Looking Forward: Management Earnings Forecasts and the Value Effect*

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Looking Forward: Management Earnings Forecasts and the Value Effect

Abstract

We examine the pricing implications of management earnings forecasts by taking advantage of the unique corporate disclosure practice in Japan, where listed firms regularly announce earnings forecasts upon requests by stock exchanges and the press. A calendar-time strategy using the forecasted earnings-to-price ratio earns a premium comparable to, and separate from, the value premium based on the book-to-market ratio. The premium is robust to a variety of factor and characteristic controls including realized and forecasted earnings momentum. The result is more consistent with characteristic pricing than factor pricing and challenges risk-based explanation.

Introduction

A wealth of studies shows that management earnings guidance influences stock prices through event studies. We find that calendar-time equity trading strategies based on management earnings forecasts generate economically significant profits that are not subsumed by existing factors or characteristics. These strategies sort stocks on the management earnings forecast deflated by the firm's market value. Our tests indicate that the pricing of such a forward-looking valueness measure is more consistent with a behavioral explanation than a rational one.

To lay out theoretical underpinnings, we begin by constructing a rational framework in which pricing of characteristics and pricing of factor covariance risk are equivalent. These two seemingly opposing views are indeed consistent under certain restrictions on investor preference. In this framework, the forecasted earnings-to-price ratio (FEP) plays a crucial role in the characteristic pricing along with the book-to-market ratio (BM). We start with clean-surplus accounting, which states that dividends are paid out of earnings or asset sales. It thus governs the dynamics of dividends by linking them to earnings and the book value. Consequently, when earnings forecasts are available, discounting dividends at the risk-free rate gives a firm's fundamental value as a linear combination of the book value, earnings, and forecasted earnings, among others (Ohlson (1995)). Taking the ratio of the fundamental value to the market price, which we call the *value ratio*, results in a decomposition of the expected return into components represented by BM, the earnings-to-price ratio (EP), and FEP. Under the preference restrictions, we show that the value ratio is linearly related to the expected return. Moreover, the coefficients on BM and FEP are positive, while that on EP has an indeterminate sign. This gives FEP a separate pricing role from BM and an independent basis for value investing. This distinction between the two price ratios is intuitive: Earnings forecasts are a forward-looking flow proxy for future cash flows, while the book value of equity is a realized stock measure of past earnings net of cash payouts. The decomposition suggests a positive relation between FEP as well as BM and subsequent returns. Since the latter relation is well known, our main interest lies in the former involving FEP, a forward-looking value measure.

Testing the pricing implication of FEP, however, faces an immediate obstacle due to the scarcity of forecasts. We overcome this issue by taking advantage of the unique corporate-disclosure practice in Japan where management forecasts are regularly announced for most listed firms, much more widely than analyst forecasts. Unlike their typical foreign counterpart, Japanese stock exchanges and the press play a pivotal role in corporate disclosure. Both the exchanges and the press request listed firms to disclose major financial statement items in a standardized format and make the responses publicly available. Notably, the requested items include not only realized figures for the past fiscal year, but also forecasts of sales, earnings, and dividends for the current, ongoing fiscal year. Revisions of forecasts are also requested at interim earnings announcements. Although voluntary, most firms—all but less than ten percent of listed firms on average over the last three decades—respond to these requests to meet the press demand and investor expectations. Moreover, the exchange listing rules require that those forecasts, once provided, be updated immediately if they change significantly—30% or more for earnings.[1] This results in voluntary

[1] Rule 405 of the Tokyo Stock Exchange Security Listing Regulations requires listed firms to issue a new forecast immediately if it differs materially from the previously published forecast (or from the actual value for the previous fiscal year if there is no prevailing forecast). Rule 407 of its Enforcement Rules stipulates the materiality to be a change by 30% or more for earnings and 10% or more for sales. This is consistent with Article 166(2)(iii) of the Financial Instruments and Exchange Act (1948) and Article 51 of the Cabinet Office Ordinance on Restrictions on

management earnings forecasts that are "effectively mandated" (Kato, Skinner, and Kunimura (2009)). In fact, every year over the last three decades, thousands of firms, more than 4,000 at the peak, announced about five forecasts per firm on average. This situation virtually avoids the self-selection bias associated with voluntary disclosure, which is important in asset pricing.

We find empirical support for the economic significance of the premium attached to FEP. Taking advantage of the availability of the exact announcement dates, we sort stocks by FEP to form value-weighted decile portfolios every month. The monthly rebalancing frequency closely replicates the actual information environment available to investors in the Japanese market. As a robustness check, we also examine annual rebalancing strategies typically employed with data from the U.S. market, where exact announcement dates are mostly unknown. We find that the average return increases in the FEP rank regardless of the rebalancing frequency. With monthly rebalancing for example, the zero investment portfolio long the highest FEP decile and short the lowest FEP decile produces an impressive spread return of 1.30% per month with a t-statistic of 4.64. As implied by the above return decomposition, we next form 25 value-weighted portfolios as the intersection of quintiles independently sorted on FEP and BM. We construct a BM-controlled FEP portfolio by equally weighting the five value-weighted BM portfolios within an FEP quintile. The mean return on the zero-cost portfolio, long the highest BM-controlled FEP quintile and short the lowest, is 0.86% per month. Since it is already BM-neutral, risk adjustment by the Fama-French three factors barely changes the premium, yielding a robust three-factor alpha of 0.72% per month. Both of these figures are economically large and statistically significant at the 1% level. The Gibbons-Ross-Shanken test strongly rejects the null hypothesis that the five BM-

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Securities Transactions, etc., both of which prohibit corporate insiders from trading on material inside information including such undisclosed management forecasts.

controlled FEP portfolio alphas are jointly zero. Therefore, the pricing of the FEP characteristic is not subsumed by the BM characteristic or the covariance risks with respect to the Fama-French three factors. This confirms the intuition that forward-looking FEP should contain separate information from realized BM.

To examine the pricing of factors in the strong presence of characteristic pricing, we perform cross-sectional asset pricing tests for a variety of specifications. Since our framework is silent on the choice of factors, we posit that the market, BM, and FEP factors linearly approximate the stochastic discount factor. As a preliminary analysis, we start with the most restricted CAPM specification using the 25 FEP-BM sorted portfolios as test assets. Not surprisingly, the Japanese market factor fails to explain the cross sectional variation in their returns; the premium on the market factor is negative and insignificant. The adjusted R-squared from a regression of average returns on estimated market betas is -4%, similar to what we know from the U.S. market. However, once the FEP factor, defined as the BM-controlled FEP tercile spread portfolio return, is added, the adjusted R-squared jumps up to 68%. The cross-sectional premium on the FEP factor is 0.64% ($t = 3.35$), which barely changes with the inclusion of the Fama-French three factors.

To test our proposition more formally, we replace the test assets with individual stocks and additionally include the lagged FEP, size, and BM characteristics. The FEP-factor premium remains significant as long as we assign portfolio betas to member stocks, a standard practice typically advocated on the ground that individual stock betas are noisy. In addition, both the FEP and BM characteristics carry significantly positive coefficients. While we report results from the Fama-MacBeth (1973) procedure with betas estimated using rolling windows, the qualitative result is robust to reasonable changes in factor construction, beta measurement, and the estimation method such as panel regressions with two-way clustered standard errors.

However, the result on factor pricing completely changes when we use the betas of individual stocks rather than those of the portfolios they belong to. Specifically, the pricing of all factors disappears, while the coefficients on the FEP and BM characteristics remain significantly positive. We confirm the same point using what is known as the characteristic-balanced portfolio approach. Specifically, we show that the differences in factor loadings do not contribute to return dispersions among stocks with similar levels of the FEP and BM characteristics. This evidence goes against our risk-based framework, which requires both characteristic pricing and factor pricing to hold. While our results do not rule out rational pricing by other unexplored factors, behavioral explanation for the characteristic pricing is more likely given that we fail to find factors whose covariance risks are priced.

We perform a battery of robustness tests on the FEP-characteristic pricing. The profit from the FEP strategy remains strong when controlled for realized EP, earnings momentum, or its variant based on earnings forecast surprise. A further investigation reveals that annual strategies based on FEP also yield significant profits unless rebalanced in February or March. Since March is the fiscal year end for the majority of Japanese firms, and since firms are not required to update forecasts unless they change by 30% or more, this suggests that forecasts prevailing near the typical fiscal-year end tend to become stale. We also find that the pricing of FEP is robust to subsamples. Finally, strategies based on I/B/E/S analyst forecasts do not yield a significantly positive three-factor alpha. This provides evidence that forecasts by managements, rather than analysts, play a central role in forming investor expectations in Japan, which should be of interest to regulators and stock exchanges around the world in designing an effective corporate-disclosure protocol.

Our study belongs to the literature on asset-pricing anomalies in international equity markets. It is well known that the value effect based on price ratios of realized fundamental proxies prevails in markets around the world (Fama and French (1998)). In particular, the Japanese value effect was documented more than two decades ago by Chan, Hamao, and Lakonishok (1991) and claimed to be stronger than its U.S. counterpart by Daniel, Titman, and Wei (2001). Momentum is also pervasive across the globe (Rouwenhorst (1998), Griffin, Ji, and Martin (2003)), although Japan is an exception to this norm (Chui, Titman, and Wei (2010), Fama and French (2012)). Building on these results, Hou, Karolyi, and Kho (2011) propose a multi-factor model based on momentum and the cash flow-to-price ratio to explain the cross section of equity returns in 49 countries. Using stocks from 46 countries, Barber, De George, Lehavy, and Trueman (2013) show that buying firms that are expected to announce earnings and shorting those that aren't earn significant returns. Japan accounts for a significant fraction of the market value that these authors examine.[2] None of them studies the profits of earnings forecast-based strategies.

Studies on the relation between management earnings forecasts and stock returns typically employ event studies, whether the subject firms are American (McNichols (1989), Clement, Frankel, and Miller (2003)) or Japanese (Conroy, Eades, and Harris (2000), Kato, Skinner, and Kunimura (2009)). On the other hand, earnings momentum uses calendar-time strategies based on surprises in realized earnings, measured relative to the consensus analyst forecast or past realized earnings (Chan, Jegadeesh, and Lakonishok (1996), Frazzini (2006), Chordia et al. (2009), and Hirshleifer, Lim, and Teoh (2009)). None of these studies examines the profits of calendar-time

[2] Gleaning summary statistics from the latest of these papers, Japanese firms cover the largest fraction of Barber, De George, Lehavy, and Trueman's (2013) non-U.S. sample in both the number of earnings announcements (20.2%) and the market capitalization (50.9%). In samples including the U.S., Japan accounts for 18.4% of the global market capitalization in Fama and French (2012) and 10% of the number of stocks in Hou, Karolyi, and Kho (2011), both next only to the U.S. as a single country.

strategies based on management earnings forecasts. We also confirm that the pricing of FEP is not explained by post announcement drifts, whether based on realized or forecasted earnings. Moreover, dispersion of opinions (Diether, Malloy, and Scherbina (2002), Sadka and Scherbina (2007)) is not responsible for our result because there is none in a firm's management forecast.

