde{pb}_{i,t-1} + \beta_2(\widetilde{pb}, N)D_{t-1}\widetilde{pb}_{i,t-1} + u(\widetilde{pb}, N, i, t+N-1),
\end{aligned} \tag{9}$$

where $D_{t-1} = 1$ if $t-1 \in [1993,2004]$, $D_{t-1} = 0$ otherwise, and $N = 5$, as we focus on the five-year horizon. These results, reported on Table 3, Panel C, show that the sharp rise in the ROE component is statistically significant.

We can also see a substantial increase in the fraction of all variations in future relative profitability that can be explained by movements in current relative P/B, as measured by the adjusted R^2 of the predictive regression of future ROE on current P/B. Going from the first half to the second half of our full sample period, Panels A and B of Table 3 show that this measure increases from 18% to 54%. These results show that the international differences in stock market valuation have become more informative for future profitability over time.

Insert Table 3 about here

Emerging Markets

This section presents results from the cross-sectional P/B decomposition among 25 emerging markets. The weaker corporate governance and more opaque accounting practices in emerging markets may make it more difficult for investors to forecast future performance. These markets' less developed financial systems and more volatile political environment may also discourage international capital flows, creating additional friction in the incorporation of cross-country differences in earnings prospects into current stock prices.

The results are reported in Table 4. Due to limits on data availability, we use a shorter sample period, which starts in 1986. The relative size of the predictive coefficients at the one-year horizon remains comparable with those from the developed market sample. But as the horizon lengthens, differences become more apparent. First, the relative importance of future returns grows more rapidly in emerging than in developed markets when the horizon lengthens. For emerging markets at the five-year horizon, variations in future returns are associated with 46.9% of all current variations in P/B. The corresponding number for developed markets, as shown on Table 2, is only 19.8%. Second, for emerging markets, the contribution of the future ROE component remains relatively stable as the horizon lengthens, staying within the 20-30% range throughout. For developed markets, in contrast, variations in future ROE that are associated with current P/B variations increase from 17.7% to 50.3% when the time horizon is lengthened from one to five years.

Insert Table 4 about here

Our results are not sensitive to whether we constrain different countries to have the same value of ρ, or to allow them to take on different values of ρ. When the 25 countries are constrained to have the same value for ρ, and by following the procedure as described in Section 2, we find that the optimal value is given by $\rho = 0.964$. We also see that the quality of the loglinear approximation remains very high (though not as high as that for developed markets, as reported on Table 2)—the sums of the three predictive coefficients are all within four percentage points from one.

Consistent with our expectation, these results suggest a weaker link between current valuations and future profitability among emerging markets. However, as almost 30% of all movements in current P/B are driven by future ROE at the five-year horizon, the relationship between them is still substantial. We also find that, relative to

its developed market counterpart, the future return component in emerging markets accounts for a larger fraction of current P/B variations. As discussed above, for emerging (developed) markets at the five-year horizon, variations in future returns are associated with 46.9% (19.8%) of all current variations in P/B. This finding is consistent with the results reported by Harvey (1995), who shows that emerging market returns tend to be more predictable.[8]

5. Aggregate Dividends

Many studies, such as the works of Shiller (1981), Campbell and Shiller (1988), and Cochrane (1992), show that variations in aggregate dividend growth are only weakly related to movements in the price-dividend ratio over time. In contrast, Sadka (2007) and Chen, Da, and Priestley (2012) show that the time-series relationship between current stock market valuations and future cash flows strengthens substantially when cash flows are proxied by aggregate earnings, rather than by aggregate dividends.

Is this difference also present in our *cross-sectional* setting? Our results above already show that there is a strong cross-country linkage between current P/B and future profitability. In this section, we investigate whether the cross-country relationship between current price-dividend ratios and future dividends tends to be weaker.

The answer to this question is not obvious. If accounting numbers are difficult to compare across countries due to differences in accounting standards and conventions, their impact on the relative valuation of international assets will be limited. By contrast, since dividends are actual cash distributions made to shareholders, they have less room for interpretation, are less sensitive to international accounting differences, and are potentially more closely related to the difference in valuation across countries.

The Variance Decomposition of the Price-Dividend Ratio (P/D): Derivation

To examine this question empirically, we use the loglinear approximation for the price-dividend ratio derived by Campbell and Shiller (1988) and then express it in finite-horizon form, as in equation (3) above for the price-to-book

[8] Harvey (1995) shows that the adjusted R^2 of a predictive regression for future stock returns tends to be higher in emerging than in developed markets. Harvey (1995) suggests that this difference is due to the fact that there are greater time variations in risk exposure in emerging than in developed markets.

ratio:

$$pd_{t-1} = \sum_{j=0}^{N} \rho^j \, \Delta d_{t+j} - \sum_{j=0}^{N} \rho^j \, r_{t+j} + \rho^{N+1} pd_{t+N}, \tag{10}$$

where pd_t is the log price-dividend ratio and r_t is the log stock return. Since equation (10) holds for all countries, it also holds when all variables are measured as deviation from world average. Using tildes to denote cross-sectionally demeaned quantities, we rewrite equation (10) as a relationship between the current relative pd, future relative dividend growth, future relative stock returns, and future relative pd:

$$\widetilde{pd}_{t-1} = \sum_{j=0}^{N} \rho^j \, \widetilde{\Delta d}_{t+j} - \sum_{j=0}^{N} \rho^j \, \tilde{r}_{t+j} + \rho^{N+1} \widetilde{pd}_{t+N}. \tag{11}$$

