The Implied Cost of Capital: A New Approach

Kewei Hou, Mathijs A. van Dijk, and Yinglei Zhang*

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Abstract

We propose a new approach to estimate the implied cost of capital (ICC). Our approach is distinct from prior studies in that we do not rely on analysts' earnings forecasts to compute the ICC. Instead, we use a cross-sectional model to forecast the earnings of individual firms. Our approach has two major advantages. First, it allows us to estimate the ICC for a much larger sample of firms over a much longer time period. Second, it is not affected by the various issues that lead to the well-documented biases in analysts' forecasts. Our cross-sectional earnings model delivers earnings forecasts that outperform consensus analyst forecasts. We show that, as a result, our approach to estimate the ICC produces a more reliable proxy for expected returns than other approaches. We present evidence on the implications for the equity premium and a variety of asset pricing anomalies.

* Kewei Hou is at the Fisher College of Business, Ohio State University. Mathijs A. van Dijk is at the Rotterdam School of Management, Erasmus University. Yinglei Zhang is at the School of Accountancy, Chinese University of Hong Kong. E-mail addresses: hou.28@osu.edu, madijk@rsm.nl, and yinglei@baf.msmail.cuhk.edu.hk. We thank Zhihong Chen, Patricia Dechow, Peter Easton, John Griffin, Zhaoyang Gu, Hao Jiang, Jim Ohlson, Lubos Pástor, Scott Richardson, K.R. Subramanyam, Siew Hong Teoh, and seminar participants at Erasmus University, Hong Kong University of Science and Technology, Limperg Institute, Singapore Management University, Tsinghua University, University of California at Irvine, and University of Southern California for helpful comments and discussion. We are grateful to Inquire-UK and Research Grants Council (RGC) of Hong Kong for funding support of this project. All errors remain our own.

Estimating a firm's expected stock return (or cost of equity capital) is essential for testing the tradeoff between risk and return, a central theme in modern finance. A large body of accounting research also relies on expected return estimates to study the impact of corporate governance and disclosure on the cost of capital. In addition, expected stock returns play a key role in capital budgeting and other corporate finance decisions, and are important to investment management practices such as portfolio allocation, performance evaluation, active risk management, and style/attribution analysis.

Prior academic studies almost exclusively rely on average realized (ex post) stock returns to measure ex ante expected returns. However, as many researchers (e.g., Blume and Friend, 1973; Sharpe, 1978; Froot and Frankel, 1989; Elton, 1999) point out, realized returns are a noisy proxy for expected returns. Empirically, expected return estimates that are based on average realized returns have proven inadequate in many regards. Elton (1999) provides examples that show that average realized returns can deviate significantly from expected returns over prolonged periods of time. Traditional asset pricing models such as the CAPM and the APT as well as empirically motivated models such as the Fama and French (1993) three-factor model can also generate expected return estimates, but these too are based on realized returns. Moreover, they are notoriously imprecise (see, e.g., Fama and French, 1997).

To address these deficiencies, recent accounting and finance literature (e.g., Claus and Thomas, 2001; Gebhardt, Lee, and Swaminathan, 2001; Pástor, Sinha, and Swaminathan, 2007) proposes an alternative approach to estimate expected returns: the implied cost of capital (ICC).[1] The ICC of a given firm is the internal rate of return that equates the firm's stock price to the present value of expected future cash flows (typically measured by analysts' earnings forecasts). In other words, it is the discount rate that the market uses to discount the expected cash flows of the firm. The main advantage of the ICC approach is that it does not rely on noisy realized returns or on a specific asset pricing model. Instead, it derives expected returns directly from stock prices and earnings forecasts.

The idea behind the ICC is simple and intuitively appealing. As a result, the ICC estimated based on analysts' forecasts has been applied in many studies on empirical asset pricing (e.g., Gebhardt, Lee, and Swaminathan, 2001; Pástor, Sinha, and Swaminathan, 2007; Chava and Purnanandam, 2009; Chen and Zhao, 2009) and on issues related to corporate governance and disclosure (e.g., Francis, Khurana, and Pereira, 2005; Hail and Leuz, 2006ab; Hribar and Jenkins, 2004). However, there is growing evidence suggesting that the performance of the analyst-based ICC as a proxy for expected returns is not satisfactory. Several authors (e.g., Easton and Monahan, 2005; Guay, Kothari, and Shu, 2005) study the reliability of the ICC as an expected return estimate by examining the relation between the ICC and realized returns. The general conclusion is that the analyst-based ICC is not a reliable proxy for expected returns. For example, Easton and Monahan (2005) find that these ICC estimates are negatively correlated with realized returns after controlling for proxies for cash flow news and discount rate news.[2] They attribute the lack

[1] We refer to Easton (2009) for a comprehensive review of this literature.

[2] According to Campbell (1991), realized returns must, mechanically, equal the sum of expected returns, news about future cash flows (cash flow news), and news about future expected returns (discount rate news). Therefore, a reliable expected return proxy should be positively correlated with realized returns after controlling for cash flow news and discount rate news.

of reliability of the ICC to the biases in analysts' earnings forecasts, and call for additional research on accounting-based expected return proxies.

There are other concerns about the analyst-based ICC estimates. First, it is not clear that analysts' earnings forecasts truly reflect market expectations. Although analysts' forecasts are widely used by researchers and practitioners, they also exhibit important biases. A large number of studies (see, e.g., Easton and Sommers, 2007) document that analysts' forecasts tend to be too optimistic. Analysts also overreact (underreact) to good (bad) earnings news, consistent with incentive-based explanations of analyst optimism (e.g., Abarbanell and Bernard, 1992; Dugar and Nathan, 1995; Lin and McNichols, 1998). Furthermore, Abarbanell and Bushee (1997) and Francis, Olsson, and Oswald (2000) find large valuation errors when analysts' forecasts are used in valuation models.

Second, the IBES analyst data are only available after 1976, and small firms and financially distressed firms are underrepresented (La Porta, 1996; Hong, Lim, and Stein, 2000; Diether, Malloy, and Scherbina, 2002). In addition, for many firms with analyst data, earnings forecasts beyond the second year are not available. This is especially true in the earlier years. As a result, the analyst-based ICC has limited cross-sectional and time series coverage, which can impede the investigation of issues that require a long time series of expected return estimates or expected return estimates for small or distressed firms.

In this paper, we propose a new approach to estimate the ICC. Building on the work of Fama and French (2000, 2006), Hou and Robinson (2006), and Hou and van Dijk (2010), we use a cross-sectional model to forecast the earnings of individual firms. These studies show that cross-sectional models are remarkably powerful in capturing variation in future profitability across firms. We then input the model-based earnings forecasts into the discounted residual income model to estimate the ICC for a large cross-section of U.S. firms.

A major advantage of our approach is that it uses the large cross-section of individual firms to compute earnings forecasts and therefore generates statistical power while imposing minimal survivorship requirements. Our approach allows us to compute the ICC for any firm with publicly traded equity and information on a limited number of accounting variables. Hence, the cross-sectional coverage of our ICC estimates is much larger than in studies that use analysts' forecasts. In addition, we are able to estimate the ICC for earlier periods during which the IBES analyst data are not available.

A second important advantage of forecasting earnings using a cross-sectional model is that the forecasts are not affected by issues related to analysts' incentives, which cause analysts' forecasts to be biased. Rather, the model provides a parsimonious and unbiased way of capturing market expectations of future earnings based on a limited set of public information that is available to market participants ex ante.

Our cross-sectional earnings model captures a substantial fraction of the variation in earnings performance across firms using variables that are known at the time of the forecast. The average adjusted R^2s of the regressions forecasting one-, two-, and three-year ahead earnings are 87%, 81%, and 77%, respectively. More importantly, the model produces earnings forecasts that are comparable to the consensus analyst forecasts in terms of accuracy, but exhibit much lower levels of bias and much higher levels of earnings response coefficients.

Following Easton and Monahan (2005), we assess the reliability of the model-based ICC by examining the relation between the ICC estimates and realized returns (controlling for proxies for cash flow news and discount rate news). We find that our ICC estimates are significantly positively correlated with realized returns, while – in line with the findings of Easton and Monahan (2005) – the traditional ICC estimates based on analysts' forecasts are negatively correlated with realized returns. A spread portfolio that longs stocks with high ICC estimates and shorts stocks with low ICC estimates produces a positive average return of close to 9% per annum for the model-based ICC and a negative average return of up to -10% for the analyst-based ICC.

We provide evidence suggesting that the greater reliability of our ICC estimates stems from the superior earnings forecasts produced by the cross-sectional model. We sort firms into tercile portfolios based on their forecast bias, forecast accuracy, or the firm-specific earnings response coefficient. We then compute the correlation between the ICC estimates and realized stock returns within each of the tercile portfolios. We find that this correlation is the highest for the portfolio of firms with the lowest forecast bias, the highest accuracy, or the greatest earnings response coefficient. The correlation decreases as the bias increases, the accuracy worsens, or as the earnings response coefficient decreases. Hence, better earnings forecasts translate into a closer association between the ICC and realized stock returns.

Our approach to estimate the ICC has important implications for a number of key issues in asset pricing. We re-examine the equity premium and a variety of asset pricing anomalies using our ICC estimates. Our analysis indicates that using our new, ex ante measure of expected returns leads to different inferences about the equity premium as well as the cross-sectional return anomalies related to size, distress, asset growth, accruals, net operating assets (NOA), and analysts' forecast dispersion, compared to studies that rely on ex post measures of expected returns.

The rest of the paper is organized as follows. Section 1 introduces the data, the firm-level cross-sectional earnings model, and the residual income model used to estimate the ICC. Section 2 reports the properties of the earnings forecasts generated by the cross-sectional model and compares them to those of the consensus analyst forecasts. Section 3 describes the ICC estimates based on both the earnings forecasts from the cross-sectional model and those based on the consensus analyst forecasts, and relates them to realized returns. Section 4 examines the equity premium and a number of cross-sectional return anomalies using the model-based ICC estimates. Section 5 concludes.

1. Data and empirical methodology

Our sample includes all NYSE, Amex, and Nasdaq listed securities with sharecodes 10 or 11 (i.e., excluding ADRs, closed-end funds, and REITs) that are at the intersection of the CRSP monthly returns file from July 1963 to June 2008 and the Compustat industrial annual file from 1963 to 2005. We use the following variable definitions. Earnings is net income before extraordinary items from Compustat. Book equity is Compustat stockholder's equity. The market value of a firm is defined as its total assets plus market equity (stock price times the number of shares outstanding at fiscal year end) minus book equity. Total assets and dividends are also from Compustat. We also calculate operating accruals using the indirect balance sheet method as the change in non-cash current assets less the change in current liabilities excluding the change in short-term debt and the change in taxes payable minus depreciation and amortization expense.

To forecast earnings at the individual firm level, we use a model that is based on an extension and variation of the cross-sectional profitability models in Fama and French (2000, 2006), Hou and Robinson (2006), and Hou and van Dijk (2010). Previous studies on earnings forecasting (e.g., Freeman, Ohlson, and Penman, 1982; O'Brien, 1988; Allee, 2008) tend to use separate time series regressions fit to individual firms with long earnings histories. This data requirement introduces survivorship bias to the tests. In addition, estimates based on these individual time series models are not very precise. The advantage of our cross-sectional approach is that it provides statistical power without imposing strict survivorship requirements.