Our study is separate from the recent profitability literature. Novy-Marx (2013) finds that gross profitability positively predicts the cross section of stock returns. However, Ball, Gerakos, Linnainmaa, and Nikolaev (2015) show that net income is comparable to gross profit in the predictive ability of future returns if they are deflated commonly by total assets, and in fact, operating profit performs better. Our variable of interest differs from these profitability measures in both the numerator and the denominator: We normalize a forecasted profit by the market value, while the above authors deflate a realized profit by some book value. Therefore, we stay within the boundary of the value anomaly literature and focus on examining the pricing implication of the forward-looking valueness measure.

The paper is organized as follows. The next section introduces the theoretical framework on the equivalence of characteristic pricing and factor pricing. It also describes the data and reviews the unique corporate disclosure practice in Japan. Section 2 examines the pricing of the FEP characteristic and its derived factor using both the portfolio approach and cross-sectional asset-pricing tests. Section 3 explores the sources of the FEP premium and performs robustness tests. The final section concludes. The appendix provides the details of the theory.

1. Motivation

We start by establishing two testable hypotheses that form the basis of subsequent empirical analysis. The first hypothesis is on characteristic pricing and asserts that a firm's expected return increases in BM and FEP. The second hypothesis is on factor pricing and argues that the pricing of such characteristics is consistent with asset pricing tests based on factor loadings. These two seemingly conflicting views are indeed equivalent with restrictions on investor preference, whose derivation is relegated to the appendix for parsimony. Below we will provide the synopsis of our theory.

1.1. Empirical hypothesis

Define a firm's fundamental value as the sum of future dividends discounted at the risk-free rate. The dividends are paid out of earnings, whose remainder is retained in book equity. The retained earnings are available to fund subsequent dividends by divesting, but at the cost of delayed payment to investors. This combination of the dividend discount model and clean surplus accounting therefore implies that the fundamental value increases in the sources of future dividends, namely future earnings and divestment in book equity. More specifically, the firm's fundamental value equals the present value of the residual income, or the future earnings in excess of the opportunity cost of past retained earnings in the book. This relation is known as the residual income-valuation model.

If the residual income follows an autoregressive process, the residual income-valuation model yields a tractable analytical expression for the firm's fundamental value. In particular, Ohlson (1995) posits that the residual income follows a modified autoregressive process with information about the future residual income other than accounting data and dividends. He shows that the fundamental value at time t, G_t, is linear in the book value, B_t, and its lag as well as earnings, X_t, and the forecast about one-period-ahead earnings, $F_t = E_t[X_{t+1}]$, where $E_t[\cdot]$ denotes the expectation given investors' information set at time t:

$$G_t = a_1 B_t + a_2(X_t - r_f B_{t-1}) + a_3 F_t. \tag{1}$$

Here, r_f is the constant risk-free rate and a_1, a_2, and a_3 are coefficients whose exact expressions can be found in the appendix. The derivation there shows that a_1 and a_3 are positive as long as G_t is stationary, while a_2 is indeterminate. The term in the parentheses, $X_t - r_f B_{t-1}$, is the residual income.

The larger compensation investors require to hold a firm's equity, the lower its market value, P_t, will be relative to the fundamental value, G_t. Thus, the ratio of the fundamental value to the market value, G_t/P_t, is a measure of the expected return, which we call *the value ratio*. The relation between the value ratio and the expected return is likely to change as investor preference and investment opportunities vary over time. Considering this time-varying relationship, we divide the right hand side of Equation (1) by the market value and write the conditional expected return, $E_t[r_{t+1}]$, using time-varying coefficients:

$$E_t[r_{t+1}] = b_{0t} + b_{1t} BM_t + b_{2t}(EP_t - r_f B_{t-1} / P_t) + b_{3t} FEP_t, \tag{2}$$

where $BM_t \equiv B_t/P_t$ is the book-to-market ratio, $EP_t \equiv X_t/P_t$ is the earnings-to-price ratio, and $FEP_t \equiv E_t[X_{t+1}]/P_t$ is the forecasted earnings-to-price ratio. In the appendix, we show that the b coefficients inherits the sign of the a coefficients with proper restrictions on investor preference. Since the sign of a_2 in Equation (1) is indeterminate, we focus on the positivity of b_1 and b_3 to establish the following empirical hypothesis:

Hypothesis 1. *(Characteristic pricing) A firm's expected return increases in the book-to-market ratio and the forecasted earnings-to-price ratio.*

Consistent with Hypothesis 1, existing empirical estimates of b_1 and b_3 from cross-sectional regressions are significantly positive, while that for b_2 is insignificant in both the U.S. using analyst forecasts (Dechow, Hutton, and Sloan (1999)) and Japan using management forecasts (Ota (2002)). More detailed discussions of these findings can be found in the appendix. This points to the profitability of a value strategy investing in stocks with high book-to-market and forecasted earnings-to-price ratios.

The above framework is consistent with factor pricing under the same preference restrictions. Therefore, if a stochastic discount factor prices all the assets in the economy and can be linearly approximated by a few factors, the expected return will be linear in the covariances between the return and those factors. In the appendix, we show that Equation (2) is another representation of such a beta-pricing model, and that the characteristics act as proxies for factor loadings. Given the positive effects that BM and FEP have on the dynamics of the fundamental value, we posit that factors based on them as well as the market return linearly approximate the stochastic discount factor. This leads to the second testable hypothesis:

Hypothesis 2. *(Factor pricing) A firm's expected return increases in loadings on the market portfolio and two zero-cost portfolios based on the book-to-market ratio and the forecasted earnings-to-price ratio, both long stocks with high ratios and short stocks with low ratios.*

The argument in the appendix establishes that characteristic pricing and factor pricing in these two hypotheses are equivalent. To be precise, it requires *both* hypotheses to hold, not one. Since they are equivalent, putting all the relevant characteristics and factors together in a cross-sectional regression should cause a multi-collinearity problem if our model is correct. In this sense, the characteristics and the factors are redundant. As such, our model is built on a stronger assumption than the view that the returns on the market portfolio and long-short portfolios based on characteristics span the multifactor efficiency frontier (for example, Fama and French (2015), Section 2). This should not be surprising because our assumptions include those consistent with such risk-based pricing as well as assumptions for the Residual Income Valuation Model with a restriction placed on the stochastic discount factor (see Assumption 1 in the appendix). Conversely, rejection of either hypothesis rejects our model. Rejection of Hypothesis 1 alone also rejects the broader characteristic-based explanation in which BM and FEP drive the fundamental value. Rejection of Hypothesis 2 alone rejects the broader risk-based explanation in which the factors based on the aggregate market and individual BM and FEP span the multifactor efficiency frontier.

In the rest of this paper, we will test these hypotheses using data from Japan where most listed firms provide earnings forecasts multiple times a year. This is a unique feature of the Japanese market where FEP is widely available. We begin by reviewing this unique corporate disclosure practice in the next section.

1.2. Institutional background and data

Major Japanese exchanges and the press request listed firms to provide the current year's forecasts along with the past fiscal year's result, and revisions of those forecasts at interim earnings announcement dates. This custom originates in the journalism culture of financial reporters who strive to scoop market and corporate news. For example, the Tokyo Stock Exchange physically houses a press club (the *Kabuto Club*) that dates back to at least 1950's. Newspapermen and correspondents stationed at the club gather news on equity markets and corporate earnings, which is then published in daily newspapers and timely broadcasted on radio, TV, and more recently the

Internet. To meet such press demand, managers of listed firms traditionally travelled to the exchange and held a press conference to announce their financial results. In late 1970's, the Japanese Stock Exchanges Conference, which consists of all organized exchanges in Japan, followed suit and started formally asking firms to disclose forecasted as well as realized earnings. Needless to say, this reinforced the pressure on listed firms to prepare forecasts. This tradition is also followed by relatively new electronic trading venues such as JASDAQ.

Our data come from the press side and are assembled by Financial Data Solutions (FDS), which recently purchased the exclusive right to distribute formatted data from Nikkei that has the largest presence at the exchange press club. With its daily newspaper, Nikkei has always preceded exchanges in announcing the result of its corporate earnings survey, recently supplementing its daily hardcopy publication with a free, even timelier website.[3] Our comprehensive database contains all management forecasts gathered by Nikkei and then published in its daily newspaper as the "quick" (*sokuhou*) and "final" (*kakuhou*) reports, which are released earlier than more formal reports (*kessan tanshin*) by stock exchanges.[4] It also includes detailed financial statement items of

[3] In fact, Nikkei has even effectively predated the actual corporate announcements often by running accurate earnings previews, which have been criticized for moving the market. Goetzmann, Hamao, and Takahashi (2015) analyze the value relevance of such Nikkei preview articles.

[4] The *sokuhou* and *kakuhou* reports are paired (initial and restating or revising) financial highlights of firms while the *kessan tanshin* reports are formal (quarterly or semiannual) financial statements. Highlights are more voluntary in nature while most firms release their forecasts in their *kessan tanshin* reports. Specifically, earnings and other accounting items are from the NPM Japan Listed-firm Daily Financial (*zaimu*) Data. Prices and returns are from the NPM Japan Listed-stock Return Data (both daily and monthly). We use the ordinary profit (*keijo rieki*) as our earnings measure. The ordinary profit can be roughly thought of as the income before extraordinary items according to the Japanese Generally Accepted Accounting Principle.

all listed firms, both consolidated and unconsolidated, complete with market information such as equity prices, returns, dividends, and the number of shares outstanding. In particular, the consolidated earnings forecasts have only been released to industry practitioners for back-testing purposes and never to the academics in a readily accessible manner till this study. In addition to realized and forecasted earnings, major financial statement items such as sales, total assets, and shareholders' equity are date-stamped on the day they are published in the Nikkei daily newspaper.[5] This allows us to construct accurate calendar-time strategies based on the price ratios in Equation (2) and control variables such as size without a look-ahead bias.