As in equation (6) above for the price-to-book ratio, we can write the unconditional, cross-sectional variance of $\widetilde{pd}$ as

$$\begin{aligned} var_{t-1}\left(\widetilde{pd}_{t-1}\right) = & \sum_{j=0}^{N} \rho^j \, cov_{t-1}\left(\widetilde{\Delta d}_{t+j}, \widetilde{pd}_{t-1}\right) \\ & - \sum_{j=0}^{N} \rho^j \, cov_{t-1}\left(\tilde{r}_{t+j}, \widetilde{pd}_{t-1}\right) + \rho^{N+1} cov_{t-1}\left(\widetilde{pd}_{t+N}, \widetilde{pd}_{t-1}\right), \end{aligned} \tag{12}$$

which is a decomposition of movements in international relative pd into three components. Dividing equation (12) through by $var_{t-1}(\widetilde{pd})$ implies that:

$$\begin{aligned} 1 = & \frac{\sum_{j=0}^{N} \rho^j \, cov_{t-1}(\widetilde{\Delta d}_{t+j}, \widetilde{pd}_{t-1})}{var_{t-1}(\widetilde{pd}_{t-1})} - \frac{\sum_{j=0}^{N} \rho^j \, cov_{t-1}(\tilde{r}_{t+j}, \widetilde{pd}_{t-1})}{var_{t-1}(\widetilde{pd}_{t-1})} \\ & + \frac{\rho^{N+1} cov_{t-1}(\widetilde{pd}_{t+N}, \widetilde{pd}_{t-1})}{var_{t-1}(\widetilde{pd}_{t-1})}. \end{aligned} \tag{13}$$

The three terms on the right hand side of equation (13) correspond to the slopes in the predictive regressions of future relative dividend growth, future relative stock returns, and future relative price-dividend ratio on the current relative price-dividend ratio, as follows:

$$\sum_{j=0}^{N-1} \rho^j \, \widetilde{\Delta d}_{i,t+j} = \beta_{t-1}(\widetilde{\Delta d}, N) \widetilde{pd}_{i,t-1} + \varepsilon(\widetilde{\Delta d}, N, i, t+N-1)$$

$$\sum_{j=0}^{N-1} \rho^j \left(-\tilde{r}_{i,t+j}\right) = \beta_{t-1}(-\tilde{r}, N)\widetilde{pd}_{i,t-1} + \varepsilon(-\tilde{r}, N, i, t+N-1) \tag{14}$$

$$\rho^N \widetilde{pd}_{i,t+N-1} = \beta_{t-1}(\widetilde{pd}, N)\widetilde{pd}_{i,t-1} + \varepsilon(\widetilde{pd}, N, i, t+N-1),$$

where i is a country subscript. Equation (13) implies that the three predictive coefficients sum to one, $\beta_{t-1}(\widetilde{\Delta d}, N) + \beta_{t-1}(-\tilde{r}, N) + \beta_{t-1}(\widetilde{pd}, N) = 1$. Empirically, how close this sum is from one serves as a check of the accuracy of the loglinear approximation (10).

The Variance Decomposition of P/D: Results

As a preliminary analysis, we calculate the correlation between $\widetilde{pd}$ and $\widetilde{pb}$ within each country of our developed market sample, over the 1980-2009 period. From Table 5, we see that 19 of the 22 correlation coefficients are positive—yet quite different from one—with an average value of only 0.353. This result suggests that $\widetilde{pd}$ and $\widetilde{pb}$, though positively correlated, can potentially have different predictive power for future cash flows and stock returns.

Insert Table 5 about here

To evaluate the information content of P/D in greater detail, we carry out a cross-sectional variance decomposition for pd. A comparison of equation (13) with equation (7) shows that, like the pb decomposition above, the cross-sectional variance of pd can be similarly decomposed into variations in relative future cash flows, relative future stock returns, and relative future valuations. We estimate pooled OLS panel regressions of (14) at the one-, three-, and five-year horizons for our developed market sample over the 1980-2009 period. As discussed above, these pooled coefficient estimates are weighted averages of the cross-sectional coefficients for each time period, and can be interpreted as the fraction of cross-sectional P/D variance that is attributable to future dividend growth, future returns, and future P/D. We report these results in Table 6, which can be directly compared with the pb decomposition results in Table 2.

Insert Table 6 about here

We find that the linkage between current relative pd and future dividend growth is much weaker than the corresponding relationship between current relative pb and future profitability. At the five-year horizon, movements in future relative dividend growth can only account for 15.5% of all current relative pd variations. By contrast, Table 2 reports that 50.3% of all current relative pb variations are related to future profitability. From a forecasting perspective, current relative pd movements can only predict 5% of all future relative dividend growth variations at the five-year horizon, while pb can forecast 34.3% of all cross-country differences in future profitability.