Specifically, for each year t between 1967 and 2005, we estimate the following pooled cross-sectional regressions using the previous ten years (three years minimum) of data:

$$E_{i,t+\tau} = \alpha_0 + \alpha_1 V_{i,t} + \alpha_2 A_{i,t} + \alpha_3 D_{i,t} + \alpha_4 DD_{i,t} + \alpha_5 E_{i,t} + \alpha_6 Neg\,E_{i,t} + \alpha_7 AC_{i,t} + \varepsilon_{i,t+\tau}\,, \quad (1)$$

where $E_{i,t+\tau}$ (τ = 1, 2, or 3) denotes the earnings of firm i in year $t+\tau$, $V_{i,t}$ is the market value of the firm, $A_{i,t}$ is the total book assets, $D_{i,t}$ is the dividend payment, $DD_{i,t}$ is a dummy variable that equals 0 for dividend payers and 1 for non-payers, $Neg\ E_{i,t}$ is a dummy variable that equals 1 for firms with negative earnings (0 otherwise), and $AC_{i,t}$ is the operating accruals. All explanatory variables are measured at the end of year t. This model is also consistent with the fundamental forecasting framework proposed by Richardson, Tuna, and Wysocki (2009).

The main difference between Equation (1) and the cross-sectional models in prior studies (e.g., Fama and French, 2000) is that we use the model to forecast dollar earnings for the next three years, whereas the other papers use cross-sectional models to predict profitability (earnings scaled by total assets) for the next year. We focus on dollar earnings to make our forecasts comparable with analysts' forecasts. In addition, it is a common practice in the literature to use dollar earnings forecasts in the residual income model to estimate the ICC. That said, we are concerned about overweighting firms with extreme earnings in the regressions. To mitigate the influence of such observations, we winsorize earnings and other level variables each year at the 0.5% and 99.5% percentiles (observations beyond the extreme percentiles are set to equal to the values at those percentiles). We also carry out robustness checks by scaling the earnings (and the other variables in the earnings regressions) using total assets, market equity, sales, or net operating assets (NOA) and obtain similar results. Furthermore, our main results are robust when we estimate the earnings regressions for each size quintile or industry (using the Fama-French 12 industry definitions downloaded from Ken French's website) separately. To save space, we do not report these and other robustness findings in the paper, but they are available upon request.

For each firm and each year t in our sample, we estimate expected earnings for year t+1, t+2, and t+3 (i.e., $E_t[E_{t+1}]$, $E_t[E_{t+2}]$, and $E_t[E_{t+3}]$) by multiplying the independent variables observed at the end of year t with the coefficients from the pooled regression estimated using the previous ten years (three years minimum) of data. This is to ensure that our earnings forecasts are strictly out of sample (that is, all information that is required to forecast earnings for year t+1, t+2, and t+3 is available at the end of year t). Note that we only require a firm to have non-missing values for the independent variables for year t to calculate its earnings forecasts. As a result, the survivorship requirement is minimal.

The ICC for a given firm is the internal rate of return that equates the current stock price to the present value of expected future cash flows. One common approach to estimate the ICC is to use the discounted residual income model, which has the following general form:

$$P_{i,t} = BPS_{i,t} + \sum_{k=1}^{\infty} \frac{\mathrm{E}_t[(ROE_{i,t+k} - R_i) \times BPS_{i,t+k-1}]}{(1+R_i)^k}, \qquad (2)$$

where $P_{i,t}$ is the stock price of firm i, R_i is the implied cost of equity capital (ICC), $BPS_{i,t}$ is book equity per share, $\mathrm{E}_t[]$ denotes market expectations, and $(ROE_{i,t+k} - R_i) \times BPS_{i,t+k-1}$ is the firm's residual income for year $t+k$, defined as the difference between the after tax return on book equity and the ICC multiplied by book equity per share for the previous year. Intuitively, a firm's residual income measures its ability to earn income beyond that required by equity investors. Assuming "clean surplus" accounting, equation (2) is equivalent to the familiar dividend discount model.[3] Previous studies (e.g., Penman and Sougiannis, 1998; Francis, Olsson, and Oswald, 2000; Gebhardt, Lee, and Swaminathan, 2001) argue that the residual income model does a better job in capturing the effect of economic profits on firm value, and the resulting valuation is less sensitive to assumptions about long-term growth rates.

We compute the ICC as the cost of capital R_i that solves an adapted version of equation (2):

$$M_{i,t} = B_{i,t} + \sum_{\kappa=1}^{11} \frac{\mathrm{E}_t[(ROE_{i,t+\kappa} - R_i) \times B_{i,t+\kappa-1}]}{(1+R_i)^{\kappa}} + \frac{\mathrm{E}_t[(ROE_{i,t+12} - R_i) \times B_{i,t+11}]}{R_i \times (1+R_i)^{11}}. \qquad (3)$$

This equation is identical to the model of Gebhardt, Lee, and Swaminathan (2001), but expresses firm valuation in terms of market equity ($M_{i,t}$) and book equity ($B_{i,t}$) instead of stock price and book equity per share. In line with Gebhardt, Lee, and Swaminathan (2001), we estimate expected ROE for year t+1 to t+3 using the earnings forecasts from our cross-sectional model and book equity determined based on clean surplus accounting ($B_{i,t+\tau} = B_{i,t+\tau-1} + E_{i,t+\tau} - D_{i,t+\tau}$, where $D_{i,t+\tau}$ is the dividend for year $t+\tau$, computed using the current dividend payout ratio for firms with positive earnings, or using current dividends divided by 0.06 × total assets as an estimate of the payout ratio for firms with negative earnings). After year t+3, we assume that the ROE mean-reverts to the historical industry median value by year t+11, after which point the residual income becomes a perpetuity. As in Gebhardt, Lee, and Swaminathan (2001), we exclude loss firms when calculating the industry median ROE.

We estimate the ICC for each firm at the end of June of each calendar year t using the end-of-June market value and the earnings forecasts at the previous fiscal year end. We follow previous studies and discard negative ICC estimates. In addition, we winsorize the ICC estimates at the 0.5% and 99.5% percentiles to minimize the impact of outliers. However, our main results are robust to relaxing the non-negativity restriction or removing the winsorization. We match the ICC estimates of individual firms with their annual stock returns from July of year t to June of year t+1.

[3] Clean surplus accounting requires that all gains and losses affecting book equity are included in earnings. In other words, the change in book equity is equal to earnings minus net dividends.

2. Properties of the earnings forecasts based on the cross-sectional model

Panel A of Table 1 presents summary statistics (the time series averages of the cross-sectional mean, median, standard deviation, and select percentiles) of the variables used in the cross-sectional earnings model in Equation (1). Panel B of Table 1 reports the average coefficients from the pooled cross-sectional regressions estimated each year from 1967 to 2005 and their time series *t*-statistics. The average coefficients for all of the explanatory variables (except the negative earnings dummy) have the same sign for the one-, two-, and three-year ahead earnings regressions. Consistent with the results of Fama and French (2006), Hou and Robinson (2006), and Hou and van Dijk (2010), earnings are highly persistent. The coefficients on lagged earnings are 0.6839, 0.5981, and 0.5398 (and highly statistically significant) for the one-, two-, and three-year ahead earnings regressions, respectively.[4] Earnings are positively related to the lagged market value of the firm and negatively related to lagged total assets. Firms that pay out more dividends and firms with lower operating accruals tend to have higher future earnings. The coefficient on the negative earnings dummy is negative for year t+1 and positive for year t+2 and t+3, although it is only statistically significant in the three-year ahead regression.

Our model captures a substantial part of the variation in future earnings performance across firms using variables that are strictly ex ante. The average regression R^2 is 87% for the one-year ahead earnings regressions, 81% for the two-year ahead regressions, and 77% for the three-year ahead regressions. This is quite remarkable considering the parsimonious specification of our earnings model.[5]

Table 2 reports, for June of each year from 1968 to 2006, the value-weighted one-, two-, and three-year ahead earnings forecasts based on our cross-sectional model (using data from the previous fiscal year end) as well as the most recent IBES consensus analyst forecasts (as of June) that are used to estimate the ICC. To facilitate comparison, we scale the model-based and the analyst-based earnings forecasts (which are on a per share basis) using the firm's end-of-June market capitalization and stock price, respectively. The average model-based earnings forecasts are in decline since the late 1970s, which is consistent with the finding of Fama and French (2004) that U.S. publicly traded firms have become less profitable over time. The analyst-based forecasts exhibit a similar time series pattern.

Table 2 also reports the number of firms for which the model-based and analysts' earnings forecasts are available for each year. The difference in the coverage between the two approaches is striking. The number of firms for which we can compute the forecasts

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4 Since we estimate the model every year using the previous ten years of pooled data, the *t*-statistics reported in Table 1 are potentially biased. Unreported results show that many of the *t*-statistics are still significant after correcting for overlapping data. We note that we only use the coefficients, not the *t*-statistics, to compute the firm-level earnings forecasts.

5 We have considered many additional earnings predictors, such as capital expenditure, R&D, and firm age. We do not include these variables in Equation (1) due to lack of explanatory power, or because they do not help improve the quality of the earnings forecasts and the reliability of the resulting ICC estimates. In particular, we have used the analyst consensus forecast as an additional predictor (using the subsample of firms with analyst coverage) and found that even though the analyst forecast shows up significantly in the earnings regressions, it contributes very little to the performance of the model-based earnings forecasts and the associated ICC estimates.

increases steadily from just above 1,000 in the late 1960s to almost 4,000 in the late 1990s, after which it drops to around 3,000 during recent years. On the other hand, analysts' forecasts start in 1982 which is the earliest year we can either obtain the three-year ahead forecasts directly from IBES or impute three-year ahead forecasts using long-term growth forecasts and two-year ahead forecasts (see Footnote 6 below for more details), and the initial coverage is very limited; it only reaches the level that is comparable to those of the model-based forecasts by the mid-1990s.[6] The difference in the coverage between model-based and analyst earnings forecasts implies that we are able to estimate the model-based ICC for a much larger sample of firm-years than the analyst-based ICC. Not only does the greater number of observations enhance the power of the tests performed using the ICC, it also allows us to address research questions that require a long time series of expected return estimates and/or require expected return estimates for small or distressed firms, for which analysts' forecasts are scarce.

Table 3 reports the time series averages of the value-weighted forecast bias, forecast accuracy, and the cross-sectional earnings response coefficient (ERC) for the model-based earnings forecasts and the analysts' forecasts. Panel A reports the bias, accuracy, and ERC for the model-based forecasts for the full sample of firm-year observations for which these forecasts are available (the sample period is 1968-2006). To compare our model-based forecasts with the analysts' forecasts, Panels B and C report the bias, accuracy, and ERC for the model-based and the analysts' forecasts for the common sample of firm-year observations for which both forecasts are available (the sample period is restricted to 1982-2006).

Following the literature, we define the forecast bias as the difference between realized earnings and the earnings forecast, scaled by market equity for the model-based forecasts and by price for the analysts' forecasts.[7] A negative bias indicates an optimistic forecast. Focusing on the common sample, we observe that analysts are overly optimistic. The average forecast bias is negative and increases monotonically with the forecasting horizon (-0.0050, -0.0150, and -0.0195 for one-, two-, and three-year ahead forecasts, respectively), consistent with the evidence in prior studies. The cross-sectional earnings model also tends to overestimate future earnings. However, the biases of the model-based forecasts are much smaller (-0.0020, -0.0029, and -0.0057 for one-, two-, and three-year ahead forecasts, respectively), and represent only 40%, 19%, and 29% of the magnitude of the corresponding analyst biases for the three forecasting horizons.