Panel A of Table 1 shows the characteristics of announcements over a period from 1977 when unconsolidated earnings forecasts become available for most firms. The number of firms announcing earnings and forecasts steadily increases from over 1,600 in 1977, although 1978 has an exceptionally small number of firms reporting earnings. This is because many of that fiscal year's announcements are recorded in 1979, as indicated by an offsetting increase in the number of earnings announcements per firm from 1.92 to 2.73.[6] Excluding 1978, the bottom row shows that over 96% of listed firms announce earnings approximately twice (1.93 times) a year on average, which typically consists of a quick report and a final report, and in some cases, a restatement. The quick reports are subject to change; the average number of changes in earnings

[5] Throughout the sample period, publication dates of financial statement items are available for unconsolidated realized figures as well as consolidated and unconsolidated forecasts. Those for consolidated realized figures become available only after early 1990's, and in earlier years FDS records the first business day past five months from the fiscal year end to avoid a look-ahead bias. Our result does not change qualitatively whether we use or omit consolidated realized figures.

[6] According to FDS, Nikkei did not provide a clear answer upon their inquiry about this anomaly.

implies that either they were indeed changed in the final reports or the final reports were subsequently restated 0.21 times on average. According to the sixth column, these changes mostly occurred between 1983 and 2003. Similarly, the middle group of columns shows that over 91% of listed firms also announce (unconsolidated) earnings forecasts. Thus, although voluntary, earnings forecasts are "effectively mandated" (Kato, Skinner, and Kunimura (2009)) in Japan. The bottom row says that firms make about five (4.90 or 4.96) forecasts per year on average including or excluding 1978. Since the forecasted figures can remain unchanged, forecasts are amended only 1.3 times per year on average. Finally, the last four columns imply that consolidated earnings forecasts became available in 1994. 76.5% of firms announce consolidated earnings forecasts 4.90 times per year, changing them 1.28 times.

Panel B summarizes the distribution of announcements by month. 69.2% of 111,024 total firm-fiscal years end in March. The majority (61.6%) of the first financial statements of the past fiscal year are reported in May, suggesting that firms typically release their quick reports within two months of the most popular fiscal year end. The spikes in the number of all statements in the subsequent three months imply that most firms with a March fiscal-year end finalize their statements by August. Since firms are requested to announce the current fiscal year's earnings forecasts together with the past year's statements, the majority of the first earnings forecasts (60.6% of the unconsolidated and 58.2% of the consolidated) occur in May. Other than May, firms announce their forecasts frequently in March, September, November, and in the case of consolidated forecasts, also December. November forecasts are typically associated with interim semiannual reports, and those in March and September with quarterly reports. However, no single month accounts for more than 16% of total forecasts. The fairly constant release of earnings forecasts throughout the year suggests conditioning at the monthly frequency, but we will also examine the annual frequency as well.

2. Testing the pricing implications of management earnings forecasts

Having confirmed the abundance of management earnings forecasts in Japan, we proceed to test their pricing implications hypothesized earlier. We will employ a battery of tests based on portfolio formation and cross-sectional regressions, starting with the former.

2.1. Portfolio approach

Exploiting the high announcement frequency, we form portfolios at the end of every month beginning in December 1977 with value-weighted returns realized at the next month end. The sample ends in December 2014. We will compute alphas using an equivalent of the three factors popularly used in the U.S. and global markets, namely Fama and French's (1993) market, size (SMB), and BM-based value (HML) factors. We construct Japanese factors using a division of the stock universe similar to the U.S. factors available on Kenneth French's website. The main analysis in this section rebalances test portfolios and factors monthly to replicate the information environment available to investors, which is possible because the exact announcement dates in the Nikkei daily newspaper are available in the FDS data.[7] However, since accounting variables such

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[7] Specifically, we sort stocks every month by size into two groups (denoted by Small and Big) and independently by BM into terciles (denoted by Low, Middle, and High). The size breakpoint is the median and the BM breakpoints are the 30th and 70th percentiles. We form six portfolios as the intersection of these size and BM groups every month. Then the Japanese SMB is computed from these portfolio returns as (Small High + Small Middle + Small Low)/3 –

as the book value change at a lower frequency, we also examine annual rebalancing in a later section.

2.1.1. Decile portfolios on realized and forecasted earnings

Panels A and B of Table 2 show the characteristics of decile portfolios formed on (realized) EP and (forecasted) FEP, respectively. To construct FEP, we use consolidated forecasts whenever available, and otherwise unconsolidated forecasts. Following the standard practice, we focus on firms with positive earnings and relegate those with negative EP or FEP to Rank 0, which is not used in the subsequent analysis.[8] Comparing the first row of the two panels, we see that the distribution of EP and FEP are similar to each other. High EP and FEP firms tend to be small in size, although loss-incurring or expecting firms (rank 0) are also small. Not surprisingly, BM is positively correlated with both EP and FEP.

The number of stocks (N) shows that there are a sizable number of loss-incurring firms, 351 firms to be precise or 12% of the universe on average. However, the number of loss-expecting firms (N for FEP) is much smaller and stands at only 188 firms, or 6.6% of forecast-announcing firms in Japan. Thus, firm managers appear to issue optimistic forecasts perhaps because forecast optimism is less likely to expose them to legal penalty than earnings manipulation, as noted by Kato, Skinner, and Kunimura (2009).

(Big High + Big Middle + Big Low)/3. The Japanese HML equals (Small High + Big High)/2 – (Small Low + Big Low)/2.

[8] Fama and French (1992, p.444 bottom) argue that "[w]hen current earnings are negative, they are not a proxy for the earnings forecasts embedded in the stock price, and E/P is not a proxy for expected returns."

The excess return (EXRET) strongly increases with ranking, yielding an impressive 10-1 spread return of 1.20% per month (t = 4.25) for EP in Panel A and 1.30% per month (t = 4.64) for FEP in Panel B. However, as Equation (2) implies, it is important to control for these variables and BM simultaneously. This is our next agenda.

2.1.2. Controlling for realized value measures

To examine the validity of Hypothesis 1, we first perform a two-way independent sort by FEP and BM and report the result in Table 3. The first two panels show that the independent sort produces a considerable variation in FEP within a BM quintile and vice versa. Therefore, although positively correlated, FEP and BM each appear to have information that is not captured by the other. Panel C confirms that value stocks with high BM tend to be smaller in market capitalization. The large average number of stocks in the diagonal cells of Panel D implies that FEP and BM are positively correlated.

Panel E reports the excess returns on the 25 FEP-BM portfolios. The rightmost column denoted by "Cont" shows the excess return on the BM-controlled FEP portfolio, defined as the equally weighted average of the five value-weighted excess BM portfolio returns within an FEP quintile. Similarly, the "Cont" row at the bottom shows the excess returns on the FEP-controlled BM portfolios. There are two equivalent ways to read the panel, row-wise and column-wise. Along the "5-1" row, the FEP spread is large across the BM quintiles, ranging from 0.47% to 1.13%, all of which are statistically significant. The BM-controlled FEP spread at the rightmost column is their average, 0.86%. The other way to reach the same figure is to look down along the rightmost "Cont" column; the excess return on the BM-controlled portfolio monotonically increases from 0.20% to 1.05% with the FEP rank, yielding the same 5-1 spread return of 0.86%. Similarly, the BM premium is robust controlling for FEP, producing an FEP-controlled BM premium of 0.76%.

If the FEP spread returns are truly separate from BM, they should not disappear upon risk adjustment. Panel F examines this point. While the FEP-controlled BM premium turns to a negative alpha of -0.32% due to the inclusion of HML in the regressors, the BM-controlled FEP premium remains robust at 0.72%, which is economically and statistically significant. The Gibbons-Ross-Shanken (GRS) test rejects the null hypothesis that the 25 non-spread portfolio alphas jointly equal zero. A closer look reveals that the GRS test on the five BM-controlled FEP portfolio alphas is also strongly rejected (p = 0.001), while that for the five FEP-controlled BM portfolio alphas is not (p = 0.246). This confirms the pricing role of forward-looking FEP that is separate from the realized BM characteristic and its derived factor.

A direct way to isolate the informational content of forecasted earnings from realized earnings is to sort on their price ratios. Since they are highly correlated, we employ conditional sorts; independent sorts leave some portfolios unpopulated in some periods. To conserve space, we report only the excess returns and alphas. Panel A of Table 4 sorts stocks by FEP first and then by EP within each FEP quintile. Strikingly, the rightmost "Cont" column shows that EP does not produce a significant spread return once FEP is controlled for. The relation is almost flat and yields a negligible FEP-controlled EP spread portfolio return of -0.04%. Its alpha in the bottom panel is -0.47% because the three-factor model strongly compensates the high loading on the value factor (not shown). In contrast, the EP-controlled FEP portfolio return in the bottom row monotonically increases with FEP, resulting in a spread of 1.12%. The spread alpha is 0.35% upon risk adjustment and is significant, though only at the 10% level. Panel B reverses the sort order, first by sorting on EP and then by FEP within each EP quintile. The EP-controlled FEP spread portfolio return at the bottom right corner of the first subpanel is 0.83%, with a 0.70% alpha in the bottom subpanel. On the other hand, the FEP-controlled EP spread portfolio return is 0.90%, which reduces to a negligible 0.07% alpha upon risk adjustment.

The results in Subsection 2.1 are consistent with Hypothesis 1 based on portfolio characteristics. We now turn to the examination of factor pricing in Hypothesis 2.

2.2. Factor pricing? Cross-sectional asset pricing tests

This subsection tests Hypothesis 2 on factor pricing, and in fact, the joint hypothesis with Hypothesis 1 on characteristic pricing. Recall that our model requires characteristic pricing and factor pricing to be equivalent, or redundant. This can be tested in the standard practice to include all the factors and characteristics of interest to "control" for each other in a cross-sectional asset pricing test; if our model is correct, such a cross-sectional regression should exhibit the classical multi-collinearity problem. If so, we shall first drop the factors to test the pricing of the characteristics alone, and then separately test the pricing of the factors alone in the absence of the characteristics. Both should test positive. If the original full model does not exhibit a multi-collinearity issue, then that alone would be the evidence against our model.