Turning to the future relative pd component of the variance decomposition, we see that even at the five-year horizon, variations in future pd still accounts for 60.3% of all current pd variations (the corresponding estimate for pb is 28.4%). This result is to be expected if dividend smoothing is important (as suggested by Sadka 2007 and Chen, Da, and Priestley 2012 using U.S. evidence). The smoothing of dividends relative to earnings will tend to make dividend less volatile than earnings, and cause changes in pd to be longer-lasting. As a result, a greater fraction of all variations in current pd will persist beyond five years, increasing the size of the future relative pd component of the variance decomposition.

The smoothing of dividends relative to earnings can also explain why current relative valuations have a much weaker link with future relative dividends. Building on the single-country results of Sadka (2007) and Chen, Da, and Priestley (2012), we show that, in a cross-country context, investors are still able to interpret financial statements prepared using different accounting conventions and understand the effects of dividend smoothing—leading international relative valuations to have a much stronger relationship with international relative earnings than with relative dividends. In this sense, we find support for Miller and Modigliani's (1961) dividend irrelevance hypothesis at an international level—what matters for international relative valuations is relative aggregate earnings, rather than how those earnings are distributed.

Unlike the significant differences for future cash flow proxies, the predictive power of relative pd and pb for future stock returns is similar. By comparing Table 6 with Table 2, we see that future relative returns account for 5% (at the one-year horizon) to 20% (at the five-year horizon) of all cross-sectional variations in current valuation, regardless of whether we measure valuation by pd or pb.

6. Portfolio-Level Results

Our previous analysis makes use of predictive regressions to examine the power of relative P/B to forecast future stock returns and profitability. One limitation of the regression framework is the linear parametric relationship that it imposes between the current and future variables. To see that the relationships we examine is robust to the use of this linear structure, we also use portfolio-level tests to demonstrate the predictive power of relative P/B for future stock returns and profitability. In each year, we sort all developed countries in our sample by their P/B. Those countries whose P/B are among the highest (lowest) 30% of a given year are classified into the "growth" ("value") portfolio for that year. These portfolios are formed at the end of June every year. As before, to allow for a lag of up to six months after a fiscal year-end in the reporting of earnings, the P/B at the end of June is calculated based on the current (i.e. end-of-June) market value and the book value from the previous December.

Subsequent to formation, we follow the portfolios' performance in the next one, three, and five years and report their average performance over time. Table 7, Panel A reports the equal-weighted stock returns on the growth, value, and value-minus-growth portfolios at all three horizons. At the one-year horizon, we obtain a mean return of 5.5% on the value-minus-growth portfolio. At the three- and five-year horizons, the cumulative returns on the value-minus-growth portfolio average 21.5% and 39.1%, which correspond to annualized returns of 6.7% and 6.8%, respectively. All mean returns are statistically different from zero at the 1% level, computed based on Newey-West (1987) standards errors.

The one-year return of 5.5% is comparable in size with the Fama-French (1992, 1993) HML premium for the U.S. within the same sample period. It is also close to the mean return of 5.7% reported by Asness, Moskowitz, and Pedersen (2013), who sort 18 developed markets by their aggregate book-to-market ratios and examine the returns on a long-short, value strategy on their equity index futures.

On Table 7, Panel B, we report the corresponding ROE on these same portfolios over the next one, three, and five years. We see that the value-minus-growth portfolios do have negative and sizable future ROE, implying that, relative to other countries, those countries that are expected to earn superior stock returns are also expected to experience relatively lower future profitability.

Insert Table 7 about here

7. Robustness Tests

In this section, we investigate whether the above findings are sensitive to several alternative specifications. First, we measure all variables under consideration in their respective local currencies, rather than in U.S. dollars. These results are reported on Table 8, Panel A. At all three time horizons that we consider, we see that the use of local currencies has no material impact on our previous findings and all the variance decomposition results are within a few percentage points from their U.S. dollar counterparts (as reported in Table 2).

Second, we not only measure all variables in local currencies, but also calculate stock returns and ROEs in excess of their country-specific risk free interest rate. Since the same risk free rate appears in contemporaneous observations of stock return and ROE, this modification does not affect the *sum* of the three terms on the right-hand-side of equation (3), but could potentially affect its *composition*. Table 8, Panel B reports these cross-sectional variance decomposition results.[9] We see that the results remain quantitatively close to our previous estimates and none of our conclusions are affected by this modification.

Third, since our current results are obtained by assuming that the discount coefficient ρ is the same across countries, we investigate the sensitivity of our results to the use of country-specific ρ's.[10] A comparison of the results reported on Table 8, Panel C with those on Table 2 shows that our conclusions are robust to the use of either a common ρ for all countries or country-specific ρ's.

Insert Table 8 about here

Finally, although the focus of this study is on how current valuation ratios are related to future cash flows,

[9] Due to limited availability of interest rate data, the number of observations used here is somewhat smaller than the developed market sample used in Section 4 (with results reported on Table 2). The appendix provides more details on interest rate series.