Turning to the forecast accuracy, which is defined as the absolute value of the forecast bias (a small number is indicative of a more accurate earnings forecast), the picture is more balanced. On the whole, analysts' forecasts are more accurate than the model-based forecasts. The average forecast accuracy for analysts is 71% to 88% of those associated

[6] The three-year ahead analysts' earnings forecasts can only be obtained for a substantially smaller number of firms when compared to the one- and two-year ahead analyst forecasts. Even as recently as 2006, the three-year ahead earnings forecast is available for just 1,721 firms (not tabulated), about half of the number of firms with one- and two-year ahead earnings forecasts. We follow prior studies in the ICC literature and estimate an imputed three-year ahead analyst forecast from the consensus long-term growth forecast and the two-year ahead forecast for firms for which the three-year ahead analyst forecast is not available. This treatment boosts the total number of firm-year observations with available three-year ahead forecasts from 16,046 to 55,820 (and from 1,721 to 2,755 in 2006).

[7] We measure realized earnings using net income before extraordinary items from Compustat for model-based forecasts and actual earnings per share provided by IBES for analysts' forecasts.

with the cross-sectional earnings model, depending on the forecasting horizon. However, the differences in the forecast accuracy between the two types of earnings forecasts are considerably smaller than the differences in the forecast bias.

Although comparing the forecast bias and accuracy provides insights into the attributes of the model-based and the analyst-based earnings forecasts, the comparison is hindered by the fact that the underlying earnings definitions are different. The model produces forecasts based on GAAP earnings, whereas the analysts' forecasts are based on pro forma (street) earnings (which may or may not equal GAAP earnings). Further, earnings forecasts that are more accurate and/or less biased do not necessarily do a better job in capturing the market's expectations about future earnings performance (see, among others, Brown, 1993; O'Brien, 1988; Wiedman, 1996). We therefore consider an additional and more direct way of evaluating the performance of the model-based forecasts relative to analysts' forecasts: comparing their earnings response coefficients (ERC). The ERC captures the reaction of stock prices to unexpected earnings (i.e., the difference between realized and forecasted earnings).[8] If the model-based forecasts (or analysts' forecasts) provide a better approximation of market expectations about future earnings, we should see a stronger stock price reaction when realized earnings deviate from the model's (or analysts') forecasts.

We estimate the ERCs for the three forecasting horizons by running annual cross-sectional regressions of the one-, two-, and three-year ahead realized returns on the firm-specific unexpected earnings (based on either the cross-sectional earnings model or analysts' forecasts) measured over the same horizon. We standardize the unexpected earnings to have unit variance for each cross section to make the ERCs comparable between model-based and analysts' forecasts.

For the common sample, the ERCs associated with the model-based forecasts are 0.1812, 0.5123, and 0.8508 for the one-, two-, and three-year forecasting horizons, respectively. By contrast, the ERCs for the corresponding analysts' forecasts are 0.1044, 0.2060, and 0.3258, which correspond to 58%, 40%, and 38% of the ERCs for the model-based forecasts. The stock prices thus react considerably more strongly to earnings surprises relative to the model-based forecasts than relative to the analysts' forecasts. These results provide clear evidence that the model-based earnings forecasts are a better proxy for market expectations than the analysts' forecasts.

The full sample average accuracy and ERC for the model-based forecasts are lower than those for the common sample. This makes sense, as the firms for which IBES analyst data are not available tend to be small firms for which earnings are harder to predict and stock returns are more volatile. The average forecast biases for the model-based forecasts are very close to zero for the full sample. Our parsimonious cross-sectional model thus on average produces unbiased earnings forecasts for a large sample of firms over an extended period of time.

[8] The literature on the ERC dates back to Ball and Brown (1968), Lev and Ohlson (1982), and Easton and Zmijewski (1989).

3. Properties of the ICC based on the cross-sectional earnings model

So far, we have shown that the cross-sectional earnings model is remarkably powerful in explaining differences in future earnings across firms. The earnings forecasts produced by the model are on average slightly less accurate than consensus analyst forecast, but are superior in terms of forecast bias and earnings response coefficient. In this section, we examine the performance of the ICC estimated using the earnings forecasts generated by the cross-sectional model and compare it to the performance of the analyst-based ICC.

Table 4 presents summary statistics of the ICC estimates for each year from 1968 to 2006. The table reports the number of firms for which we are able to estimate the ICC as well as the mean, the standard deviation, and the 25th, 50th (median), and 75th percentiles of the ICC estimates of each year.

The coverage of the model-based ICC is around 1,000 firms during the first few years, but rapidly increases to more than 2,500 firms from 1975 onwards. Over the entire sample period 1968-2006, we are able to estimate the ICC for a total of 102,067 firm-year observations. Table 4 shows that there is considerable variation in the ICC over time. The mean ICC increases from around 15% during the late 1960s to a high of 20% in 1982, and then gradually declines to around 7% toward the end of our sample period.[9] The ICC also shows significant variation across firms, as witnessed by the substantial cross-sectional standard deviation for each year.

For comparison, we also report the summary statistics for the ICC estimated based on analysts' forecasts. The coverage of the analyst-based ICC starts in 1982, and is much more limited than that of the model-based ICC for the majority of the 1980s and 1990s; only in recent years does it converge to the model-based ICC coverage. The total number of firm-year observations for the analyst-based ICC sample is 51,572, about half of the number for model-based ICC. The mean analyst-based ICC shows a declining pattern over time, from a high of 13% in 1982 to around 9% toward the end of the sample period. The cross-sectional standard deviation for the analyst-based ICC is always smaller than that of model-based ICC for each year in the common sample period 1982-2006.

Following Easton and Monahan (2005), we study the reliability of the model-based and the analyst-based ICC as measures of expected returns by examining their correlations with realized returns. Easton and Monahan (2005) conclude that the analyst-based ICC is not a reliable proxy for expected returns because of its negative correlation with realized stock returns. Panel A of Table 5 reports the time series averages of the cross-sectional correlations between the ICC and annual realized returns for the three years following the computation of the ICC (denoted r_{t+1}, r_{t+2}, and r_{t+3}, respectively). We calculate the correlations between the ICC and the realized returns for the second and third year here because the ICC represents a weighted average of the discount rates for all future horizons, and thus is expected to be positively correlated with realized returns in subsequent years as well.

[9] The decline in the ICC after the early 1980s coincides with a dramatic increase in the number of newly listed firms on major U.S. exchanges. Fama and French (2004) hypothesize that the increase in the new lists is due to a decline in the cost of equity capital. Our results support this explanation. In addition, they suggest that the high stock market valuations in the late 1990s are possibly driven by low required rates of return demanded by investors.

Consistent with Easton and Monahan (2005), we find negative correlations between the analyst-based ICC and realized returns. The average correlations are -0.0149 (*t*-stat = -0.60) for year *t*+1 realized returns, and -0.0641 (*t*-stat = -2.80) and -0.0755 (*t*-stat = -3.84) for year *t*+2 and *t*+3 returns, respectively. On the other hand, for the model-based ICC, we find positive average correlations of 0.0551 (*t*-stat = 2.83), 0.0511 (*t*-stat = 3.03), and 0.0429 (*t*-stat = 2.65) with year *t*+1, *t*+2, and *t*+3 realized returns, respectively.

The magnitude of the positive correlations between the model-based ICC and realized returns (around 5%) may seem modest. However, this magnitude is consistent with studies that apply the Campbell (1991) return decomposition analysis to individual stock returns (e.g., Vuolteenaho, 2002; Chen and Zhao, 2009) and find that only a very small fraction of the variation in realized returns can be explained by variation in expected returns. As we show in tests below, the economic significance of these correlations – in terms of the realized return spreads of portfolios sorted on the model-based ICC – is substantial. Furthermore, we find considerably higher correlations within certain subgroups of firms in additional analyses. The bottom line is that, in contrast to the analyst-based ICC, our model-based ICC estimates are significantly positively correlated with realized returns. This finding suggests that our new model-based ICC is a more reliable proxy for expected returns than the analyst-based ICC.

We carry out additional tests by running annual Fama-MacBeth (1973) cross-sectional regressions of realized returns on the model-based or the analyst-based ICC. Following Easton and Monahan (2005), we control for proxies of cash flow news and discount rate news in the regressions. We measure cash flow news as the change in the earnings forecast, and discount rate news as the negative of the change in the ICC estimate for a given year. Since neither cash flow news nor discount rate news over a certain year should be predictable based on the ICC that is available at the beginning of the year, we orthogonalize the cash flow and discount rate news proxies with respect to the ICC.

Panel A of Table 5 reports the average regression coefficients and their associated time series *t*-statistics. When we regress year *t*+1 realized returns on the model-based ICC, the average coefficient is 0.2289 (*t*-stat = 2.45). The coefficient increases slightly to 0.2474 (*t*-stat = 2.16) after controlling for cash flow news and discount rate news in the regressions.[10] We obtain similar results when we regress year *t*+2 and *t*+3 realized returns on the model-based ICC.

By way of contrast, the average coefficients when we regress realized returns on the analyst-based ICC are negative in all but one of the specifications.[11] The negative coefficients range from -0.1003 to -0.5976 and are statistically significant at the 10% level in four specifications. Thus, the Fama-MacBeth regressions confirm the evidence from the correlation analysis that our new approach to estimate the ICC yields a more reliable measure of expected returns than the approach based on analysts' forecasts.

To gauge the economic significance of the relation between ICC and realized returns, we sort firms into decile portfolios at the end of June of each year based on their

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[10] Since our proxies for cash flow and discount rate news are derived from the earnings forecasts of the cross-sectional model and the resulting ICC estimates, the sign and significance of the coefficients on the cash flow and discount rate news proxies provide further evidence on the reliability of our ICC estimates. As expected, the coefficients on both news proxies are positive and statistically significant.

[11] When we regress year t+1 returns on ICC and cash flow and discount rate news, the regression produces a positive but statistically insignificant average coefficient of 0.1475 (*t*-stat = 0.40).

estimated ICC (model-based or analyst-based) and compute the equal-weighted and value-weighted average realized returns of each portfolio for the three years after portfolio formation. Panel B of Table 5 reports the average returns of these ICC-sorted decile portfolios. The results show that the realized returns for the next three years increase with the model-based ICC. The equal-weighted (value-weighted) average return spread between the portfolio of firms with the highest model-based ICC (Decile 10) and the portfolio of firms with the lowest ICC (Decile 1) is 8.84% (8.14%) per year with a *t*-statistic of 2.42 (2.46) in the first year following portfolio formation. High ICC firms continue to outperform low ICC firms in the second and third year after portfolio formation. The average equal-weighted (value-weighted) 10-1 return spreads are 9.91% (7.58%) and 9.08% (5.91%) for the second and third year, respectively, all of which are statistically significant with *t*-stats above 2.