We begin by constructing the relevant factors. We double sort stocks every month independently by BM and FEP into terciles with breakpoints at the 30^{th} and 70^{th} percentiles. This yields nine value-weighted portfolios formed at the intersections of the FEP and BM characteristics. The FEP factor, dubbed PMU (for profitable minus unprofitable), is the equally weighted average of the three value-weighted high FEP portfolio returns across the BM terciles less that of the three low FEP portfolio returns. In the previous section's terminology, this is the BM-controlled FEP spread portfolio return using terciles. We continue to use the same market, size, and value factors as control factors. The test assets are either the 25 FEP-BM portfolios or individual stocks. To be consistent with existing studies on Japanese and international markets (Daniel, Titman, and Wei (2001), Hou, Karolyi, and Kho (2011)), factor loadings are measured by rolling regressions using previous 36 months of observations requiring at least 12 months in our base specification. The main estimation method employs the Fama-MacBeth (1973) procedure. Each month we run a cross-sectional regression of excess asset returns on lagged factor betas and lagged characteristics if applicable. We report the time-series mean of the factor and characteristic premiums, with the Shanken (1992) correction applied to the standard errors of factor premiums.[9]

For parsimony, below we will show only the estimates from the above procedure. However, our result is robust to reasonable changes in factor construction, beta measurement, and the estimation method; specifically, the qualitative result does not change (1) if we construct factors from a double sort on FEP and BM, or a single sort on FEP, using the 20th and 80th percentiles instead of the 30th and 70th percentiles, (2) if we estimate betas on a rolling basis using the previous 60 months with a minimum of 36 months, or using the entire sample rather than rolling windows, or (3) if we use panel regressions with two-way clustered standard errors (along the asset and time dimensions, Petersen (2009)) instead of the Fama-MacBeth (1973) procedure.[10]

Table 5 reports the estimated premium coefficients from the second pass of the Fama-MacBeth (1973) procedure. Test assets are the 25 FEP-BM portfolios in Panel A and individual stocks in Panel B. The first column shows that the CAPM cannot explain the cross-section of FEP-BM portfolio returns. The market premium is negative and insignificant, and the adjusted R^2 from

[9] Although the Shanken (1992) correction was originally designed for a balanced panel, we also inflate the standard errors of factor premia with the unbalanced panel of individual stocks for conservativeness.

[10] We thank Mitchell Petersen for making available his Stata code for a panel regression with two-way clustered standard errors.

a single cross-sectional regression of average returns on average lagged rolling betas is -4%. However, once PMU is included, the adjusted R^2 jumps up to 66%. The estimated cross-sectional PMU premium is 0.64% per month and is statistically significant at the 1% level. Because PMU is already controlled for BM, including the SMB and HML in Column 3 barely changes its premium. The adjusted R^2 does rise to 95%, confirming the separation of FEP and BM as value measures. Figure 1 shows the plots of fitted returns from these three models against average returns. If a model perfectly explains the cross section of 25 FEP-BM portfolio returns, the circles will fall on the dashed 45-degree line. The flat relation in Panel A depicts the inability of CAPM beta to explain the cross section of these portfolio returns. Once we include PMU in Panel B, it is visually clear that the fitted returns get more closely aligned to the 45 degree line, and even more so as we further add SMB and HML in Panel C. Thus, at a first glance, the model seems to do a decent job in explaining the cross-sectional variation in the average returns of the 25 FEP-BM portfolios. However, characteristic pricing cannot be examined by portfolios. Moreover, the risk pricing embedded in Hypothesis 2 requires the stochastic discount factor to price all traded assets in the economy, not only portfolios. The complete test thus requires the examination of individual stock returns.

Accordingly we replace the test assets with individual stocks in Panel B. The first four columns continue to use portfolio betas assigned to member stocks, while the remaining columns employ individual stock betas. The first three columns are very similar to the corresponding columns in Panel A: both PMU and HML are positively priced with their premiums comparable to those in panel A, and additionally, SMB carries a positive and significant premium, though its magnitude is considerably smaller. When the characteristics are additionally included in Column 4, the PMU premium remains significantly positive, while HML becomes insignificant. The coefficients on both the FEP and BM characteristics are significant at the 1% level. If one takes the popular view that individual stock betas are noisy and therefore assigns the betas of the portfolios that they belong to in this way, one might conclude that both the FEP characteristic and its derived factor are priced. However, such a rule of thumb lacks formal justification.

To scrutinize this issue, we use individual stock betas in Columns 5-8 of Panel B. The result is strikingly different. None of the loadings on the MKTRF, PMU, SMB, and HML factors is significant in any specification. This rejects Hypothesis 2 and hence our model. When the characteristics are included in the full model in Column 8, both the FEP and BM characteristics carry significantly positive premiums with t-statistics of more than 4. Admittedly, the adjusted R^2 is still only 4%, which however is not surprising with individual stocks. There is no multi-collinearity problem here, which again rejects our model.

2.3. Factor pricing? Characteristic-balanced portfolio approach[11]

We also examine factor pricing via the portfolio approach. Researchers have proposed a procedure specifically designed to examine the nature of pricing. To examine factor (covariance risk) pricing, one can first sort stocks by characteristics and then conditionally by a factor loading within each characteristic portfolio. If the factor covariance risk is priced, then the long-short position on the factor loading using such characteristic-balanced portfolios should carry a significant premium (Daniel, Titman, and Wei (2001), Hou, Karolyi, and Kho (2011)). One can flip the roles of the factor loadings and the characteristics to also construct factor loading-balanced characteristic portfolios to examine characteristic pricing. Since our model implies the equivalence of characteristics and factors, we employ a single independent sort on factor loadings and

[11] We thank Andrew Karolyi for suggesting to examine the issue in this subsection.

characteristics rather than multiple dependent sorts to conserve space. Specifically, building on the existing evidence against the pricing of the BM-factor (HML) loading in the Japanese (Daniel, Titman, and Wei (2001)) and international (Hou, Karolyi, and Kho (2011)) markets, we focus on the FEP-factor (PMU) loading and the BM and FEP characteristics. We sort stocks by each of these three attributes separately into terciles using breakpoints at 30% and 70%. This three-way sort yields 27 portfolios formed at the intersections of the PMU loading, BM, and FEP.

Panel A of Table 6 reports the attributes of the 27 portfolios. The average number of stocks (N) ranges between 26 and 203, indicating that each portfolio is fairly diversified. Despite the independent sorts, the three way interaction appears to control the levels of the characteristics and the factor loading well, except some apparent variation among the highest BM and PMU-loading (βPMU) portfolios.

Within each of the nine BM-FEP characteristic portfolios, we long stocks with high PMU loadings and short stocks with low PMU loadings to form a characteristic-balanced, zero-cost PMU-loading portfolio. Subpanel B(1) shows the result. We see that none of the nine portfolios, except for one, exhibits a significantly positive average return. The only exception is in the high FEP, low BM intersection (FEP rank 3, BM rank 1), which shows a large premium of 1.13% per month that is statistically significant at the 1% level. Examining the three PMU-loading portfolios with BM rank 1 and FEP rank 3 in Panel A, we find that the return monotonically increases from -0.01% to 1.13% as the PMU loading rises from -0.88 to 1.33. Therefore, if we limit our attention to this relatively small cross-section of about 110 stocks on average, the PMU covariance risk may look priced. However, again, our model should price all the stocks. The average equally weighted return of the nine value-weighted spread portfolios on the FEP loading with balanced characteristics is only 0.15% with an insignificant t-statistic of 0.89 (shown as "Average" at the bottom of Panel B(1)). Thus, we reject Hypothesis 2 here as well.

In contrast, there continues to be strong support for characteristic pricing. We permute the three stock attributes and report the returns of the long-short FEP portfolios balanced with BM and the PMU loading in Subpanel B(2), as well as the result for the long-short BM portfolios balanced with FEP and the PMU loading in Subpanel B(3). In each subpanel, eight out of the nine balanced portfolio spreads are significantly positive. The average equally weighted return on the nine value-weighted FEP portfolios with balanced attributes in Subpanel B(2) is 0.76% per month (t = 6.01), and that on the nine attribute-balanced BM portfolios in Subpanel B(3) is 0.72% per month (t = 4.20), both of which are economically large and statistically significant.

Overall, the results in the last two subsections reject Hypothesis 2 on factor pricing and hence our model. However, the evidence for Hypothesis 1 is strong, failing to reject a broader characteristic-based explanation. While we have examined the pricing of the market, HML, and PMU factors only, a behavioral story would be likely to the extent that we fail to find priced factors. Exhaustive search for priced factors is beyond the scope of this paper (see the discussion of Equation (A.9) in the appendix that the pricing relation is silent on the choice of factors).

3. Sources of the management earnings-forecast premium

This section performs robustness tests against rebalancing frequency, subsamples, and analyst forecasts. We also discuss the concern about earnings momentum. These results provide additional insights on the pricing implication of management earnings forecasts. Given the rejection of factor pricing in the previous section, we will focus on characteristic pricing from here on.

3.1. Annual rebalancing: Does forecast freshness matter?

According to Table 1, the majority of Japanese firms have fiscal years ending in March and announce their financial statements and first forecasts in May. This implies that firms tend to make "fresh" forecasts of next March earnings in May. The forecasts will become stale over the remaining months of the year unless they revise forecasts; recall that firms are not required to do so unless forecasts change by 30% or more, and that they indeed revise only 1.34 out of about five forecasts they make a year (Table 1, Panel A). Hence the question, does the freshness of forecasts matter to their pricing?

To address this question, we switch from monthly to annual rebalancing. We form 25 independently sorted BM-FEP portfolios every year in a particular month and measure value-weighted returns from the next month through the portfolio formation month in the next year. For example, portfolios rebalanced in June realize their monthly returns from July to next June. This is the typical rebalancing frequency and timing with data from the U.S. market where exact announcement dates are usually unavailable. We vary the rebalancing month from January to December, yielding twelve separate annual rebalancing strategies. Portfolios controlled for one sorting key can be constructed following the double sort procedure described in Section 2.1.2. Table 7 reports spread returns and alphas of the controlled portfolios by rebalancing month. As the rebalancing month shifts from January, the 5-1 spread return on the BM-controlled FEP quintile portfolios first decreases and becomes insignificant with rebalancing in February and March, the latter of which is the most popular fiscal year end. It then increases and reaches 0.51% with rebalancing in May. Rebalanced in April, the spread return is already a sizable 0.39% perhaps because some firms appear to announce their financial statements within one month of their March fiscal-year end; notice that while 69.2% of firms' fiscal years end in March, only 61.6% of the first forecasts occur in May in Panel B of Table 1. This is complemented by the relatively high fraction (8.0%) of first forecasts in April, slightly higher than the fraction (5.0%) of February fiscal year ends assuming the typical two-month lag. The spread return remains large with rebalancing in any of the remaining months of the year, with a slight decrease in December. Again, because the portfolios are already controlled for BM, the three-factor alpha is of comparable magnitude to the spread return. This is roughly consistent with the hypothesis that trading on stale forecasts reduces the profit.