[10] To obtain country-specific estimates of ρ, we use the procedure as described in Section 2 above and apply it to each country individually.

it is also of interest to examine the link between current stock *returns* and future cash flows—as valuation ratios are driven by expectations (or the "stock" of information already incorporated in prices), whereas returns are driven by *innovations* in expectations (or the "flow" of new information that just gets reflected in prices). By regressing future cash flows on current stock returns, we estimate the fraction of price innovations that is related to future cash flows. As a comparison with our results above for valuation ratios, we use both ROE and dividend growth as our cash flow measure. Table 9 reports these results. We see that the relationship between current returns and future ROE is both statistically and economically significant. This result indicates that a substantial fraction of all cross-sectional variations in price innovations (or returns) is related to differences in future ROE across countries. In contrast, and consistent with the results we report above regarding the relationship between P/D and dividend growth, the cross-sectional link between current returns and future dividend growth is weak.

Insert Table 9 about here

8. Conclusions

International differences in P/B are found to be closely related to variations in future profitability across countries. Among 22 developed markets over the 1980-2009 period, we find that about 50% of all cross-country variations in P/B are associated with movements in profitability up to five years into the future. From a forecasting perspective, we find that 34% of all cross-country differences in future profitability at the five-year horizon have been incorporated into current relative P/B. Over time, we find that the link between future profitability and current valuations has become stronger. In the cross section, the link tends to be weaker for emerging than for developed markets. Although accounting differences may have made earnings from different countries more difficult to compare relative to dividends, we still find that aggregate profitability is much more closely related to international valuations than aggregate dividends are. Our findings suggest that, even at an international, aggregate level, investors are still able to identify value-relevant information about future earnings prospects, understand their differences across countries, and incorporate them into stock market valuations.

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Appendix

Interest Rate Data

The robustness tests reported on Table 7, Panel B require the use of country-specific interest rates in the construction of excess stock returns and excess return on equity (ROE). This appendix displays the interest rate series used in each country, the sample periods covered, and the total number of years of data available. The sources of the interest rate series are displayed in the last column. The IFS is the International Financial Statistics database compiled by the International Monetary Fund. The U.S. Treasury Bill data is obtained from Professor Kenneth French's website.

Country	Sample Period	No. of Years	Interest Rate Series	Source
Australia	1980 – 2009	30	Australia Dealer Bill - 90 Days	Datastream
Austria	1990 – 2009	20	Austria VIBOR 1 Month - Offered Rate	Datastream
Belgium	1980 – 2009	30	Belgium Treasury Bill - 1 Month	IFS
Canada	1987 – 2009	23	Canada Treasury Bill - 3 Months	IFS
Denmark	1987 – 2009	23	Denmark Interbank 1 Month - Offered Rate	Datastream
Finland	1988 – 2009	22	Finland Interbank Fixing 1 Month - Offered Rate	Datastream
France	1983 – 2009	27	France Treasury Bill - 1 Month	IFS
Germany	1980 – 2009	30	Money Market Rate - 1-Month Frankfurt Banks (DISC) - Middle Rate	Datastream
Hong Kong	1990 – 2009	20	Hong Kong Exchange Fund Bill - 3 Months	Datastream
Ireland	1983 – 2009	27	Ireland Interbank 1 Month - Offered Rate	Datastream
Italy	1986 – 2009	24	Italy Treasury Bill Auction Gross - 3 Months	IFS
Japan	1980 – 2009	30	Japan Treasury Bill	IFS
Luxemburg	1992 – 2009	18	Luxembourg SE Bonds (EURO) Short Term - RED. Yield	Datastream
Netherlands	1980 – 2009	30	Netherlands Interbank 1 Month - Middle Rate	Datastream
New Zealand	1991 – 2009	19	New Zealand Bank Bill - 30 Days	Datastream
Norway	1985 – 2009	25	Norway Interbank 1 Month - Middle Rate	Datastream

Country	Sample Period	No. of Years	Interest Rate Series	Source
Singapore	1989 – 2009	21	Singapore Treasury Bill - 3 Months	IFS
Spain	1990 – 2009	20	Spain Treasury Bill - 1 to 3 Months	
Sweden	1982 – 2009	28	Sweden Treasury Bill - 1 Month	IFS
Switzerland	1986 – 2009	24	Switzerland Treasury Bill	IFS
United Kingdom	1980 – 2009	30	United Kingdom Treasury Bill Tender - 3 Months	IFS
United States	1980 – 2009	30	United States Treasury Bill - 1 Month	Fama-French Factors