The contrast with the analyst-based ICC is, again, striking. Sorting on analyst-based ICC produces an average equal-weighted (value-weighted) return spread of 0.26% (-4.26%) with a *t*-statistic of 0.06 (-1.17) in the first year following portfolio formation. The relation between realized returns and analyst-based ICC becomes significantly more negative in subsequent years. In the second and third years after portfolio formation, the equal-weighted and value-weighted average return spreads range from -5.48% to -10.42%, with *t*-statistics from -1.57 to -2.77.[12]

The results up to this point suggest that the model-based ICC is a more reliable proxy for expected returns than the analyst-based ICC. Easton and Monahan (2005) and Easton and Sommers (2007), among others, attribute the lack of reliability of the ICC estimates based on analysts' forecasts to the poor quality of those forecasts. Table 6 provides complementary evidence on whether the greater reliability of our ICC estimates stems from the superior quality of the earnings forecasts delivered by our cross-sectional model. At the end of June of each year, we sort firms into tercile portfolios based on their forecast bias (Panel A), forecast accuracy (Panel B), or the earnings response coefficient (Panel C) associated with their model-based earnings forecasts for the next three years.[13] We then compute the cross-sectional correlation between the model-based ICC estimates and realized returns for each group separately. To facilitate comparison with the results in Table 5, we also estimate annual Fama-MacBeth cross-sectional regressions of realized returns on the model-based ICC within each group. Table 6 reports the average correlations as well as the average Fama-MacBeth regression coefficients (and their associated time series *t*-statistics) for each of the tercile portfolios.

Table 6 shows that the relation between realized returns and the model-based ICC is the strongest for the group of firms with the smallest forecast bias. The middle portfolio (Tercile 2) – which has an average bias that is the closest to zero – shows the highest correlations between realized returns and the ICC, ranging from 0.1329 to 0.2009 for the three forecasting horizons. The correlations weaken considerably as the forecast bias

[12] We verify that the differences between the model-based and analyst-based ICC are not driven by the different sample periods. Unreported results show that the portfolio sorts based on the model-based ICC over the period for which the analyst-based ICC is available (after 1982) are very similar to the full sample period results. For example, for the post-1982 period, the average equal-weighted (value-weighted) return spread between the extreme ICC-sorted portfolios is 8.71% (6.91%) for the first year following portfolio formation.

[13] In the spirit of the cross-sectional ERC reported in Table 3, we estimate a firm-specific ERC for each firm each year by dividing its one-, two-, and three-year ahead realized returns by the unexpected earnings measured over the same horizon. Firms with a negative ERC are excluded from the analysis.

increases. The Fama-MacBeth regression coefficients exhibit a similar pattern; they are large, positive, and statistically significant for the middle portfolio, while the magnitude of the coefficients is substantially smaller for tercile portfolios 1 and 3.

The portfolios sorted on the forecast accuracy or the firm-specific ERC also show a clear pattern. The relation between realized returns and the model-based ICC is the strongest for firms with the most accurate earnings forecasts. Both the correlations and the Fama-MacBeth regression coefficients decrease monotonically as the forecast accuracy deteriorates. Similarly, the correlations and the Fama-MacBeth coefficients increase monotonically with the firm-specific ERC. For firms with the lowest ERC, the relation between realized returns and the model-based ICC is negative. But for firms with the highest ERC, the relation becomes positive and highly significant.[14]

Overall, the results in Table 6 are supportive of the hypothesis that the improved reliability of our model-based ICC estimates derives from the greater quality of the underlying earnings forecasts.

4. Implications for asset pricing

Our new and improved measure of expected stock returns – the ICC based on earnings forecasts generated by the cross-sectional earnings model – allows us to re-evaluate a number of important issues in empirical asset pricing. In this section, we present evidence on the equity premium and a variety of cross-sectional return anomalies using our model-based ICC estimates. Many of these issues are difficult to investigate using the analyst-based ICC because they either require a long time series of expected return estimates or they involve firms that are not followed by analysts (for which the analyst-based ICC would not be available).

4.1 The equity premium

Table 7 reports the implied equity risk premium based on the model-based ICC. For comparison, we also report the realized excess returns of the CRSP market index (ex post equity premium). Panels A and B report equal-weighted and value-weighted results, respectively. We use two different proxies for the risk-free rate: the annualized 30-day T-Bill rate and the 10-year Treasury constant maturity rate.

Table 7 shows that the implied equity premium based on the ICC is substantially smaller than the average realized excess return of the market index, consistent with Claus and Thomas (2001) and Fama and French (2002). For the 1968-2006 sample period, the equal-weighted average market return is 9.31% in excess of the T-Bill rate or 7.75% in excess of the T-Bond rate. On the other hand, the equity premium implied by our model-based ICC is only 6.81% over the T-Bill rate or 5.25% over the T-Bond rate, 2.5% lower than the ex post equity premium estimates. The difference increases to 3.41% for value-weighted equity premium estimates. The value-weighted realized market return is 5.98% relative in excess of the T-Bill rate or 4.42% in excess of the T-Bond rate, compared to an ICC-implied equity premium of 2.57% over the T-Bill rate or 1.01% over the T-Bond rate.

[14] Firms with unexpected earnings close to zero could produce extreme observations for our firm-specific ERC measure. To ensure that these extreme observations do not dominate our tests, we also winsorize the unexpected earnings that are close to zero and recalculate the ERC. We find that the results are nearly identical to those reported in Panel C.

Our estimate of the implied equity risk premium is lower than the estimates obtained by past studies using the analyst-based ICC. For example, both Claus and Thomas (2001) and Gebhardt, Lee, and Swaminathan (2001) estimate the implied equity premium (over the 10-year risk-free rate) to be around 3% over 1985-1998 and 1979-1995, respectively, compared to our estimate of 1.01% for the value-weighted market portfolio over 1968-2006. The difference in the estimates is consistent with the finding in Easton and Sommers (2007) that the optimism in analysts' earnings forecasts leads to an upward bias in the analyst-based ICC estimates.

In Mehra and Prescott's (1985) paper on the equity premium puzzle, they demonstrate that the variance-covariance matrix of aggregate consumption and stock and bond returns, when combined with a reasonable level of risk aversion, implies an equity premium slightly below one percent. The value-weighted equity premium derived from our model-based ICC is consistent with this estimate.

Table 7 also reports the equal-weighted (Panel A) and value-weighted (Panel B) average realized excess returns and implied risk premiums for 12 industry portfolios (classified using the definitions downloaded from Ken French's website). Panel A shows that the equal-weighted average realized return of the industry portfolios ranges from a low of 8.00% (6.43%) for *Other* to a high of 13.37% (11.80%) for *Healthcare* in excess of the T-Bill rate (T-Bond rate). The implied risk premiums are considerably lower for most industries. The premium varies from 3.88% (2.31%) for *Energy* to 7.89% (6.32%) for *Consumer NonDurables* over the T-Bill rate (T-Bond rate). The results in Panel B paint a similar picture. The value-weighted average return ranges from 4.77% (3.21%) for *Consumer Durables* to 8.92% (7.35%) for *Energy*, whereas the implied risk premium ranges from 1.14% (-0.43%) for *Business Equipment* to 5.57% (4.01%) for *Utilities*, when measure against the T-Bill rate (T-Bond rate).

4.2 Anomalies

We investigate whether some of the well-known cross-sectional return anomalies also exist in ex ante expected returns as measured by the model-based ICC. Table 8 reports the results of univariate sorts based on various risk and firm characteristics that have been shown or hypothesized to predict average stock returns: market beta (see, for example, Fama and MacBeth, 1973; Fama and French, 1992), size (Banz, 1981; Fama and French, 1992), book-to-market equity (BE/ME) (Fama and French, 1992; Lakonishok, Shleifer, and Vishny, 1994), leverage (Bhandari, 1988; Fama and French, 1992), distress (Vassalou and Xing, 2004; Campbell, Hilscher, and Szilagyi, 2008), capital expenditures (CAPEX) (Titman, Wei, and Xie, 2004), asset growth (Cooper, Gulen, and Schill, 2008), accruals (Sloan, 1996), net operating assets (NOA) (Hirshleifer et al., 2004), and dispersion in analysts' earnings forecasts (Diether, Malloy, and Scherbina, 2002). If the return predictability associated with these variables represents systematic differences in ex ante expected returns, we should expect the differences to also show up in the ICC.

Specifically, at the end of June of each year, we sort firms into decile portfolios based on the characteristic of interest and compute the equal-weighted and value-weighted annual realized returns and ICC for each decile portfolio. Table 8 reports the time series averages of the equal-weighted (Panel A) and value-weighted (Panel B) realized returns and ICC of the decile portfolios as well as the average spread (and its associated *t*-statistic) between Deciles 10 and 1 (High-Low).

The relation between market beta and the ICC is similar to that between beta and realized returns. Both the ICC and realized returns appear to be negatively correlated with market beta, contrary to the prediction of the CAPM. The average realized return spreads between high beta firms (Decile 10) and low beta firms (Decile 1) are -4.01% (equal-weighted) and -0.84% (value-weighted) per year and statistically insignificant (*t*-stats of -1.00 and -0.16, respectively). The spreads in the ICC are of similar magnitude (-4.57% equal-weighted and -1.26% value-weighted) but are statistically significant (*t*-stats of -7.77 and -2.41, respectively).[15]

The relation between size and the ICC is considerably stronger than the size effect in realized returns. The average realized return spread between small firms (Decile 1) and large firms (Decile 10) is 4.53% (equal-weighted) and 4.03% (value-weighted) per year, neither of which is statistically significant (*t*-stats of 1.23 and 1.08, respectively). On the other hand, the average spreads in the ICC between small and big firms are 8.30% (equal weighted) and 6.38% (value-weighted), both of which are economically and statistically (*t*-stats greater than 11) significant. Unreported results indicate that the stronger size effect in ICC relative to that in realized returns is driven by the second half of our sample period. This result is consistent with the evidence in Hou and van Dijk (2010) that negative cash flow shocks to small firms and positive cash flow shocks to big firms after the early 1980s mask the significant size premium in ex ante expected returns and cause the size effect in realized returns to be negligible.

The results based on BE/ME indicate that there is a significant value/growth effect in both realized and ex ante expected returns. The average realized spreads between high BE/ME firms (Decile 10) and low BE/ME firms (Decile 1) are 15.62% (equal-weighted) and 8.14% (value-weighted) per year, both of which are statistically significant (*t*-stats of 5.95 and 2.27, respectively). The spreads in ICC are smaller, especially for equal-weighted returns (7.49% equal-weighted and 7.95% value-weighted), but are still economically large and statistically significant (*t*-stats of 13.26 and 16.69).

The positive relation between leverage and realized returns (8.98% for the equal-weighted 10-1 spread and 3.54% for the value-weighted spread) carries over to the ICC (6.98% for the equal-weighted spread and 4.90% for the value-weighted spread), but the statistical significance of the latter is much higher (*t*-stats of 2.45 vs. 20.43 for equal-weighted returns and 0.90 vs. 14.66 for value-weighted returns). Similarly, distress (measured using a dynamic logit model as in Campbell, Hilscher, and Szilagyi, 2008) is positively related to both realized returns and the ICC.[16] The average realized return spreads between high distress firms (Decile 10) and low distress firms (Decile 1) are 5.42% (equal-weighted) and 5.04% (value-weighted) per year. However, they are not statistically significant (*t*-stats of 1.28 and 0.90, respectively). On the other hand, the average spreads in ICC are 8.54% (equal-weighted) and 5.67% (value-weighted) per year, both of which are highly significant (*t*-stats above 9).

CAPEX is negatively related to realized returns with a spread between low CAPEX firms (Decile 1) and high CAPEX firms (Decile 10) of 6.12% (*t*-stat of 2.35) per year for equal-weighted returns and 3.80% (*t*-stat of 1.29) for value-weighted returns. The relation between CAPEX and the ICC is stronger in statistical terms (*t*-stats of 11.60 and 6.78 for

[15] In general, the ICC spreads are associated with much higher *t*-statistics because the ICC is substantially less volatile than realized returns.