Interestingly, the 5-1 spread return on the FEP-controlled BM portfolios reaches the second largest value, 0.68%, with rebalancing in February or March, when the FEP spread return is smallest. Not surprisingly, the BM-based spread becomes insignificant or even significantly negative upon risk adjustment including HML.

3.2. Subsample analysis

This section presents a subsample analysis that attempts to shed light on three questions. First, has the FEP premium been robust over time? If investors systematically exploit the profit opportunities, the premium may have weakened in recent years. Second, Panel A of Table 1 reveals that consolidated earnings forecasts have become available in the period that approximately corresponds to the second half of the sample period. Also recall that the construction of FEP prefers them over unconsolidated forecasts whenever available. Thus we ask, do consolidated earnings forecasts improve the performance of our FEP strategy, because they presumably reflect firms' profitability and cash flows more accurately than unconsolidated earnings? Finally, Japan experienced what is considered a stock market bubble in the second half of the 1980's, which abruptly ended with a crash in 1990. Since then the economy has undergone a prolonged stagnation dubbed the lost decades. Does this bear any implication on premiums?

To examine these points, we divide the sample into two subsamples of roughly equal length at the end of 1996 and repeat the double sort on FEP and BM in Section 2.1.2. Table 8 reports the result. The top subpanels show that both the value and FEP premiums increased in the second subsample starting in 1997. The FEP-controlled BM-based value premium increased from 0.66% to 0.88% per month. As expected, the BM-based value premium disappears upon risk adjustment in the bottom two panels. In contrast, the BM-controlled FEP-based value premium has increased substantially from 0.69% in the first subsample to 1.03% in the second, with the three factor alpha only slightly declining from 0.86% to 0.76%. The GRS test rejects the null of zero alphas for the five FEP portfolios in both periods.

The significant increase in both the FEP and BM premiums over the recent years poses a significant challenge to asset pricing theory. On one hand, the persistence of these premiums suggests that they result from some equilibrium force. On the other hand, it begs the equilibrium model to explain the trend. The Japanese value premium was documented almost a quarter century ago by Chan, Hamao, and Lakonishok (1991) and claimed to be stronger than its U.S. counterpart by Daniel, Titman, and Wei (2001). Despite the popularization, the BM-based value premium has increased. To this we have added another robust, forecast-based profit to be explained. The answers to the questions at the beginning of this section are affirmative; the premiums are robust and have not been arbitraged away despite the potential attempts to exploit these profit opportunities. The increased premiums are consistent with the hypotheses that the consolidated forecasts contain more accurate information about the fundamental value than unconsolidated forecasts.

3.3. Comparison with analyst forecasts

Due to the infrequency of management earnings forecasts in many countries, existing studies that take the portfolio approach typically rely on analyst forecasts. This section compares the investment value of management and analyst forecasts in Japan where both of them are abundant. I/B/E/S provides analyst forecasts of net income and earnings per share starting in December 1994 and January 1987, respectively, for Japanese firms. This allows us to form portfolios on analyst forecast earnings-to-price ratios (AFEP) based on these consensus analyst forecasts. To save space, we summarize the result here without tables, which are available upon request.

The average number of firms in a positive-AFEP decile portfolio using the I/B/E/S net income (earnings per share) is 111 (107) over the period from January 1995 (February 1987) to December 2010.[12] By comparison, the average using management forecasts from the FDS data is 327 (293) for the respective sample period. Thus, in contrast to the U.S. where using analyst forecasts would expand the sample, doing so in Japan not only cuts the sample period by at least nine years, but also shrinks the cross section to almost one third of what is available with management forecasts. This is because analysts tend to cover only large growth firms, while managers of most listed Japanese firms issue their forecasts (Table 1, Panel A).

For parsimony, we report below the result using the I/B/E/S net income only; earnings per share from I/B/E/S have weaker return-predictability and its use will work only in favor of us. While the top-minus-bottom decile I/B/E/S AFEP portfolio return is 1.14% per month (t = 2.25), its three-factor alpha is insignificant at 0.14% (t = 0.32). From a two-way sort, the BM-controlled I/B/E/S AFEP portfolio return is 0.49% (t = 1.73) with a three-factor alpha of 0.33% (t = 1.15).

[12] The sample in this and next subsections ends in 2010 due to data availability.

These weak premiums based on analyst forecasts are in stark contrast to the strengthening FEP premiums using management forecasts in the second subsample (Table 8, Panel B), which incidentally has a similar sample period.

The inferior performance of the trading strategy based on analyst forecasts is in line with their inaccuracy documented in the existing literature. Conroy and Harris (1995) compare forecasts by (mostly) sell-side analysts in I/B/E/S and journalists at Toyo Keizai, a leading publisher on Japanese business and investment. They find that I/B/E/S forecasts are consistently less accurate and more optimistic than Toyo Keizai forecasts, which incorporate management earnings forecasts through questionnaires and company visits. A recent analysis by Ota and Kondo (2011) confirms this by further comparing these forecasts to management forecasts, concluding that management forecasts play a central role in forming expectations about the accounting performance of Japanese firms. We provide evidence that more accurate forecasts lead to better cross-sectional return predictability.

3.4. Controlling for earnings momentum

It is well known that prices react slowly to earnings announcements. As a result, stocks with large earnings surprise tend to have higher subsequent returns. It is natural to wonder if such earnings momentum, rather than the relationship in Equation (2), is driving our result. Since management earnings forecasts are announced more frequently than realized earnings in Japan, our concern is twofold: Investors may be responding to surprise in either realized or forecasted earnings with delay.

To address this concern, we follow the literature on earnings momentum and first compute the standardized unexpected earnings (SUE) as the seasonal difference in realized earnings normalized by the size of the announced earnings, and the standardized unexpected forecasts (SUF) as its management forecast-based counterpart. We then perform three-way sorts by BM, FEP, and either SUE or SUF, which produces a total of 27 portfolios. Extending the two-way sort procedure in the preceding sections to a three-way sort in a straightforward manner, we form three SUE-BM-controlled FEP portfolios by equally weighting the nine value-weighted SUE-BM portfolios within each FEP tercile. The SUE-BM-controlled FEP premium is then the return on the SUE-BM-controlled portfolio with the highest FEP minus that with the lowest FEP. Similarly, we compute the SUF-BM-controlled FEP premium.

We confirm that a sizable portion of the FEP premium remains after separating the BM-based value effect and realized or forecasted earnings momentum. To save space again, we focus on the result controlling for SUF without using tables, which are available upon request. The result using SUE is stronger and only favors us. The SUF-BM-controlled FEP premium ranges from 0.59% to 1.02%, with the three-factor alpha from 0.44% to 0.68%, all of which are statistically significant at 1%. Therefore, the pricing of FEP remains robust after controlling for the BM-based value effect and forecast-based earnings momentum.

4. Conclusion

Japanese exchanges strongly encourage listed firms to report current earnings forecasts as well as the past fiscal year's earnings announcements. Although voluntary, most firms choose to provide such earnings guidance to the exchanges and the press to meet the investor demand. The press then releases such forecasts to the investing public. Taking advantage of this institutional feature, we construct calendar-time portfolio strategies based on FEP and BM, as motivated by a characteristic decomposition of the expected return based on the Ohlson model with restrictions on investor preference. Intuitively, these two price ratios contain different information as FEP reflects forward-looking management earnings forecasts, while BM is based on the realized book value. We find that the FEP-based value premium is statistically significant and as economically large as the BM-based value premium. Neither the BM-based value effect nor earnings momentum, whether based on earnings or forecasts, explains the FEP premium. These results are robust to a variety of factor and characteristic controls and estimation methods. In particular, we fail to find unambiguous support for factor pricing. Annual strategies yield a significant premium unless rebalanced in February or March, and the premium becomes smaller with rebalancing in December and January. This suggests that stale forecasts contain less accurate information about the firms' fundamental value. The FEP premium increases in the second half of the sample period during which firms start announcing consolidated earnings forecasts and the Japanese economy experiences a prolonged stagnation. This is in sharp contrast to the weak investment performance of strategies based on I/B/E/S analyst forecasts, which produce insignificant profits controlling for the market, size, and BM-based value factors.

Interesting agenda are left for future research. We have focused on the level of forecasts and ignored their variability, or accuracy. Management earnings forecasts in Japan can be considered public information due to their extensive media coverage. This is a unique opportunity to examine whether the precision of public information plays a crucial role in determining market efficiency.

Finally, Japanese firms announce forecasts of dividends as well as earnings. Conroy, Eades, and Harris (2000) exploit this fact and show that, consistent with Modigliani and Miller's dividend irrelevance proposition, dividend surprise has no significant impact on stock prices of Japanese firms. If large average returns on high FEP firms result from mispricing, investors may also misperceive dividend forecasts of such firms. It would be informative to reexamine the dividend irrelevance proposition conditional on the level of FEP.

A. Appendix

This appendix presents a rational, risk-based model that forms the basis of Hypotheses 1 and 2. We assume that a firm's fundamental process follows the modified autoregressive process considered in Ohlson (1995). The resulting cash flows are priced by a stochastic discount factor. These are standard in accounting and finance, respectively, but the mapping between them has not been explored in detail. In particular, we will show that characteristic pricing and factor pricing are equivalent under some assumptions.