TABLE 1
Summary statistics

Country	Sample Period	No. of Years	Mean Annual Stock Return in % (s.d.)	Mean Annual Clean-Surplus ROE in % (s.d.)	Mean Dividend Yield in % (s.d.)	Mean Price-to-Book Ratio (s.d.)
Panel A: 22 Developed Markets						
Australia	1980 – 2009	30	12.40 (22.61)	11.65 (17.64)	4.21 (1.12)	1.88 (0.75)
Austria	1980 – 2009	30	19.88 (47.12)	20.37 (30.41)	2.01 (0.86)	1.83 (0.54)
Belgium	1980 – 2009	30	16.77 (29.22)	18.60 (67.84)	3.91 (1.51)	1.01 (0.52)
Canada	1987 – 2009	23	11.81 (18.78)	12.57 (15.26)	2.61 (0.77)	2.08 (0.50)
Denmark	1980 – 2009	30	15.38 (23.76)	19.70 (51.27)	1.94 (0.62)	1.58 (0.62)
Finland	1988 – 2009	22	16.37 (39.37)	14.08 (24.33)	2.80 (1.16)	2.21 (1.34)
France	1983 – 2009	27	17.05 (28.67)	19.08 (17.40)	3.57 (1.19)	2.07 (0.59)
Germany	1980 – 2009	30	13.70 (26.17)	12.00 (16.06)	2.48 (0.85)	1.96 (0.65)
Hong Kong	1980 – 2009	30	16.21 (35.74)	16.42 (21.54)	4.15 (1.77)	1.72 (0.49)
Ireland	1980 – 2009	30	17.41 (37.03)	15.97 (25.20)	4.10 (2.66)	1.96 (1.02)
Italy	1986 – 2009	24	6.84 (25.37)	13.12 (16.67)	2.86 (0.97)	1.88 (0.58)
Japan	1980 – 2009	30	10.67 (33.03)	10.10 (15.02)	1.06 (0.45)	2.19 (0.84)
Luxemburg	1992 – 2009	18	14.62 (28.43)	15.73 (41.77)	2.49 (0.99)	1.46 (0.99)
Netherlands	1980 – 2009	30	15.98 (24.70)	15.62 (22.13)	4.19 (1.50)	1.75 (0.77)
New Zealand	1991 – 2009	19	12.73 (25.31)	25.83 (29.39)	4.93 (1.00)	2.95 (1.15)
Norway	1981 – 2009	29	18.40 (27.59)	19.84 (34.72)	2.94 (1.39)	2.17 (0.85)
Singapore	1989 – 2009	21	10.21 (31.48)	9.51 (16.80)	2.40 (0.83)	1.52 (0.34)
Spain	1990 – 2009	20	12.46 (22.45)	6.22 (23.22)	3.29 (1.24)	1.80 (1.02)
Sweden	1982 – 2009	28	17.12 (35.12)	16.52 (16.37)	2.85 (0.96)	2.04 (0.67)
Switzerland	1986 – 2009	24	12.27 (19.66)	13.30 (17.30)	1.88 (0.36)	2.26 (0.74)
United Kingdom	1980 – 2009	30	13.29 (21.74)	12.98 (20.62)	4.35 (1.21)	1.99 (0.73)
United States	1980 – 2009	30	12.59 (19.76)	13.97 (5.99)	3.11 (1.64)	2.72 (1.03)

TABLE 1
Summary statistics (continued)

Country	Sample Period	No. of Years	Mean Annual Stock Return in % (s.d.)	Mean Annual Clean-Surplus ROE in % (s.d.)	Mean Dividend Yield in % (s.d.)	Mean Price-to-Book Ratio (s.d.)
Panel B: 25 Emerging Markets						
Argentina	1993 – 2009	17	9.07 (46.44)	6.99 (26.05)	2.69 (1.56)	1.64 (0.54)
Chile	1989 – 2009	21	22.83 (40.80)	14.26 (12.26)	4.29 (3.39)	1.79 (0.56)
China	1996 – 2009	14	19.94 (37.27)	17.49 (26.23)	3.38 (1.91)	2.04 (0.87)
Colombia	1992 – 2009	18	19.33 (49.10)	13.45 (41.27)	2.67 (1.72)	1.14 (0.92)
Czech Republic	1995 – 2009	15	22.61 (36.18)	13.34 (21.21)	4.60 (2.75)	1.48 (0.89)
Greece	1990 – 2009	20	12.49 (29.83)	16.61 (21.21)	3.19 (1.42)	2.60 (1.16)
Hungary	1992 – 2009	18	20.05 (38.77)	16.81 (20.43)	3.33 (1.82)	1.88 (0.66)
India	1990 – 2009	20	19.93 (45.01)	17.30 (23.75)	1.73 (0.97)	2.81 (1.00)
Indonesia	1992 – 2009	18	19.72 (64.81)	10.00 (33.02)	2.54 (1.49)	3.07 (0.98)
Israel	1993 – 2009	17	13.84 (22.03)	14.75 (25.12)	3.19 (1.71)	2.02 (0.37)
Korea	1990 – 2009	20	20.59 (74.95)	11.58 (37.71)	2.00 (0.90)	1.30 (0.45)
Malaysia	1986 – 2009	24	12.52 (30.10)	15.53 (26.31)	3.00 (1.24)	2.31 (0.73)
Mexico	1989 – 2009	21	18.17 (31.93)	15.31 (19.06)	2.43 (1.72)	2.07 (0.49)
Pakistan	1992 – 2009	18	12.12 (43.14)	15.38 (22.06)	5.40 (4.44)	2.58 (1.13)
Peru	1994 – 2009	16	12.86 (29.03)	23.60 (69.11)	3.61 (3.05)	2.11 (1.42)
Philippines	1990 – 2009	20	13.19 (42.56)	9.37 (34.88)	1.50 (0.82)	2.18 (1.20)
Poland	1994 – 2009	16	12.35 (33.75)	18.31 (31.13)	2.07 (1.19)	2.11 (0.56)
Portugal	1990 – 2009	20	11.48 (27.13)	10.90 (25.70)	3.10 (0.87)	2.12 (0.72)
Russia	1998 – 2009	12	30.02 (43.06)	35.51 (36.16)	2.15 (1.27)	1.72 (1.02)
Slovenia	2000 – 2009	10	30.94 (49.70)	25.29 (25.78)	1.65 (0.78)	1.82 (0.59)
South Africa	1980 – 2009	30	16.29 (37.20)	18.26 (28.68)	3.96 (1.86)	2.31 (0.61)
Sri Lanka	1993 – 2009	17	7.97 (34.03)	10.45 (12.91)	4.11 (2.38)	1.48 (0.59)
Taiwan	1988 – 2009	22	4.30 (29.30)	10.35 (12.48)	2.04 (1.18)	2.88 (1.15)
Thailand	1987 – 2009	23	15.76 (45.21)	16.58 (32.54)	3.51 (2.11)	2.26 (0.79)
Turkey	1989 – 2009	21	16.99 (46.81)	16.15 (40.88)	4.74 (4.91)	2.11 (0.95)