[16] We obtain similar results when we use Altman's Z-score or Ohlson's O-score to measure distress.

equal-weighted and value-weighted returns, respectively) but slightly weaker in economic terms (4.86% and 2.17% for equal-weighted and value-weighted returns, respectively).

The negative relation between asset growth and the ICC is much weaker economically than the effect in realized returns. The average realized return spreads between low asset growth firms (Decile 1) and high asset growth firms (Decile 10) are 12.06% (equal-weighted) and 7.58% (value-weighted) per year, but the spreads in ICC are only 3.87% (equal-weighted) and 2.40% (value-weighted).

The results for accruals and NOA show that the two anomalies largely exist only in realized returns. For accruals, the average equal-weighted (value-weighted) spread between Deciles 1 and 10 decreases from 6.44% (5.51%) in realized returns to 1.26% (-0.37%) in ICC. Similarly, the average equal-weighted (value-weighted) spread between NOA Deciles 1 and 10 decreases from 11.71% (5.78%) in realized returns to 1.73% (-1.03%) in ICC.

In terms of realized returns, the analyst dispersion effect is among the strongest anomalies that we consider in this paper. The average realized return spreads between low dispersion (Decile 1) and high dispersion (Decile 10) firms are 14.21% (equal-weighted) and 10.42% (value-weighted) per year, both of which are statistically significant (*t*-stats above 2). Interestingly, the relation between analyst dispersion and the ICC is in the opposite direction of that in realized returns. The average 1-10 spreads in ICC are -2.38% (equal-weighted) and -3.66% (value-weighted), both of which are statistically highly significant (*t*-stats of -7.85 and -10.07, respectively).

In sum, the results in Table 8 show that the inferences about certain cross-sectional return anomalies are sensitive to the choice of the expected return proxy. In particular, we find little evidence that the patterns in average realized returns associated with asset growth, accruals, NOA, and analyst dispersion reflect reliable differences in ex ante expected returns measured by our model-based ICC. These findings suggest that risk-based interpretations may have limited scope for explaining these anomalies, but the evidence could be consistent with behavioral interpretations that attribute the patterns in realized returns to corrections of mispricing as earnings realizations differ from investors' expectations.

5. Conclusions

We propose a new method to estimate the implied cost of capital (ICC) of a firm using earnings forecasts from a cross-sectional model. Our cross-sectional earnings model captures significant variation in future earnings performance across firms using ex ante publicly available information. In addition, it generates earnings forecasts that outperform consensus analyst forecasts in terms of forecast bias and earnings response coefficient. We find that the ICC estimated using the model-based earnings forecasts is a more reliable proxy for expected returns than the ICC based on analysts' forecasts, as witnessed by the stronger relation between the model-based ICC and realized stock returns.

We re-examine the equity premium and a number of cross-sectional return anomalies using our new and improved ICC estimates. Consistent with the equity premium estimates derived by Mehra and Prescott (1985), we find a value-weighted implied equity premium of around 1% per annum. In addition, we find that the average return patterns associated with asset growth, accruals, NOA, and analyst dispersion do not reflect reliable differences in ex ante expected returns.

We present evidence that the greater reliability of the model-based ICC stems from the superior quality of the underlying earnings forecasts. As such, we also contribute to the on-going debate regarding the value relevance of GAAP vs. street earnings (e.g., Bradshaw and Sloan, 2002; Cohen, Hann, and Ogneva, 2007). In unreported preliminary tests, we find that the greater reliability of our ICC estimates not only derives from the power of the cross-sectional earnings model as a tool to forecast the earnings of individual firms, but also from the greater value relevance of the GAAP earnings forecasts produced by the model relative to the pro forma earnings (or "street earnings") forecasts produced by analysts.[17] We leave more extensive tests to disentangle these two effects to future work.

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[17] We estimate the same cross-sectional model separately for GAAP earnings and street earnings and find that the correlation with realized returns is considerably higher for the ICC estimates based on the cross-sectional model of GAAP earnings than for the ICC based on the cross-sectional model of street earnings. This result is consistent with the hypothesis that market participants focus on GAAP earnings rather than street earnings in setting asset prices.

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Table 1: Cross-sectional earnings regressions, 1967-2005

Panel A of this table presents summary statistics (the time series averages of the cross-sectional mean, median, standard deviation, and select percentiles) of the variables used in the cross-sectional earnings model. Panel B of this table reports the average slopes and their time series *t*-statistics from pooled regressions estimated each year from 1967 to 2005 using the previous ten years (three year minimum) of data. E_{t+1}, E_{t+2}, and E_{t+3} are one-, two-, and three-year ahead earnings, respectively, V_t is the market value of a firm, A_t is the total assets, D_t is the dividend payment, DD_t is a dummy variable that equals 0 for dividend payers and 1 for non-payers, $Neg\ E_t$ is a dummy variable that equals 1 for firms with negative earnings and 0 otherwise, and AC_t is the operating accruals. All variables except DD_t and $Neg\ E_t$ are expressed in US$m.

Panel A: Summary statistics of the variables in the cross-sectional earnings model

Variable	Mean	1%	25%	Median	75%	99%	STD
E_t	50.28	-149.24	-0.46	4.09	23.53	1077.86	345.05
V_t	2867.86	4.04	54.66	216.00	973.94	52009.76	15421.67
A_t	2225.83	2.58	34.15	140.46	638.35	38788.67	13706.90
D_t	17.63	0.00	0.02	0.43	4.00	302.60	113.59
DD_t	0.46	0.00	0.00	0.50	0.84	1.00	0.47
$Neg\ E_t$	0.21	0.00	0.00	0.00	0.48	1.00	0.38
AC_t	-52.06	-1014.32	-17.27	-2.43	0.66	91.38	325.31

Panel B: Coefficient estimates of the cross-sectional earnings model

LHS		Intercept	V_t	A_t	D_t	DD_t	E_t	$Neg\ E_t$	AC_t	Adj. R^2
E_{t+1}	Coefficient	2.1958	0.0140	-0.0079	0.2487	-2.8010	0.6839	-0.3305	-0.0510	0.87
	t-stat	*7.22*	*12.63*	*-6.89*	*8.11*	*-8.83*	*38.99*	*-0.79*	*-9.87*	
E_{t+2}	Coefficient	2.3349	0.0179	-0.0080	0.3939	-3.1478	0.5981	0.2372	-0.0571	0.81
	t-stat	*6.20*	*10.67*	*-4.74*	*9.33*	*-8.53*	*22.90*	*0.47*	*-6.19*	
E_{t+3}	Coefficient	2.5032	0.0225	-0.0088	0.4734	-3.4405	0.5398	0.8907	-0.0697	0.77
	t-stat	*7.20*	*10.65*	*-4.07*	*11.18*	*-9.85*	*18.80*	*2.68*	*-5.14*	

Table 2: Summary statistics of earnings forecasts, 1968-2006

This table reports the year-by-year summary statistics of the one-, two-, and three-year ahead earnings forecasts based on the cross-sectional earnings model using data from the previous fiscal year end (Panel A) and the most recent IBES consensus analyst forecasts (Panel B) as of June of each year. $E_t[E_{t+1}]$, $E_t[E_{t+2}]$, and $E_t[E_{t+3}]$ are the value-weighted one-, two-, and three-year ahead forecasted earnings (scaled by market capitalization for model-based forecasts and by stock price for analysts' forecasts). N_{t+1}, N_{t+2}, and N_{t+3} represent the number of firms for which the earnings forecasts are available. If the three-year ahead earnings forecast is missing from IBES, we use the consensus long-term growth forecast and the two-year ahead forecast to impute the three-year ahead forecast.

Year	N_{t+1}	$E_t[E_{t+1}]$	N_{t+2}	$E_t[E_{t+2}]$	N_{t+3}	$E_t[E_{t+3}]$	N_{t+1}	$E_t[E_{t+1}]$	N_{t+2}	$E_t[E_{t+2}]$	N_{t+3}	$E_t[E_{t+3}]$
			Panel A: Cross-sectional model						*Panel B: IBES*			
1968	1081	0.0544	1081	0.0611	1081	0.0683						
1969	1175	0.0654	1175	0.0691	1175	0.0747						
1970	1313	0.0820	1313	0.0916	1313	0.0942						
1971	1526	0.0541	1526	0.0579	1526	0.0627						
1972	1623	0.0567	1623	0.0575	1623	0.0606						
1973	1740	0.0680	1740	0.0700	1740	0.0718						
1974	1808	0.0965	1808	0.0972	1808	0.0995						
1975	2718	0.0976	2718	0.0994	2718	0.1022						
1976	2966	0.0883	2966	0.0918	2966	0.0987						
1977	2968	0.1027	2968	0.1042	2968	0.1122						
1978	2905	0.1135	2905	0.1184	2905	0.1249						
1979	2949	0.1218	2949	0.1264	2949	0.1343						
1980	2964	0.1281	2964	0.1352	2964	0.1412						
1981	2908	0.1191	2908	0.1293	2908	0.1404						
1982	2841	0.1389	2841	0.1512	2841	0.1651	1698	0.0978	1341	0.1162	1109	0.1335
1983	2938	0.0864	2938	0.1006	2938	0.1105	1842	0.0378	1492	0.0520	1307	0.0590
1984	3082	0.1020	3082	0.1150	3082	0.1288	2009	0.0574	1674	0.0724	1441	0.0783
1985	3016	0.0891	3016	0.0982	3016	0.1070	2082	0.0472	1717	0.0562	1475	0.0649
1986	3170	0.0648	3170	0.0711	3170	0.0793	2168	0.0344	1811	0.0420	1530	0.0462
1987	3126	0.0562	3126	0.0628	3126	0.0688	2223	0.0332	1907	0.0423	1628	0.0474
1988	3109	0.0733	3109	0.0802	3109	0.0854	2229	0.0469	1899	0.0542	1556	0.0605
1989	3177	0.0713	3177	0.0778	3177	0.0843	2395	0.0470	2084	0.0530	1693	0.0577

Table 2, continued

Year	N_{t+1}	$E_t[E_{t+1}]$	N_{t+2}	$E_t[E_{t+2}]$	N_{t+3}	$E_t[E_{t+3}]$	N_{t+1}	$E_t[E_{t+1}]$	N_{t+2}	$E_t[E_{t+2}]$	N_{t+3}	$E_t[E_{t+3}]$
	Panel A: Cross-sectional model						*Panel B: IBES*					
1990	3250	0.0692	3250	0.0773	3250	0.0851	2446	0.0409	2130	0.0499	1709	0.0576
1991	3189	0.0601	3189	0.0682	3189	0.0741	2410	0.0339	2178	0.0450	1754	0.0540
1992	3154	0.0489	3154	0.0563	3154	0.0653	2450	0.0349	2221	0.0445	1849	0.0543
1993	3193	0.0473	3193	0.0535	3193	0.0588	2635	0.0372	2416	0.0510	2024	0.0578
1994	3395	0.0459	3395	0.0511	3395	0.0571	2910	0.0439	2701	0.0514	2266	0.0576
1995	3566	0.0478	3566	0.0501	3566	0.0531	3421	0.0405	3105	0.0479	2527	0.0579
1996	3828	0.0438	3828	0.0468	3828	0.0501	3767	0.0085	3408	0.0464	2808	0.0533
1997	3946	0.0398	3946	0.0435	3946	0.0473	3979	0.0343	3565	0.0463	3043	0.0533
1998	3889	0.0337	3889	0.0391	3889	0.0447	4189	0.0273	3803	0.0401	3287	0.0481
1999	3890	0.0275	3890	0.0332	3890	0.0412	4089	0.0296	3701	0.0393	3164	0.0452
2000	3721	0.0298	3721	0.0343	3721	0.0424	3817	0.0274	3293	0.0368	2839	0.0475
2001	3461	0.0302	3461	0.0357	3461	0.0441	3510	0.0221	3022	0.0348	2565	0.0557
2002	3407	0.0179	3407	0.0218	3407	0.0277	3498	0.0333	3223	0.0447	2742	0.0556
2003	3348	0.0193	3348	0.0215	3348	0.0238	3427	0.0448	3196	0.0539	2845	0.0622
2004	3201	0.0314	3201	0.0318	3201	0.0335	3530	0.0469	3371	0.0544	2949	0.0616
2005	3054	0.0387	3054	0.0389	3054	0.0407	3544	0.0546	3414	0.0619	2955	0.0684
2006	2266	0.0456	2266	0.0455	2266	0.0468	3299	0.0617	3196	0.0693	2755	0.0758