A.1. The fundamental value

Clean-surplus accounting requires that earnings, X, be either paid out as dividends, D, or retained in the book equity, B:

$$B_{t+1} = B_t + X_{t+1} - D_{t+1}, \tag{A.1}$$

Suppose the dividend discount model gives a firm's fundamental value, G_t, as the sum of expected future dividends discounted at a constant risk-free rate, r_f. With clean-surplus accounting and an appropriate transversality condition,[13] this produces the so-called Residual Income Valuation Model,

$$G_t = \sum_{\tau=1}^{\infty} \frac{E_t[D_{t+\tau}]}{R_f^{\tau}} = B_t + \sum_{\tau=1}^{\infty} \frac{E_t[X_{t+\tau}^a]}{R_f^{\tau}}, \tag{A.2}$$

where $R_f \equiv 1 + r_f$ is the gross risk-free rate, $E_t[\cdot]$ represents the conditional expectation given investors' information set, and

$$X_t^a \equiv X_t - r_f B_{t-1} \tag{A.3}$$

[13] Specifically, $E_t[B_{t+\tau}] / R_f^{\tau} \to 0$ as $\tau \to \infty$.

is the residual income (also known as abnormal earnings). Ohlson (1995) assumes that the residual income follows a modified autoregressive process,

$$\begin{aligned} X_{t+1}^a &= \omega X_t^a + V_t + \varepsilon_{1,t+1}, \\ V_{t+1} &= \gamma V_t + \varepsilon_{2,t+1}, \end{aligned} \tag{A.4}$$

where ω and γ are constants, ε_1 and ε_2 are unpredictable mean-zero error terms, and V_t is information about future abnormal earnings other than accounting data and dividends. We assume that $-1 < \omega, \gamma < 1$ for the system to be stationary. Ohlson shows that the resulting fundamental value is linear in the residual income and "other information" V_t,[14]

$$\begin{aligned} G_t &= B_t + \alpha_1 X_t^a + \alpha_2 V_t, \\ \alpha_1 &= \frac{\omega}{R_f - \omega}, \ \alpha_2 = \frac{R_f}{(R_f - \omega)(R_f - \gamma)} > 0. \end{aligned} \tag{A.5}$$

Substitute $V_t = E_t[X_{t+1}^a] - \omega X_t^a$ from Equation (A.4) to remap variables to observable data:

$$\begin{aligned} G_t &= (1 - r_f \alpha_2) B_t + (\alpha_1 - \omega\alpha_2)(X_t - r_f B_{t-1}) + \alpha_2 E_t[X_{t+1}] \\ &= \frac{R_f (1-\omega)(1-\gamma)}{\Omega} B_t - \frac{\omega\gamma}{\Omega}(R_f X_t - r_f d_t) + \frac{R_f}{\Omega} E_t[X_{t+1}], \end{aligned} \tag{A.6}$$

where $\Omega \equiv (R_f - \omega)(R_f - \gamma) > 0$. The second line replaces the lagged book equity in the first line by the current dividend via the clean-surplus relation in Equation (A.1). We see that the coefficients on B_t and $E_t[X_{t+1}]$ are positive, while the one on X_t is indeterminate. Equation (A.6) gives the firm's fundamental value, which discounts future dividends at the risk-free rate. We now derive the firm's

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[14] This can be derived by the standard approach to solving a vector autoregression. Alternatively, $R_f - \omega$ times the summation term in Equation (A.2) can be evaluated as

$\sum_{\tau=0}^{\infty} E_t(X_{t+\tau+1}^a)/R_f^\tau - \sum_{\tau=1}^{\infty} E_t(\omega X_{t+\tau}^a)/R_f^\tau = E_t(X_{t+1}^a) + \sum_{\tau=1}^{\infty} E_t(V_{t+\tau})/R_f^\tau = \omega X_t^a + V_t + \gamma V_t/(R_f - \gamma),$ where we have used the Gordon growth formula in the last equality. Dividing this by $R_f - \omega$ and adding B_t produces Equation (A.5).

market value, which discounts future dividends at a risky rate implied by the stochastic discount factor.

A.2. The market value

Next, price the dividend stream D by the stochastic discount factor, $m > 0$:

$$P_t = E_t[(P_{t+1} + D_{t+1})m_{t+1}] = Cov_t(P_{t+1} + D_{t+1}, m_{t+1}) + E_t[P_{t+1} + D_{t+1}]E_t[m_{t+1}], \quad \text{(A.7)}$$

where P is the firm's market value and $Cov_t(\cdot)$ represents the conditional covariance. As is well known, this expression results from the first-order condition for the representative investor's utility maximization problem. Pricing a risk-free bond by this relation implies that the conditional gross risk-free rate is given by $R_{ft} = 1/E_t[m_{t+1}] \equiv 1 + r_{ft}$.

We will now relate the market value to the fundamental value. Suppose the risk-averse investor requires a discount, $\Delta_t < 0$, from the fundamental value, G_t, to hold the firm's risky equity. Therefore, we can alternatively write P_t as the sum of these two components,

$$P_t = G_t + \Delta_t, \; G_t = \frac{E_t[G_{t+1} + D_{t+1}]}{R_{ft}}, \quad \text{(A.8)}$$

The second equation is merely a restatement that the fundamental value G_t discounts dividends at the risk-free rate (see Equation (A.2)). Use this decomposition of P_t to rewrite Equation (A.7) for the following expression for the expected excess return:

$$E_t[r^e_{t+1}] \equiv \frac{E_t[P_{t+1} + D_{t+1} - R_{ft}P_t]}{P_t} = -Cov_t\left(\frac{P_{t+1} + D_{t+1}}{P_t}, \frac{m_{t+1}}{E_t[m_{t+1}]}\right) \equiv \kappa_t \underbrace{\left(\frac{G_t}{P_t} - 1\right)}_{=-\Delta_t/P_t},$$
$$\kappa_t \equiv R_{ft} - \frac{E_t[\Delta_{t+1}]}{\Delta_t} > 0, \quad \text{(A.9)}$$

where the last expression in the first line merely factors the parentheses there, which equals $-\Delta_t/P_t$, from the original expression. Therefore, the factoring coefficient, κ_t, in the second line is given by the original expression divided by $-\Delta_t/P_t$ and using the relation that $E_t[P_{t+1} + D_{t+1} - R_{ft}P_t] = E_t[\Delta_{t+1} - R_{ft}\Delta_t]$ from Equation (A.8). κ_t is positive as long as the representative investor is risk-averse, which guarantees that $E_t[r^e_{t+1}] > 0$, $Cov_t(P_{t+1} + D_{t+1}, m_{t+1}) < 0$, and again, $\Delta_t < 0$. The covariance expression makes it clear that pricing and hence the discount, Δ, depends on the preference, i.e., the moments of the stochastic discount factor, m. We now make the key assumption on this discount term, or equivalently the stochastic discount factor:

Assumption 1. The expected growth rate of the risk discount, $E_t[\Delta_{t+1}]/\Delta_t$, is common across securities at a given time, t.

This assumption makes characteristic pricing and factor pricing equivalent. To see this, note first that the expected return increases linearly in the value ratio, G_t/P_t, because $\kappa_t > 0$ in Equation (A.9). Assumption 1 guarantees that the linearity coefficient, κ_t, is common across assets and allows cross-sectional comparison. Dividing Equation (A.6) by the price, we then see that the value ratio, G_t/P_t, and hence the expected return, will be linear in the price ratios of the characteristics on the right-hand side of the equation. And yet all this is consistent with factor pricing as shown by the covariance expression in the first line of Equation (A.9). Thus, characteristics and factor loadings are equivalent, and redundant indeed: Each of them should perfectly explain the cross-sectional variation in expected returns, but putting them together in a cross-sectional regression should cause a multi-collinearity problem.

Note that Equation (A.9) does not require the Ohlson model in the previous subsection; it holds for the risk-averse price P_t of any dividend stream D_t whose fundamental (risk-neutral) value G_t discounts it at the risk-free rate (the second relation in Equation (A.8)). Thus, the equation by itself does not tell us what characteristics determine the fundamental value, G_t, for which we employ the Ohlson model. Likewise, Equation (A.9) does not fix the factors that matter in pricing, for which we make an additional assumption in the main text (Hypothesis 2). See the discussion below about Lyle, Callen, and Elliott (2013, Appendix 1) for an example in which the market return serves as the pricing factor to yield the conditional CAPM.

The typical range of parameter values considered in the existing literature is $0 \leq \omega, \gamma \leq 1 < R_f$. With this, we have $\alpha_1 \geq 0$ and $\alpha_2 > 0$, and the coefficients in the second line of Equation (A.6) satisfy $R_f(1 - \omega)(1 - \gamma)/ \Omega \geq 0$ and $-\omega\gamma R_f/\Omega \leq 0$. For example, using U.S. analyst forecasts, Dechow, Hutton, and Sloan (1999, p.26) first assess the deep parameters $\omega \approx 0.62$ and $\gamma \approx 0.32$. Under the assumption that $r_f = 0.12$, they then evaluate $R_f(1 - \omega)(1 - \gamma)/\Omega = 0.72$, $-\omega\gamma R_f/\Omega = -0.55$, and $\alpha_2 = 2.80$. They further estimate regression coefficients corresponding to these three quantities at 0.24 (s.e. = 0.035), 0.05 (s.e. = 0.150), and 5.79 (s.e. = 0.256), respectively, with standard errors in parentheses. In comparison, using Japanese management forecasts, Ota (2002, Table 2, Model P2) finds the respective regression coefficients at 0.64 (t = 6.39), –1.33 (t = -0.86), and 16.98 (t = 9.34) with t-statistics in parentheses. Notice that, in both countries, the estimated coefficients on FEP ($E_t[X_{t+1}]/P_t$) and BM (B_t/P_t) are significantly positive, while the one on EP (X_t/P_t) is insignificant.

Several remarks follow. First, Ohlson's (1995) original model is set up in risk neutrality. Since all assets should earn the risk-free rate in such a setting, sorting on price ratios of characteristics should not spread average returns absent mispricing (see, e.g., Dechow, Hutton, and Sloan (1999, p.27)). Our framework allows the expected return to vary across assets in a rational setting. Second, Equation (A.9) implies that if there is indeed the cross-sectional variation in κ_t,, it directly reflects the one in the expected gross growth rate of risk discount, $E_t[\Delta_{t+1}]/\Delta_t \equiv 1 + g_t$. We assume that g_t is common across assets in a given period t, rather than constant over time for a given asset. In the literature, for example, both Feltham and Ohlson (1999, Appendix A, the first equation on p.181) and Ang and Liu (2001, Definition 2.1, Equation (17)) assume that the conditional covariance between the residual income shock and the stochastic discount factor is affine in the representative firm's operating assets. This implies that the priced risk grows as firm size does over time, similar to the assumption that the expected risk discount grows at a constant rate, say g, without the time subscript. This differs from our assumption that g_t is common across assets in a given period t. We leave the analysis of the potentially strong restriction that Assumption 1 places on investor preference as a future agenda. Third, we are not the first to decompose the expected return from the extended Ohlson model with risk-averse investors. Lyle, Callen, and Elliott (2013, Proposition 3) derive an equivalent of Equation (A.6) with $g = 0$ under a parametric assumption on the stochastic discount factor. In contrast, we directly restrict the risk discount and allow non-zero growth. Finally, it is useful to illustrate the equivalence between factor pricing and characteristic pricing within the setting of a prominent model. For example, if the stochastic discount factor is linear (or approximately so) in the market return, our model will produce the conditional Capital Asset Pricing Model (CAPM), as does the model by Lyle, Callen, and Elliott (2013, Appendix 1). The assumption of constant g will place a restriction on the dynamics of the conditional market beta, which will be the single measure of priced risk and is a linear function of characteristics, specifically, BM and FEP. The pricings of beta and characteristics are requirements and not options: the expected return must be linear in the conditional market beta. It must also be linear in BM and FEP. Since the market beta and the two characteristics are equivalent and redundant, putting them together in a cross-sectional regression should cause a multi-collinearity problem.