TABLE 1
Summary statistics (continued)

Notes:

This table reports the sample periods and summary statistics for all countries in our sample. All variables are obtained from Datastream, measured at the country-index level, and are denominated in US dollars. Panel A contains results for developed markets; Panel B contains results for emerging markets. All statistics reported are sample averages, with standard deviations shown in parentheses.

TABLE 2
Cross-sectional variance decomposition of the price-to-book ratio

Horizon (Years)	Sample	Country-year Obs.	Future ROE	-Future Returns	Future P/B	Sum	Adjusted R-sq. (Future ROE)
1	1980-2008	563	0.177 [4.14] {4.90}	0.056 [3.34] {2.69}	0.760 [15.28] {14.35}	0.993	0.138
3	1980-2006	519	0.396 [7.89] {6.90}	0.148 [5.05] {3.16}	0.444 [8.07] {5.77}	0.988	0.288
5	1980-2004	475	0.503 [8.46] {6.43}	0.198 [5.31] {3.45}	0.284 [6.53] {4.56}	0.986	0.342

Notes:

This table reports the cross-sectional variance decomposition of the price-to-book ratio (P/B) for 22 developed markets. The estimates are obtained by running pooled OLS regressions, as slopes of the predictive regressions of future return on equity (ROE), negative future returns, and future P/B on current P/B. All variables are measured in logs and as deviations from world averages. The first column on this table shows the horizon N (in years). The second column reports the sample period for current P/B that corresponds to the particular horizon. The third column reports the number of country-year observations used. The next three columns display the three components of the P/B variance decomposition. Two t-statistics are reported for each coefficient estimate: the first is based on the Rogers (1983) standard error with time clustering, the second is based on the double-clustered standard error as proposed by Thompson (2011). The next column reports the sum of the three components. The last column reports the adjusted R-squared of the predictive regression of future ROE on current P/B.

TABLE 3
Cross-sectional variance decomposition for two sub-periods

Country-year Obs.	Future ROE	-Future Returns	Future P/B	Sum	Adjusted R-sq. (Future ROE)
		Panel A: 1980-1992			
211	0.357 [10.02] {3.94}	0.223 [5.19] {4.26}	0.399 [8.35] {4.73}	0.979	0.176
		Panel B: 1993-2004			
264	0.639 [9.61] {5.80}	0.176 [3.05] {1.87}	0.177 [4.85] {3.12}	0.992	0.540
		Panel C: Full Sample			
475	0.346 [10.25] {4.44}	0.225 [5.42] {4.86}	0.414 [9.33] {5.33}	0.985	0.373
		Interaction Terms with Sub-period Dummy			
	(Future ROE)*D	(-Future Returns)*D	(Future P/B)*D		
	0.302 [5.09] {2.28}	-0.051 [-0.79] {-0.55}	-0.250 [-4.64] {-3.58}		

Notes:

Panels A and B of this table report, respectively, the cross-sectional variance decomposition of the price-to-book ratio (P/B) for 22 developed markets in two sub-periods: 1980-1992 and 1993-2004, at the 5-year horizon. Within each sub-period, the estimates are obtained by running pooled OLS regressions, as slopes of the predictive regressions of future return on equity (ROE), negative future returns, and future P/B on current P/B. The first column reports the number of country-year observations used. The columns labeled future ROE, negative future returns, and future P/B display the three components of the variance decomposition. Panel C reports the cross-sectional variance decomposition of P/B with all years included and estimated with a sub-period dummy, which takes on the value of one when the start year of the estimation falls into the second half of our sample (1993-2004). The first row in Panel C reports the coefficients

on future ROE, negative future returns, and future P/B. The second row in Panel C reports the coefficients on the interaction terms between future ROE, negative future returns, future P/B and the sub-period dummy variable. All variables are measured in logs and as deviations from world averages. Two t-statistics are reported for each coefficient estimate: the first is based on the Rogers (1983) standard error with time clustering, the second is based on the double-clustered standard error as proposed by Thompson (2011). The next column reports the sum of the three components. The last column reports the adjusted R-squared of the predictive regression of future ROE on current P/B.