Table 3: Average bias, accuracy, and earnings response coefficient of model-based and analysts' forecasts, 1968-2006

This table reports the time series averages of the value-weighted forecast bias, forecast accuracy, and cross-sectional earnings response coefficient (ERC) for earnings forecasts generated by the cross-sectional earnings model and those associated with analysts' forecasts. Panel A reports the bias, accuracy, and ERC for the model-based forecasts for the full sample of firm-year observations for which these forecasts are available (the sample period is 1968-2006). Panels B and C report the bias, accuracy, and ERC for the model-based and analysts' forecasts for the common sample of firm-year observations for which both forecasts are available (the sample period is limited to 1982-2006). $E_t[E_{t+1}]$, $E_t[E_{t+2}]$, and $E_t[E_{t+3}]$ are the one-, two-, and three-year ahead earnings forecasts. If the three-year ahead earnings forecast is missing from IBES, we use the consensus long-term growth forecast and the two-year ahead forecast to impute the three-year ahead forecast. Forecast bias is the difference between realized earnings and the earnings forecast (scaled by market capitalization for model-based forecasts and by price for IBES forecasts). Forecast accuracy is the absolute value of the forecast bias. ERCs are estimated each year by running cross-sectional regressions of one-, two-, and three-year ahead realized returns on unexpected earnings (realized minus forecasted earnings) measured over the same horizon. We standardize the unexpected earnings to have unit variance for each cross-section to make the ERCs comparable between model-based and analysts' forecasts.

	$E_t[E_{t+1}]$	$E_t[E_{t+2}]$	$E_t[E_{t+3}]$
	Panel A: Cross-sectional model, full sample		
Bias	-0.0013	-0.0006	-0.0003
Accuracy	0.0277	0.0399	0.0507
ERC	0.1036	0.2064	0.3082
	Panel B: Cross-sectional model, common sample		
Bias	-0.0020	-0.0029	-0.0057
Accuracy	0.0272	0.0367	0.0424
ERC	0.1812	0.5123	0.8508
	Panel C: IBES, common sample		
Bias	-0.0050	-0.0150	-0.0195
Accuracy	0.0240	0.0277	0.0302
ERC	0.1044	0.2060	0.3258

Table 4: Summary statistics of model-based and analyst-based ICC estimates, 1968-2006

This table reports the year-by-year summary statistics of the model-based (Panel A) and analyst-based (Panel B) ICC. The ICCs are estimated at the end of June of each year by solving the discounted residual income model, which incorporates the earnings forecasts from either the cross-sectional earnings model or analysts' forecasts for the next three years and requires that the ROE reverts to the historical industry median between year 4 and year 12. Residual incomes after year 12 are assumed to be a perpetuity. N is the number of firms for which we can estimate the ICC for a given year.

Year	N	Mean	STD	25%	Median	75%	N	Mean	STD	25%	Median	75%
			Panel A: Cross-sectional model						*Panel B: IBES*			
1968	1072	0.1543	0.1062	0.0899	0.1235	0.1760						
1969	1172	0.1397	0.0854	0.0918	0.1186	0.1580						
1970	1319	0.1722	0.0947	0.1144	0.1504	0.1916						
1971	1506	0.1215	0.0705	0.0813	0.1087	0.1416						
1972	1611	0.1098	0.0521	0.0788	0.1026	0.1322						
1973	1739	0.1393	0.0614	0.1073	0.1346	0.1612						
1974	1804	0.1650	0.0730	0.1253	0.1579	0.1900						
1975	2694	0.1680	0.0862	0.1176	0.1525	0.1927						
1976	2954	0.1780	0.1031	0.1176	0.1521	0.1975						
1977	2978	0.1819	0.0994	0.1201	0.1523	0.1985						
1978	2872	0.1712	0.0948	0.1174	0.1472	0.1864						
1979	2887	0.1759	0.0944	0.1216	0.1533	0.1957						
1980	2861	0.1845	0.0984	0.1257	0.1624	0.2062						
1981	2742	0.1733	0.0968	0.1150	0.1486	0.1924						
1982	2768	0.2021	0.1052	0.1381	0.1732	0.2190	889	0.1321	0.0487	0.0999	0.1268	0.1544
1983	2757	0.1426	0.0876	0.0925	0.1252	0.1653	1073	0.1050	0.0443	0.0759	0.1033	0.1271
1984	2823	0.1622	0.0985	0.1086	0.1382	0.1860	1297	0.1173	0.0477	0.0842	0.1092	0.1323
1985	2733	0.1532	0.0913	0.1018	0.1325	0.1726	1418	0.1098	0.0417	0.0851	0.1058	0.1275
1986	2826	0.1301	0.0871	0.0849	0.1124	0.1471	1477	0.1009	0.0424	0.0742	0.0935	0.1128
1987	2834	0.1235	0.0818	0.0787	0.1057	0.1409	1508	0.0968	0.0406	0.0733	0.0926	0.1134
1988	2842	0.1421	0.0894	0.0925	0.1172	0.1552	1488	0.1075	0.0461	0.0797	0.1017	0.1233
1989	2963	0.1648	0.1139	0.0944	0.1188	0.1583	1591	0.1031	0.0394	0.0776	0.0993	0.1191

Table 4, continued

Year	N	Mean	STD	25%	Median	75%	N	Mean	STD	25%	Median	75%
	Panel A: Cross-sectional model						*Panel B: IBES*					
1990	2884	0.1883	0.1300	0.0891	0.1157	0.1567	1604	0.1044	0.0421	0.0722	0.0943	0.1171
1991	2669	0.1576	0.1112	0.0778	0.1013	0.1347	1630	0.1037	0.0443	0.0746	0.0975	0.1219
1992	2652	0.1072	0.0791	0.0672	0.0865	0.1122	1776	0.0980	0.0440	0.0715	0.0912	0.1128
1993	2775	0.0895	0.0672	0.0573	0.0794	0.1030	1917	0.0980	0.0424	0.0667	0.0871	0.1087
1994	3003	0.0941	0.0674	0.0636	0.0821	0.1059	2128	0.0999	0.0452	0.0679	0.0896	0.1104
1995	3171	0.0966	0.0740	0.0615	0.0820	0.1054	2399	0.0937	0.0394	0.0705	0.0909	0.1112
1996	3467	0.0941	0.0727	0.0604	0.0813	0.1038	2681	0.0972	0.0420	0.0682	0.0887	0.1082
1997	3494	0.1000	0.0728	0.0642	0.0818	0.1036	2864	0.0975	0.0458	0.0681	0.0867	0.1051
1998	3424	0.0920	0.0610	0.0639	0.0801	0.0994	3072	0.1063	0.0482	0.0662	0.0845	0.1044
1999	3292	0.0904	0.0626	0.0585	0.0799	0.1023	2912	0.1043	0.0471	0.0692	0.0910	0.1120
2000	3161	0.0983	0.0736	0.0574	0.0842	0.1163	2591	0.1033	0.0540	0.0666	0.0966	0.1231
2001	2831	0.0961	0.0729	0.0609	0.0818	0.1089	2380	0.1112	0.0517	0.0687	0.0891	0.1116
2002	2719	0.1093	0.0906	0.0547	0.0746	0.1016	2521	0.0973	0.0459	0.0728	0.0890	0.1051
2003	2643	0.0885	0.0762	0.0528	0.0733	0.0965	2692	0.1017	0.0365	0.0771	0.0932	0.1097
2004	2612	0.0726	0.0586	0.0477	0.0641	0.0820	2768	0.0867	0.0324	0.0709	0.0842	0.0975
2005	2593	0.0749	0.0539	0.0532	0.0691	0.0855	2730	0.1067	0.0341	0.0727	0.0854	0.0977
2006	1920	0.0730	0.0462	0.0504	0.0661	0.0838	2165	0.0897	0.0330	0.0749	0.0862	0.0986

Table 5: Relation between realized returns and ICC estimates, 1968-2006

Panel A of this table reports the time series averages of the cross-sectional correlations (and their time series *t*-statistics) between realized returns and ICC estimates, as well as the average coefficients (and their time series *t*-statistics) from annual Fama-MacBeth (1973) regression of realized returns on ICC estimates and proxies for cash flow news and discount rate news. Annual realized returns for year *t*+1, year *t*+2, and year *t*+3 (denoted by r_{t+1}, r_{t+2}, and r_{t+3}, respectively) are calculated by compounding monthly returns from July of year *t* to June of year *t*+1, from July of year *t*+1 to June of year *t*+2, and from July of year *t*+2 to June of year *t*+3, respectively. The ICC is estimated at the end of June of year *t* by solving the discounted residual income model. *Ncf* is the cash flow news proxy, which is the change in the earnings forecasts for a given year. *–Ndr* is the discount rate news proxy, which is the negative of the change in the ICC estimate for a given year. Both *Ncf* and *–Ndr* are orthogonalized with respect to the ICC. Panel B of this table reports the time series averages of the equal-weighted (EW) and value-weighted (VW) realized returns (and their time series *t*-statistics) over the next three years for decile portfolios sorted based on ICC measured at the end of June of each year, as well as the average return spread between Deciles 10 and 1 (10-1).