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Table 1: Summary statistics of announcements. Panel A shows the number of listed firms, earnings announcements and forecast announcements (unconsolidated and consolidated) by year. "#firms" is the number of listed firms or firms making announcements. "#" is the average number of announcements per firm within the year. "Changes" is the average number of changes in the announced figure per firm within the year. Panel B reports the distribution of the fiscal year end and announcements by month using the same headings. "First" and "All" are the number of first and all announcements, respectively, for a given fiscal year.

Panel A: Announcements by year

	Listed	Earnings announcements				Forecasts, unconsolidated				Forecasts, consolidated			
				Per firm				Per firm				Per firm	
Year	#firms (N)	#firms	(% N)	#	Changes	#firms	(% N)	#	Changes	#firms	(% N)	#	Changes
1977	1,646	1,628	(98.9%)	2.94	0.02	1,620	(98.4%)	5.31	1.84				
1978	1,651	542	(32.8%)	1.92	0.03	1,578	(95.6%)	2.56	1.09				
1979	1,700	1,689	(99.4%)	2.73	0.02	1,688	(99.3%)	4.76	1.57				
1980	1,707	1,679	(98.4%)	2.07	0.01	1,693	(99.2%)	5.08	2.00				
1981	1,719	1,702	(99.0%)	2.04	0.01	1,706	(99.2%)	5.32	1.97				
1982	1,742	1,721	(98.8%)	1.97	0.01	1,731	(99.4%)	5.24	1.99				
1983	1,763	1,740	(98.7%)	2.00	0.25	1,749	(99.2%)	5.29	1.93				
1984	1,778	1,761	(99.0%)	2.00	0.35	1,763	(99.2%)	5.19	1.81				
1985	1,811	1,784	(98.5%)	1.99	0.37	1,790	(98.8%)	5.20	1.68				
1986	2,077	1,956	(94.2%)	1.93	0.35	2,002	(96.4%)	4.72	1.72				
1987	2,167	2,051	(94.6%)	2.00	0.37	2,058	(95.0%)	5.04	1.61				
1988	2,288	2,157	(94.3%)	2.05	0.36	2,149	(93.9%)	5.06	1.53				
1989	2,410	2,246	(93.2%)	2.07	0.38	2,264	(93.9%)	5.20	1.29				
1990	2,546	2,372	(93.2%)	2.01	0.35	2,393	(94.0%)	5.43	1.26				
1991	2,683	2,517	(93.8%)	1.99	0.36	2,525	(94.1%)	5.35	1.28				
1992	2,707	2,566	(94.8%)	2.00	0.35	2,559	(94.5%)	5.69	1.63				
1993	2,778	2,614	(94.1%)	1.99	0.35	2,634	(94.8%)	4.92	1.62				
1994	2,910	2,750	(94.5%)	1.99	0.37	2,781	(95.6%)	4.87	1.26	1,525	(52.4%)	3.96	0.62
1995	3,072	2,922	(95.1%)	2.00	0.39	2,959	(96.3%)	4.75	1.30	1,856	(60.4%)	4.17	1.05
1996	3,207	3,069	(95.7%)	1.99	0.40	3,100	(96.7%)	4.92	1.17	2,034	(63.4%)	4.27	0.93
1997	3,333	3,208	(96.2%)	1.99	0.38	3,240	(97.2%)	5.04	1.23	2,168	(65.0%)	4.39	0.98
1998	3,394	3,291	(97.0%)	2.00	0.41	3,301	(97.3%)	5.11	1.50	2,277	(67.1%)	4.71	1.33
1999	3,451	3,346	(97.0%)	2.01	0.40	3,373	(97.7%)	5.88	1.37	2,496	(72.3%)	4.94	1.09
2000	3,595	3,463	(96.3%)	2.00	0.38	3,514	(97.7%)	5.87	1.24	2,824	(78.6%)	5.42	1.28
2001	3,701	3,567	(96.4%)	2.01	0.39	3,601	(97.3%)	4.79	1.31	2,951	(79.7%)	5.33	1.37
2002	3,780	3,647	(96.5%)	2.01	0.39	3,679	(97.3%)	4.87	1.25	3,064	(81.1%)	5.54	1.29
2003	3,792	3,679	(97.0%)	2.02	0.39	3,702	(97.6%)	5.14	1.13	3,102	(81.8%)	5.59	1.20
2004	3,875	3,750	(96.8%)	1.08	0.01	3,778	(97.5%)	5.29	1.12	3,152	(81.3%)	5.18	1.21
2005	3,951	3,864	(97.8%)	1.60	0.01	3,879	(98.2%)	5.25	1.07	3,248	(82.2%)	5.19	1.17
2006	4,069	3,981	(97.8%)	1.71	0.01	3,998	(98.3%)	5.76	1.03	3,360	(82.6%)	5.74	1.13
2007	4,123	4,031	(97.8%)	1.89	0.01	4,053	(98.3%)	4.97	0.92	3,417	(82.9%)	6.50	1.07
2008	4,080	3,976	(97.5%)	1.93	0.01	3,716	(91.1%)	4.61	1.07	3,386	(83.0%)	5.18	1.27
2009	3,962	3,855	(97.3%)	2.31	0.01	3,405	(85.9%)	4.13	1.34	3,298	(83.2%)	3.75	1.56
2010	3,838	3,753	(97.8%)	1.80	0.01	2,936	(76.5%)	3.38	1.01	3,185	(83.0%)	3.53	1.19
2011	3,745	3,660	(97.7%)	1.13	0.01	2,597	(69.3%)	3.19	0.58	3,139	(83.8%)	3.56	1.09
2012	3,839	3,610	(94.0%)	1.22	0.01	2,156	(56.2%)	3.80	0.59	3,104	(80.9%)	4.50	1.72
2013	3,837	3,489	(90.9%)	1.53	0.00	1,956	(51.0%)	4.56	0.66	3,103	(80.9%)	5.76	2.26
2014	3,868	3,464	(89.6%)	1.44	0.00	1,864	(48.2%)	4.48	0.60	3,123	(80.7%)	5.75	2.19
Average			(94.5%)	1.93	0.21		(91.7%)	4.90	1.33		(76.5%)	4.90	1.28
Average excl. 1978			(96.2%)	1.93	0.21		(91.6%)	4.96	1.34		(76.5%)	4.90	1.28

Panel B: Announcements by month

Month	Fiscal year end		Earnings announcements				Forecasts, unconsolidated				Forecasts, consolidated			
			First		All		First		All		First		All	
1	1,854	(1.7%)	4,659	(4.2%)	5,759	(2.9%)	4,444	(4.3%)	12,729	(2.5%)	938	(1.5%)	5,725	(1.9%)
2	5,564	(5.0%)	8,864	(8.0%)	12,423	(6.2%)	8,299	(8.1%)	35,594	(7.1%)	3,646	(6.0%)	22,565	(7.6%)
3	76,857	(69.2%)	2,811	(2.5%)	5,417	(2.7%)	2,930	(2.8%)	73,909	(14.8%)	2,385	(3.9%)	39,062	(13.1%)
4	1,684	(1.5%)	8,914	(8.0%)	12,753	(6.3%)	7,674	(7.5%)	24,297	(4.9%)	5,655	(9.3%)	14,437	(4.9%)
5	2,556	(2.3%)	68,354	(61.6%)	74,826	(37.2%)	62,433	(60.6%)	74,549	(14.9%)	35,442	(58.2%)	41,602	(14.0%)
6	2,110	(1.9%)	3,645	(3.3%)	13,319	(6.6%)	3,705	(3.6%)	33,611	(6.7%)	6,483	(10.6%)	21,524	(7.2%)
7	722	(0.7%)	2,564	(2.3%)	10,046	(5.0%)	2,409	(2.3%)	11,270	(2.3%)	1,027	(1.7%)	5,702	(1.9%)
8	1,352	(1.2%)	2,300	(2.1%)	48,646	(24.2%)	2,023	(2.0%)	23,328	(4.7%)	1,219	(2.0%)	17,975	(6.0%)
9	5,053	(4.6%)	1,036	(0.9%)	4,196	(2.1%)	1,262	(1.2%)	74,983	(15.0%)	538	(0.9%)	40,520	(13.6%)
10	1,601	(1.4%)	1,548	(1.4%)	4,080	(2.0%)	1,485	(1.4%)	27,165	(5.4%)	867	(1.4%)	14,661	(4.9%)
11	3,360	(3.0%)	4,376	(3.9%)	5,970	(3.0%)	4,372	(4.2%)	73,936	(14.8%)	1,731	(2.8%)	38,748	(13.0%)
12	8,311	(7.5%)	1,953	(1.8%)	3,784	(1.9%)	1,963	(1.9%)	35,440	(7.1%)	988	(1.6%)	34,625	(11.7%)
Total	111,024	(100.0%)	111,024	(100.0%)	201,219	(100.0%)	102,999	(100.0%)	500,811	(100.0%)	60,919	(100.0%)	297,146	(100.0%)

Table 2: Decile portfolios formed on realized and forecasted earnings-to-price ratios. Every month, stocks are sorted by realized EP (Panel A) or forecasted FEP (Panel B) into decile portfolios and held for one month. Rank 0 is the portfolio of negative EP or FEP stocks. SIZE is the market capitalization in billions of yen. BM is the book-to-market ratio. These are the average equally weighted pre-ranking characteristics of individual stocks within each portfolio. N is the average number of stocks. EXRET is the value-weighted monthly excess return in percent. The sample period is from January 1978 through December 2014. t-statistics are shown in parentheses. p-values are shown in square brackets.