TABLE 4
Cross-sectional variance decomposition of the price-to-book ratio for emerging markets

Horizon (Years)	Sample	Country-year Obs.	Future ROE	-Future Returns	Future P/B	Sum	Adjusted R-sq. (Future ROE)
1	1986-2008	437	0.216 [6.21] {5.60}	0.127 [3.79] {3.31}	0.645 [14.41] {11.40}	0.988	0.150
3	1986-2006	387	0.285 [6.14] {5.35}	0.306 [5.71] {3.77}	0.390 [5.97] {4.57}	0.981	0.128
5	1986-2004	337	0.287 [5.40] {3.79}	0.469 [9.73] {4.53}	0.207 [4.19] {2.47}	0.962	0.098

Notes:

This table reports the cross-sectional variance decomposition of the price-to-book ratio (P/B) for 25 emerging markets. The estimates are obtained by running pooled OLS regressions, as slopes of the predictive regressions of future return on equity (ROE), negative future returns, and future P/B on current P/B. All variables are measured in logs and as deviations from world averages. The first column on this table shows the horizon N (in years). The second column reports the sample period for current P/B that corresponds to the particular horizon. The third column reports the number of country-year observations used. The next three columns display the three components of the P/B variance decomposition. Two t-statistics are reported for each coefficient estimate: the first is based on the Rogers (1983) standard error with time clustering, the second is based on the double-clustered standard error as proposed by Thompson (2011). The next column reports the sum of the three components. The last column reports the adjusted R-squared of the predictive regression of future ROE on current P/B.

TABLE 5
Time-series correlations between the aggregate price-to-book and price-dividend ratios

Country	Sample Period	No. of Years	Correlation Coefficient
Australia	1980 – 2009	30	0.167
Austria	1980 – 2009	30	0.688
Belgium	1980 – 2009	30	-0.133
Canada	1987 – 2009	23	0.429
Denmark	1980 – 2009	30	0.398
Finland	1988 – 2009	22	0.342
France	1983 – 2009	27	0.071
Germany	1980 – 2009	30	0.481
Hong Kong	1980 – 2009	30	0.770
Ireland	1980 – 2009	30	0.182
Italy	1986 – 2009	24	0.329
Japan	1980 – 2009	30	0.546
Luxemburg	1992 – 2009	18	-0.184
Netherlands	1980 – 2009	30	0.189
New Zealand	1991 – 2009	19	-0.216
Norway	1981 – 2009	29	0.444
Singapore	1989 – 2009	21	0.731
Spain	1990 – 2009	20	0.831
Sweden	1982 – 2009	28	0.366
Switzerland	1986 – 2009	24	0.587
United Kingdom	1980 – 2009	30	0.167
United States	1980 – 2009	30	0.585

Notes:

This table reports the time-series Pearson correlations between the aggregate price-to-book ratio (P/B) and price-dividend ratio (P/D) within each country, with both variables being measured in logs and as deviations from world averages. The variables are obtained from Datastream, measured at the country-index level, and are denominated in US dollars.

TABLE 6
Cross-sectional variance decomposition of the price-dividend ratio

Horizon (Years)	Sample	Country-year Obs.	Future Dividend Growth	-Future Returns	Future P/D	Sum	Adjusted R-sq. (Future Dividend Growth)
1	1980-2008	595	0.044 [2.46] {1.68}	0.053 [2.83] {4.39}	0.891 [40.30] {32.04}	0.989	0.012
3	1980-2006	551	0.124 [4.94] {1.85}	0.153 [5.36] {6.77}	0.692 [27.87] {11.60}	0.969	0.043
5	1980-2004	507	0.155 [4.06] {1.52}	0.193 [5.72] {4.25}	0.603 [24.64] {10.12}	0.952	0.048

Notes:

This table reports the cross-sectional variance decomposition of the price-dividend ratio (P/D) for 22 developed markets. The estimates are obtained by running pooled OLS regressions, as slopes of the predictive regressions of future dividend growth, negative future returns, and future P/D on current P/D. All variables are measured in logs and as deviations from world averages. The first column on this table shows the horizon N (in years). The second column reports the sample period for current P/D that corresponds to the particular horizon. The third column reports the number of country-year observations used. The next three columns display the three components of the P/D variance decomposition. Two t-statistics are reported for each coefficient estimate: the first is based on the Rogers (1983) standard error with time clustering, the second is based on the double-clustered standard error as proposed by Thompson (2011). The next column reports the sum of the three components. The last column reports the adjusted R-squared of the predictive regression of future dividend growth on current P/D.

TABLE 7
Future stock returns and returns on equity of value and growth portfolios

Panel A: Stock Returns				
Horizon (Years)	Sample (Start years)	Mean Value Portfolio Returns	Mean Growth Portfolio Returns	Mean Value-Growth Portfolio Returns
1	1980-2008	0.173 (3.59)	0.118 (2.61)	0.055 (3.39)
3	1980-2006	0.724 (4.41)	0.509 (3.38)	0.215 (7.72)
5	1980-2004	1.467 (4.25)	1.077 (3.15)	0.391 (6.49)
Panel B: Return on Equity (ROE)				
Horizon (Years)	Sample (Start years)	Mean Value Portfolio ROE	Mean Growth Portfolio ROE	Mean Value-Growth Portfolio ROE
1	1980-2008	0.088 (2.44)	0.221 (7.47)	-0.133 (-3.75)
3	1980-2006	0.375 (3.56)	0.799 (6.28)	-0.424 (-4.09)
5	1980-2004	0.820 (3.79)	1.494 (6.05)	-0.675 (-3.58)