Panel A: Correlations and Fama-MacBeth cross-sectional regression coefficients

			Fama-MacBeth regressions						Fama-MacBeth regressions				
		Corr.	Intercept	*ICC*	*Ncf*	*–Ndr*	Adj. R^2	Corr.	Intercept	*ICC*	*Ncf*	*–Ndr*	Adj. R^2
Dep. Var.													
			Cross-sectional model						*IBES*				
r_{t+1}	Coefficient	0.0551	0.1253	0.2289			0.01	-0.0149	0.1901	-0.1003			0.01
	t-stat	*2.83*	*3.35*	*2.45*				*-0.60*	*4.15*	*-0.46*			
	Coefficient		0.1348	0.2474	0.4446	0.2449	0.19		0.1447	0.1475	0.3849	0.4552	0.20
	t-stat		*3.39*	*2.16*	*12.01*	*10.60*			*3.39*	*0.40*	*14.83*	*14.41*	
r_{t+2}	Coefficient	0.0511	0.1223	0.2483			0.01	-0.0641	0.1911	-0.5112			0.01
	t-stat	*3.03*	*3.4*	*3.06*				*-2.80*	*6.19*	*-2.78*			
	Coefficient		0.1411	0.3174	0.4474	0.2200	0.17		0.2238	-0.5976	0.3856	0.3829	0.16
	t-stat		*3.88*	*3.94*	*12.80*	*11.57*			*5.92*	*-1.85*	*14.44*	*13.58*	
r_{t+3}	Coefficient	0.0429	0.1381	0.2389			0.01	-0.0755	0.2030	-0.5020			0.01
	t-stat	*2.65*	*4.11*	*2.58*				*-3.84*	*7.26*	*-2.45*			
	Coefficient		0.1311	0.3202	0.4437	0.2099	0.16		0.2148	-0.5525	0.3667	0.3488	0.13
	t-stat		*3.90*	*2.82*	*12.16*	*10.41*			*6.61*	*-1.74*	*13.86*	*13.16*	

Table 5, continued

Panel B: Returns on ICC-sorted portfolios

Decile	r_{t+1}	*t-stat*	r_{t+2}	*t-stat*	r_{t+3}	*t-stat*	r_{t+1}	*t-stat*	r_{t+2}	*t-stat*	r_{t+3}	*t-stat*
	Cross-sectional model, EW returns						*IBES, EW returns*					
1	0.1049	*2.27*	0.0883	*2.19*	0.1224	*2.87*	0.1966	*3.92*	0.1830	*4.62*	0.2062	*6.04*
2	0.1306	*3.34*	0.1240	*3.47*	0.1467	*4.34*	0.1897	*4.42*	0.1685	*5.95*	0.1766	*8.03*
3	0.1367	*3.48*	0.1503	*4.01*	0.1635	*4.66*	0.1745	*4.27*	0.1450	*6.02*	0.1568	*7.29*
4	0.1480	*4.02*	0.1559	*4.31*	0.1680	*4.77*	0.1636	*4.27*	0.1395	*6.08*	0.1379	*5.93*
5	0.1480	*4.21*	0.1573	*4.17*	0.1675	*4.88*	0.1578	*4.23*	0.1304	*5.92*	0.1628	*7.09*
6	0.1578	*4.22*	0.1654	*4.42*	0.1802	*5.10*	0.1578	*5.19*	0.1312	*6.16*	0.1596	*6.77*
7	0.1774	*4.40*	0.1735	*4.57*	0.1798	*4.89*	0.1633	*4.69*	0.1340	*5.63*	0.1391	*5.32*
8	0.1777	*4.61*	0.1915	*4.84*	0.1921	*5.17*	0.1649	*4.67*	0.1184	*4.59*	0.1340	*5.81*
9	0.1865	*4.36*	0.1872	*4.46*	0.1970	*4.49*	0.1889	*4.94*	0.1385	*5.35*	0.1300	*4.43*
10	0.1933	*4.58*	0.1873	*4.38*	0.2132	*5.07*	0.1992	*4.53*	0.0978	*3.01*	0.1020	*3.00*
10-1	0.0884	*2.42*	0.0991	*3.33*	0.0908	*2.49*	0.0026	*0.06*	-0.0852	*-2.18*	-0.1042	*-2.77*

Decile	r_{t+1}	*t-stat*	r_{t+2}	*t-stat*	r_{t+3}	*t-stat*	r_{t+1}	*t-stat*	r_{t+2}	*t-stat*	r_{t+3}	*t-stat*
	Cross-sectional model, VW returns						*IBES, VW returns*					
1	0.0914	*2.60*	0.0865	*2.65*	0.1105	*3.65*	0.1786	*3.96*	0.1499	*4.17*	0.1766	*5.05*
2	0.1180	*3.68*	0.1069	*3.62*	0.1148	*4.37*	0.1611	*4.38*	0.1267	*4.12*	0.1332	*5.13*
3	0.1185	*3.90*	0.1217	*3.82*	0.1591	*5.61*	0.1329	*3.87*	0.1237	*4.25*	0.1393	*6.08*
4	0.1422	*4.64*	0.1489	*4.80*	0.1428	*5.44*	0.1363	*4.23*	0.1287	*5.28*	0.1370	*4.89*
5	0.1324	*4.63*	0.1495	*4.94*	0.1568	*5.55*	0.1353	*4.16*	0.1346	*5.45*	0.1571	*6.16*
6	0.1393	*5.09*	0.1525	*5.64*	0.1735	*6.97*	0.1462	*5.06*	0.1307	*5.64*	0.1287	*4.82*
7	0.1450	*4.62*	0.1385	*5.34*	0.1781	*6.32*	0.1522	*4.90*	0.1111	*4.06*	0.1418	*4.36*
8	0.1695	*5.24*	0.1767	*5.81*	0.1768	*5.99*	0.1533	*4.42*	0.1255	*4.47*	0.1241	*4.37*
9	0.1519	*4.35*	0.1770	*4.69*	0.1675	*4.38*	0.1455	*4.58*	0.1255	*4.62*	0.1193	*3.66*
10	0.1728	*4.11*	0.1623	*4.01*	0.1696	*4.44*	0.1320	*3.50*	0.0952	*2.59*	0.1066	*2.56*
10-1	0.0814	*2.46*	0.0758	*2.53*	0.0591	*2.25*	-0.0466	*-1.17*	-0.0548	*-1.57*	-0.0701	*-1.78*

Table 6: Relation between realized returns and ICC estimates conditioning on forecast bias, accuracy, and ERC, 1968-2006

This table reports the time series averages of the cross-sectional correlations between realized returns (Ret) and ICC estimates, as well as annual Fama-MacBeth (1973) regression coefficients of realized returns on ICC estimates, separately for firms with different levels of forecast bias, forecast accuracy, and earnings response coefficient (ERC). At the end of June of each year, we sort firms into tercile portfolios based on their forecast bias (Panel A), forecast accuracy (Panel B), or ERC (Panel C) associated with the model-based earnings forecasts for the next three years ($E_t[E_{t+1}]$, $E_t[E_{t+2}]$, and $E_t[E_{t+3}]$). We then calculate the correlations between the realized returns and the ICC estimates and estimate cross-sectional regressions of realized returns on the ICC estimates within each tercile portfolio. Annual realized returns are calculated by compounding monthly returns from July to June of next year. The ICC is estimated at the end of June of each year by solving the discounted residual income model. Forecast bias is realized earnings minus earnings forecast scaled by market capitalization. Forecast accuracy is the absolute value of forecast bias. We estimate a firm-specific ERC for each firm each year by dividing the firm's one-, two-, and three-year ahead realized returns by the unexpected earnings measured over the same horizon. Firms with negative ERC are excluded from the analysis. The table also reports the time series averages of the value-weighted bias, accuracy, ERC, realized return, and ICC for each tercile portfolio.

Panel A: Relation between realized returns and ICC estimates conditioning on forecast bias

	Tercile	Bias	Ret	ICC	Corr.	*t-stat*	FM	*t-stat*
	1	-0.0736	0.0294	0.1134	0.0969	*8.50*	0.4300	*5.17*
Bias $E_t[E_{t+1}]$	2	-0.0025	0.0740	0.0818	0.1329	*5.98*	1.2556	*4.68*
	3	0.0270	0.1311	0.0846	0.0688	*4.22*	0.6208	*3.37*
	1	-0.1986	-0.0315	0.1291	0.1477	*10.18*	0.5056	*8.04*
Bias $E_t[E_{t+2}]$	2	-0.0169	0.0660	0.0905	0.2009	*7.25*	1.7470	*7.45*
	3	0.0459	0.2395	0.0855	0.1198	*5.19*	1.2920	*3.68*
	1	-0.2352	-0.0120	0.1258	0.1074	*8.25*	0.3393	*6.22*
Bias $E_t[E_{t+3}]$	2	-0.0254	0.0529	0.0893	0.1723	*6.97*	1.4716	*6.65*
	3	0.0537	0.2244	0.0857	0.1161	*5.83*	1.2909	*5.50*

Table 6, continued

Panel B: Relation between realized returns and ICC estimates conditioning on forecast accuracy

	Tercile	Accuracy	Ret	ICC	Corr.	*t-stat*	FM	*t-stat*
	1	0.0071	0.0876	0.0766	0.1068	*4.85*	1.0131	*3.99*
Accuracy $E_t[E_{t+1}]$	2	0.0339	0.0953	0.0921	0.0873	*3.95*	0.8283	*2.98*
	3	0.1206	0.0749	0.1112	0.0427	*3.71*	0.1570	*2.25*
	1	0.0127	0.0873	0.0770	0.1837	*6.65*	1.7321	*6.43*
Accuracy $E_t[E_{t+2}]$	2	0.0529	0.0819	0.0923	0.1226	*5.56*	1.1259	*4.39*
	3	0.1807	0.0733	0.1125	0.0331	*2.09*	0.0386	*0.38*
	1	0.0177	0.0810	0.0765	0.1689	*6.62*	1.5412	*6.51*
Accuracy $E_t[E_{t+3}]$	2	0.0676	0.0981	0.0938	0.0995	*4.56*	0.8798	*3.31*
	3	0.2174	0.0972	0.1127	0.0199	*1.33*	-0.0285	*-0.27*

Panel C: Relation between realized returns and ICC estimates conditioning on earnings response coefficient (ERC)

	Tercile	ERC	Ret	ICC	Corr.	*t-stat*	FM	*t-stat*
	1	1.7441	0.0160	0.0913	-0.1011	*-4.45*	-0.2442	*-3.54*
ERC $E_t[E_{t+1}]$	2	8.5684	0.0936	0.0847	0.0330	*1.10*	0.6098	*2.06*
	3	47.9953	0.2098	0.0770	0.1095	*3.95*	1.5682	*2.87*
	1	1.6600	-0.0102	0.0903	-0.0359	*-2.18*	-0.2087	*-2.06*
ERC $E_t[E_{t+2}]$	2	8.1473	0.0811	0.0852	0.0874	*3.67*	1.4044	*4.35*
	3	44.9729	0.1673	0.0781	0.1476	*5.56*	1.9213	*4.80*
	1	1.8018	0.0033	0.0911	-0.0201	*-1.44*	-0.1811	*-1.36*
ERC $E_t[E_{t+3}]$	2	8.4809	0.0661	0.0838	0.0652	*2.82*	1.0932	*3.26*
	3	39.5920	0.1459	0.0791	0.1698	*7.37*	2.0571	*7.45*

Table 7: Market and industry realized and implied risk premiums, 1968-2006

This table reports the time series averages of the equal-weighted (Panel A) and value-weighted (Panel B) realized excess returns and implied risk premiums for the aggregate market and for the 12 Fama-French industry portfolios (classified using the definitions downloaded from Ken French's website). Annual realized returns are calculated by compounding monthly returns from July to June of next year. The ICC is estimated at the end of June of each year by solving the discounted residual income model. We use two proxies for the risk-free rate: the annualized 30-day T-Bill rate (denoted "1") and the 10-year Treasury constant maturity rate (denoted "2").