Notes:

This table reports the future stock returns and returns on equity (ROE) on the value and growth portfolios formed at the country-index level. These portfolios are formed by sorting all developed countries in our sample by their price-to-book ratio (P/B). Those countries whose P/B are among the highest (lowest) 30% of a given year are classified into the "growth" ("value") portfolio for that year. The first column shows the holding period N (in years). The second column reports the range of start years (i.e. the time when the portfolio is formed) for a particular holding period. Panel A reports the portfolios' mean, equal-weighted,

cumulative stock returns N years after portfolio formation. Panel B reports the portfolios' mean, equal-weighted, cumulative ROE N years after portfolio formation. T-statistics based on the Newey-West (1987) standard errors (with lag length N) are reported in parentheses.

TABLE 8
Robustness tests: Variance decomposition of the price-to-book ratio

Horizon (Years)	Sample	Country-year Obs.	Future ROE	-Future Returns	Future P/B	Sum	Adjusted R-sq. (Future ROE)
Panel A: Local Currency							
1	1980-2008	563	0.158 [3.39] {4.04}	0.067 [4.14] {2.93}	0.767 [14.58] {14.10}	0.992	0.116
3	1980-2006	519	0.363 [6.44] {5.57}	0.180 [5.33] {3.13}	0.446 [8.06] {5.79}	0.989	0.269
5	1980-2004	475	0.477 [7.45] {5.26}	0.231 [6.03] {3.23}	0.278 [5.90] {4.31]	0.986	0.330
Panel B: Local Currency, Excess ROE and Stock Returns							
1	1980-2008	529	0.167 [3.18] {3.65}	0.043 [2.36] {2.74}	0.800 [14.69] {14.98}	1.010	0.134
3	1980-2006	485	0.378 [5.95] {5.73}	0.131 [4.61] {3.24}	0.522 [9.37] {8.47}	1.031	0.296
5	1980-2004	441	0.549 [8.45] {6.23}	0.203 [5.37] {3.09}	0.292 [6.18] {4.23}	1.044	0.404

TABLE 8
Robustness tests: Variance decomposition of the price-to-book ratio (continued)

Horizon (Years)	Sample	Country-year Obs.	Future ROE	-Future Returns	Future P/B	Sum	Adjusted R-sq. (Future ROE)
Panel C: Country-specific ρ							
1	1980-2008	563	0.177 [4.14] {4.90}	0.056 [3.34] {2.69}	0.759 [15.43] {14.33}	0.992	0.138
3	1980-2006	519	0.394 [7.79] {6.87}	0.147 [5.01] {3.13}	0.443 [8.32] {5.64}	0.984	0.286
5	1980-2004	475	0.499 [8.33] {6.43}	0.196 [5.22] {3.40}	0.288 [6.50] {4.32}	0.983	0.337

Notes:

This table reports four robustness tests for the cross-sectional variance decomposition of the price-to-book ratio (P/B) for 22 developed markets. The estimates are obtained by running pooled OLS regressions, as slopes of the predictive regressions of future return on equity (ROE), negative future returns, and future P/B on current P/B. Panel A reports variance decomposition results when all variables are denominated in local currencies. Panel B reports results that use local-currency variables, and with stock returns and ROE being measured in excess of the local riskfree rate. Further details on the interest rate series used are reported in the appendix. Panel C reports results that use country-specific values of the discount coefficient ρ. The first column shows the horizon N (in years). The second column reports the sample period for current P/B that corresponds to the particular horizon. The third column reports the number of country-year observations used. The next three columns display the three components of the P/B variance decomposition. All variables are measured in logs and as deviations from world averages. Two t-statistics are reported for each coefficient estimate: the first is based on the Rogers (1983) standard error with time clustering, the second is based on the double-clustered standard error as proposed by Thompson (2011). The next column reports the sum of the three

components. The last column reports the adjusted R-squared of the predictive regression of future ROE on current P/B.

TABLE 9

Robustness tests: Regression of future cash flows on current stock returns

Horizon (Years)	Sample	Country-year Obs.	Future ROE	Future Dividend Growth	Adjusted R-sq.
1	1980-2008	563	0.165 [2.73] {2.66}		0.022
3	1980-2006	519	0.236 [2.45] {2.28}		0.017
5	1980-2004	475	0.313 [3.00] {3.39}		0.020
1	1980-2008	595		-0.148 [-2.13] {-2.07}	0.022
3	1980-2006	551		0.052 [0.52] {0.38}	-0.001
5	1980-2004	507		0.006 [0.06] {0.05}	-0.002

Notes:

This table reports pooled OLS regression results of future return on equity (ROE) or future dividend growth on current stock returns for 22 developed markets. The first column shows the horizon N (in years). The second column reports the sample period for current stock returns that corresponds to the particular horizon. The third column reports the number of country-year observations used. The next two columns display the slope of the regression of future ROE or future dividend growth on current returns. All variables are measured in logs and as deviations from world averages. Two t-statistics are reported for each coefficient estimate: the first is based on the Rogers (1983) standard error with time clustering, the second is based on the double-clustered standard error as proposed by Thompson (2011). The last column reports the adjusted R-squared of the regressions.