Panel A: Equal-weighted risk premiums

	Excess Ret1	*t-stat*	Excess Ret2	*t-stat*	Excess ICC1	*t-stat*	Excess ICC2	*t-stat*
Market	0.0931	*2.40*	0.0775	*2.04*	0.0681	*16.27*	0.0525	*13.20*
Consumer NonDurables	0.0802	*2.08*	0.0646	*1.72*	0.0789	*19.11*	0.0632	*15.45*
Consumer Durables	0.0868	*1.72*	0.0712	*1.45*	0.0764	*17.65*	0.0607	*13.58*
Manufacturing	0.0884	*2.32*	0.0727	*1.96*	0.0727	*17.70*	0.0570	*15.42*
Energy	0.0886	*1.83*	0.0730	*1.50*	0.0388	*8.60*	0.0231	*7.12*
Chemicals	0.0866	*2.47*	0.0710	*2.07*	0.0653	*16.69*	0.0497	*13.73*
Business Equipment	0.1207	*2.12*	0.1050	*1.86*	0.0591	*13.60*	0.0434	*10.78*
Telecommunication	0.1145	*2.58*	0.0989	*2.27*	0.0536	*12.89*	0.0380	*10.33*
Utilities	0.0922	*3.38*	0.0765	*2.93*	0.0754	*19.04*	0.0597	*19.53*
Wholesale and Retail	0.0885	*1.94*	0.0729	*1.63*	0.0749	*16.47*	0.0592	*12.79*
Healthcare	0.1337	*2.66*	0.1180	*2.37*	0.0484	*12.43*	0.0327	*8.42*
Finance	0.0894	*2.20*	0.0737	*1.85*	0.0737	*14.62*	0.0580	*11.53*
Other	0.0800	*1.89*	0.0643	*1.56*	0.0711	*15.35*	0.0554	*12.58*

Table 7, continued

Panel B: Value-weighted risk premiums

	Excess Ret1	*t-stat*	Excess Ret2	*t-stat*	Excess ICC1	*t-stat*	Excess ICC2	*t-stat*
Market	0.0598	*2.12*	0.0442	*1.62*	0.0257	*9.18*	0.0101	*6.06*
Consumer NonDurables	0.0756	*2.57*	0.0600	*2.10*	0.0220	*8.27*	0.0063	*2.83*
Consumer Durables	0.0477	*1.39*	0.0321	*0.97*	0.0395	*14.10*	0.0238	*9.05*
Manufacturing	0.0534	*1.81*	0.0377	*1.32*	0.0272	*9.59*	0.0115	*6.47*
Energy	0.0892	*2.77*	0.0735	*2.30*	0.0252	*6.04*	0.0095	*2.94*
Chemicals	0.0658	*2.17*	0.0502	*1.71*	0.0237	*8.20*	0.0080	*4.46*
Business Equipment	0.0621	*1.34*	0.0465	*1.02*	0.0114	*3.12*	-0.0043	*-1.94*
Telecommunication	0.0591	*1.91*	0.0435	*1.45*	0.0350	*10.06*	0.0193	*7.96*
Utilities	0.0677	*2.42*	0.0521	*1.92*	0.0557	*16.83*	0.0401	*18.59*
Wholesale and Retail	0.0737	*2.04*	0.0581	*1.65*	0.0262	*9.64*	0.0105	*3.87*
Healthcare	0.0777	*2.42*	0.0620	*1.95*	0.0135	*4.49*	-0.0021	*-1.02*
Finance	0.0761	*1.99*	0.0604	*1.62*	0.0293	*8.31*	0.0137	*3.99*
Other	0.0536	*1.51*	0.0379	*1.09*	0.0273	*7.33*	0.0117	*3.84*

Table 8: The model-based ICC and cross-sectional return anomalies, 1968-2006

This table reports the time series averages of the equal-weighted (Panel A) and value-weighted (Panel B) realized returns (Ret) and ICC for decile portfolios sorted based on various firm-level characteristics, as well as the 10-1 (High-Low) realized return and ICC spread and their time series *t*-statistics. Beta is estimated using a rolling 60-month (24 month minimum) window ending in June of each year. Size is market capitalization at the end of June of each year. BE/ME is book equity divided by market capitalization at previous year's fiscal year end. Leverage is book value of debt divided by book equity. Distress is the default probability estimated using a dynamic logit model as in Campbell, Hilscher, and Szilagyi (2008). CAPEX is capital expenditure scaled by lagged total assets. Asset growth is the growth rate in total assets. Accruals is operating accruals scaled by lagged total assets. NOA is net operating assets scaled by lagged total assets. Analyst dispersion is the standard deviation of IBES analysts' forecasts divided by the stock price as of June of each year.

Panel A: Equal-weighted portfolios

Characteristic		Low	2	3	4	5	6	7	8	9	High	10-1	*t-stat*
Beta	Ret	0.1540	0.1615	0.1700	0.1630	0.1703	0.1719	0.1420	0.1502	0.1347	0.1140	-0.0401	*-1.00*
	ICC	0.1577	0.1420	0.1348	0.1275	0.1270	0.1231	0.1198	0.1177	0.1164	0.1120	-0.0457	*-7.77*
Size	Ret	0.1665	0.1492	0.1435	0.1476	0.1507	0.1378	0.1418	0.1355	0.1313	0.1212	-0.0453	*-1.23*
	ICC	0.1666	0.1172	0.1082	0.1040	0.0994	0.0976	0.0943	0.0941	0.0919	0.0836	-0.0830	*-13.33*
BE/ME	Ret	0.0641	0.1051	0.1159	0.1387	0.1480	0.1673	0.1816	0.1864	0.2049	0.2202	0.1562	*5.95*
	ICC	0.1032	0.0940	0.1029	0.1108	0.1197	0.1274	0.1368	0.1466	0.1604	0.1782	0.0749	*13.26*
Leverage	Ret	0.0926	0.1318	0.1345	0.1529	0.1603	0.1623	0.1768	0.1649	0.1735	0.1824	0.0898	*2.45*
	ICC	0.0974	0.1108	0.1164	0.1194	0.1244	0.1276	0.1327	0.1389	0.1519	0.1672	0.0698	*20.43*
Distress	Ret	0.1283	0.1364	0.1453	0.1643	0.1712	0.1777	0.1720	0.1648	0.1743	0.1825	0.0542	*1.28*
	ICC	0.0874	0.0980	0.1076	0.1161	0.1232	0.1330	0.1413	0.1490	0.1581	0.1728	0.0854	*9.58*
CAPEX	Ret	0.1577	0.1716	0.1713	0.1635	0.1708	0.1597	0.1551	0.1568	0.1397	0.0964	-0.0612	*-2.35*
	ICC	0.1585	0.1410	0.1366	0.1303	0.1276	0.1244	0.1207	0.1185	0.1158	0.1099	-0.0486	*-11.60*

Table 8, continued

Characteristic		Low	2	3	4	5	6	7	8	9	High	10-1	*t-stat*
Asset Growth	Ret	0.1714	0.1997	0.1849	0.1791	0.1731	0.1625	0.1568	0.1486	0.1150	0.0508	-0.1206	*-4.36*
	ICC	0.1466	0.1444	0.1417	0.1366	0.1298	0.1258	0.1218	0.1175	0.1133	0.1079	-0.0387	*-7.91*
Accruals	Ret	0.1460	0.1633	0.1833	0.1792	0.1665	0.1618	0.1543	0.1556	0.1417	0.0816	-0.0644	*-4.28*
	ICC	0.1346	0.1312	0.1265	0.1278	0.1283	0.1297	0.1282	0.1290	0.1258	0.1220	-0.0126	*-4.66*
NOA	Ret	0.1712	0.1782	0.1771	0.1780	0.1769	0.1611	0.1647	0.1404	0.1302	0.0542	-0.1171	*-3.32*
	ICC	0.1324	0.1338	0.1319	0.1308	0.1314	0.1309	0.1313	0.1290	0.1250	0.1152	-0.0173	*-4.37*
Analyst Dispersion	Ret	0.2663	0.1975	0.1829	0.1626	0.1485	0.1556	0.1437	0.1423	0.1333	0.1242	-0.1421	*-3.87*
	ICC	0.0844	0.0826	0.0893	0.0926	0.0963	0.0997	0.1021	0.1036	0.1050	0.1082	0.0238	*7.85*

Panel B: Value-weighted portfolios

Characteristic		Low	2	3	4	5	6	7	8	9	High	10-1	*t-stat*
Beta	Ret	0.1128	0.1246	0.1334	0.1251	0.1336	0.1200	0.1108	0.1286	0.1167	0.1044	-0.0084	*-0.16*
	ICC	0.0992	0.0893	0.0845	0.0858	0.0882	0.0892	0.0890	0.0889	0.0917	0.0866	-0.0126	*-2.41*
Size	Ret	0.1559	0.1472	0.1431	0.1483	0.1494	0.1383	0.1425	0.1355	0.1304	0.1156	-0.0403	*-1.08*
	ICC	0.1431	0.1167	0.1080	0.1038	0.0993	0.0973	0.0941	0.0941	0.0915	0.0793	-0.0638	*-11.29*
BE/ME	Ret	0.1015	0.1142	0.1324	0.1122	0.1349	0.1504	0.1354	0.1715	0.1689	0.1829	0.0814	*2.27*
	ICC	0.0631	0.0720	0.0802	0.0867	0.0930	0.1035	0.1103	0.1165	0.1282	0.1426	0.0795	*16.69*
Leverage	Ret	0.1101	0.1240	0.1194	0.1145	0.1295	0.1332	0.1318	0.1294	0.1396	0.1455	0.0354	*0.90*
	ICC	0.0657	0.0735	0.0760	0.0814	0.0885	0.0940	0.0998	0.1082	0.1181	0.1147	0.0490	*14.66*

Table 8, continued

Characteristic		Low	2	3	4	5	6	7	8	9	High	10-1	*t-stat*
Distress	Ret	0.1207	0.1311	0.1210	0.1315	0.1703	0.1623	0.1361	0.1318	0.1501	0.1711	0.0504	*0.95*
	ICC	0.0780	0.0910	0.0990	0.1030	0.1057	0.1116	0.1178	0.1179	0.1308	0.1347	0.0567	*9.16*
CAPEX	Ret	0.1376	0.1381	0.1219	0.1241	0.1457	0.1358	0.1153	0.1204	0.1121	0.0996	-0.0380	*-1.29*
	ICC	0.1036	0.0971	0.0937	0.0920	0.0914	0.0873	0.0858	0.0859	0.0831	0.0819	-0.0217	*-6.78*
Asset Growth	Ret	0.1493	0.1502	0.1439	0.1455	0.1183	0.1342	0.1279	0.1223	0.1165	0.0735	-0.0758	*-3.00*
	ICC	0.1027	0.0971	0.0961	0.0939	0.0894	0.0870	0.0830	0.0818	0.0795	0.0787	-0.0240	*-3.87*
Accruals	Ret	0.1210	0.1157	0.1293	0.1306	0.1311	0.1231	0.1213	0.0994	0.1138	0.0659	-0.0551	*-2.17*
	ICC	0.0796	0.0871	0.0863	0.0888	0.0897	0.0893	0.0870	0.0831	0.0821	0.0832	0.0037	*1.05*
NOA	Ret	0.1396	0.1228	0.1477	0.1260	0.1317	0.1219	0.1216	0.1046	0.1200	0.0818	-0.0578	*-2.07*
	ICC	0.0778	0.0820	0.0826	0.0840	0.0869	0.0917	0.0935	0.0929	0.0934	0.0881	0.0103	*3.37*
Analyst Dispersion	Ret	0.2073	0.1442	0.1470	0.1025	0.1166	0.1191	0.1120	0.1307	0.1144	0.1030	-0.1042	*-2.31*
	ICC	0.0698	0.0761	0.0795	0.0850	0.0889	0.0950	0.0951	0.0981	0.1008	0.1063	0.0366	*10.07*