Panel A: Portfolios formed on the realized earnings-to-price ratio, EP

EP rank	0	1	2	3	4	5	6	7	8	9	10	10-1
EP	-0.30	0.02	0.04	0.05	0.07	0.08	0.09	0.11	0.13	0.16	0.29	
SIZE (bil. yen)	46	140	168	177	159	143	125	103	88	73	69	
BM	0.58	0.66	0.66	0.69	0.72	0.76	0.82	0.88	0.95	1.04	1.34	
N	351	249	248	249	249	249	249	249	249	249	249	
EXRET (%)	0.59	-0.38	0.10	0.11	0.34	0.27	0.48	0.66	0.68	0.78	0.82	1.20
	(1.60)	(-1.27)	(0.36)	(0.43)	(1.43)	(1.13)	(1.89)	(2.44)	(2.52)	(2.72)	(2.59)	(4.25)
	[0.11]	[0.21]	[0.72]	[0.67]	[0.15]	[0.26]	[0.06]	[0.02]	[0.01]	[0.01]	[0.01]	[0.00]

Panel B: Portfolios formed on the forecasted earnings-to-price ratio, FEP

FEP rank	0	1	2	3	4	5	6	7	8	9	10	10-1
FEP	-0.29	0.02	0.04	0.05	0.07	0.08	0.09	0.11	0.13	0.15	0.25	
SIZE (bil. yen)	40	129	163	171	163	145	126	104	84	69	56	
BM	0.39	0.68	0.70	0.71	0.74	0.78	0.82	0.87	0.92	0.99	1.21	
N	188	266	265	265	266	266	265	265	266	265	266	
EXRET (%)	0.42	-0.23	-0.11	0.05	0.18	0.32	0.46	0.54	0.78	1.02	1.07	1.30
	(1.08)	(-0.74)	(-0.41)	(0.18)	(0.75)	(1.26)	(1.81)	(2.10)	(2.85)	(3.56)	(3.15)	(4.64)
	[0.28]	[0.46]	[0.68]	[0.85]	[0.46]	[0.21]	[0.07]	[0.04]	[0.00]	[0.00]	[0.00]	[0.00]

Table 3: Controlling for the book-to-market ratio. Every month, 25 portfolios are formed as the intersection of independently sorted quintiles of the forecasted earnings-to-price ratio (FEP) and the book-to-market ratio (BM) and held for a month. Panels A through D show the average equally weighted pre-ranking characteristics of individual stocks within each portfolio. Panel E reports the value-weighted monthly excess return in percent. The "Cont" column shows the excess return on the BM-controlled FEP portfolio, defined as the equally weighted average of the five excess value-weighted BM portfolio returns within an FEP quintile. The "Cont" row shows the excess returns on the FEP-controlled BM portfolios defined similarly. Panel F shows the three-factor alpha in percent, measured as the intercept from a regression of the excess portfolio return on a constant, the excess market return and size and value factors rebalanced monthly. "GRS-F(n, d)" is the Gibbons-Ross-Shanken (GRS) F-statistic (with the numerator and denominator degrees of freedom n and d, respectively) for the hypothesis that the 25 FEP-BM portfolio alphas jointly equal zero. The GRS statistics for the controlled portfolios are defined similarly. The sample period is from January 1978 through December 2014. p-values are shown in square brackets. *, **, and *** represent significance at 10%, 5%, and 1%, respectively.

Panel A: Forecast earnings-to-price ratio

		BM				
		1	2	3	4	5
	1	0.03	0.03	0.03	0.03	0.03
	2	0.06	0.06	0.06	0.06	0.06
FEP	3	0.09	0.09	0.09	0.09	0.09
	4	0.12	0.12	0.12	0.12	0.12
	5	0.21	0.19	0.18	0.19	0.23

Panel B: Book-to-market ratio

		BM				
		1	2	3	4	5
	1	0.23	0.52	0.75	1.04	1.73
	2	0.27	0.52	0.75	1.03	1.67
FEP	3	0.28	0.53	0.75	1.03	1.65
	4	0.29	0.53	0.75	1.04	1.65
	5	0.28	0.53	0.76	1.05	2.00

Panel C: Size (billion yen)

		BM				
		1	2	3	4	5
	1	236	172	86	56	29
	2	251	224	139	76	42
FEP	3	178	219	127	79	48
	4	116	140	103	71	49
	5	80	90	73	58	42

Panel D: Number of stocks

		BM				
		1	2	3	4	5
	1	188	105	81	72	76
	2	139	128	104	87	69
FEP	3	96	125	120	106	82
	4	61	104	127	128	108
	5	38	74	106	139	167

Panel E: Excess return (%)

		BM						
		1	2	3	4	5	5-1	Cont
	1	-0.44	-0.11	0.13	0.52	0.90***	1.34***	0.20
	2	0.02	-0.04	0.33	0.60**	1.00***	0.97***	0.38
FEP	3	0.27	0.32	0.61**	0.68**	0.81***	0.54*	0.54**
	4	0.69*	0.60**	0.63**	0.97***	0.96***	0.27	0.77***
	5	0.66	1.02***	0.95***	1.28***	1.37***	0.71**	1.05***
	5-1	1.10***	1.13***	0.82***	0.76***	0.47**		0.86***
	Cont	0.24	0.36	0.53**	0.81***	1.01***	0.76***	

Panel F: Three-factor alpha (%)

		BM						
		1	2	3	4	5	5-1	Cont
	1	-0.21	-0.47**	-0.59***	-0.58***	-0.32*	-0.12	-0.43***
	2	0.04	-0.34**	-0.22	-0.27*	-0.19	-0.24	-0.20*
FEP	3	0.30*	0.00	0.04	-0.17	-0.23	-0.53**	-0.01
	4	0.52**	0.17	0.01	0.14	-0.13	-0.65**	0.14
	5	0.23	0.49**	0.18	0.36*	0.18	-0.04	0.29*
	5-1	0.43	0.95***	0.77***	0.94***	0.51**		0.72***
	Cont	0.18	-0.03	-0.12	-0.10	-0.14	-0.32**	

GRS-F(25, 416): 1.41 [p = 0.091]

BM-controlled FEP portfolios: GRS-F(5, 436): 4.52 [p = 0.001]

FEP-controlled BM portfolios: GRS-F(5, 436): 1.34 [p = 0.246]

Table 4: Controlling for the realized earnings-to-price ratio. Every month, 25 portfolios are formed as the intersection of dependently sorted quintiles of the realized earnings-to-price ratio (EP) and forecasted EP (FEP) and held for a month. Stocks are first sorted by FEP in Panel A and EP in Panel B. The top subpanels report the value-weighted monthly excess return in percent. The "Cont" column in Panel A shows the excess return on the FEP-controlled EP portfolio, defined as the equally weighted average of the five excess value-weighted FEP portfolio returns within an EP quintile. The "Cont" row shows the excess returns on the EP-controlled FEP portfolios defined similarly. Those for Panel B are defined similarly. The bottom subpanels show the three-factor alpha in percent, measured as the intercept from a regression of the excess portfolio return on a constant, the excess market return and size and value factors rebalanced monthly. "GRS-F(n, d)" is the Gibbons-Ross-Shanken (GRS) F-statistic (with the numerator and denominator degrees of freedom n and d, respectively) for the hypothesis that the 25 EP-FEP portfolio alphas jointly equal zero. The GRS statistics for the controlled portfolios are defined similarly. The sample period is from January 1978 through December 2014. p-values are shown in square brackets. *, **, and *** represent significance at 10%, 5%, and 1%, respectively.

Panel A: Sorted by FEP then EP

Excess return (%)

		FEP						
		1	2	3	4	5	5-1	Cont
	1	-0.54	0.21	0.60**	0.92***	1.18***	1.72***	0.48*
	2	-0.36	0.17	0.37	0.63**	1.07***	1.43***	0.38
EP	3	-0.08	-0.02	0.16	0.76***	0.99***	1.07***	0.36
	4	0.14	0.28	0.32	0.67**	1.04***	0.90***	0.49**
	5	0.25	0.19	0.46	0.57*	0.72**	0.48	0.44*
	5-1	0.78***	-0.02	-0.14	-0.35	-0.46*		-0.04
	Cont	-0.12	0.17	0.38	0.71***	1.00***	1.12***	

Three-factor alpha (%)

		FEP						
		1	2	3	4	5	5-1	Cont
	1	-0.43*	0.00	0.40**	0.46**	0.49**	0.93***	0.18
	2	-0.17	0.13	0.20	0.24	0.44**	0.61**	0.16
EP	3	-0.02	-0.19	-0.22*	0.23	0.25	0.27	0.01
	4	0.03	-0.03	-0.15	0.08	0.15	0.12	0.02
	5	-0.16	-0.35**	-0.27*	-0.31*	-0.36*	-0.20	-0.29**
	5-1	0.28	-0.35	-0.67***	-0.77***	-0.85***		-0.47***
	Cont	-0.15	-0.09	-0.01	0.14	0.20	0.35*	

GRS-F(25, 416): 1.94 [p = 0.005]

FEP-controlled EP portfolios: GRS-F(5, 436): 3.30 [p = 0.006]

EP-controlled FEP portfolios: GRS-F(5, 436): 1.25 [p = 0.287]

Panel B: Sorted by EP then FEP

Excess return (%)

		EP						
		1	2	3	4	5	5-1	Cont
	1	-0.47	-0.08	0.11	0.46	0.54*	1.01***	0.11
	2	-0.44	-0.03	0.20	0.51*	0.68**	1.12***	0.19
FEP	3	-0.08	0.30	0.35	0.58**	1.05***	1.12***	0.44*
	4	0.16	0.34	0.45*	0.97***	0.93***	0.77***	0.57**
	5	0.50	0.95***	1.09***	1.14***	0.99***	0.49*	0.94***
	5-1	0.98***	1.03***	0.98***	0.69***	0.46*		0.83***
	Cont	-0.07	0.30	0.44*	0.73***	0.84***	0.90***	

Three-factor alpha (%)

		EP						
		1	2	3	4	5	5-1	Cont
	1	-0.33	-0.25*	-0.40**	-0.17	-0.41**	-0.08	-0.31***
	2	-0.38**	-0.25*	-0.17	-0.12	-0.24	0.15	-0.23**
FEP	3	-0.04	0.21	-0.02	0.01	0.21	0.25	0.07
	4	0.05	0.14	0.10	0.36**	0.12	0.07	0.16
	5	0.10	0.67***	0.64***	0.50***	0.06	-0.05	0.39***
	5-1	0.43	0.92***	1.05***	0.67***	0.46*		0.70***
	Cont	-0.12	0.10	0.03	0.12	-0.05	0.07	

GRS-F(25, 416): 1.97 [p = 0.004]

EP-controlled FEP portfolios: GRS-F(5, 436): 6.00 [p = 0.000]

FEP-controlled EP portfolios: GRS-F(5, 436): 1.40 [p = 0.223]

Table 5: Fama-MacBeth regressions. The test assets are 25 value-weighted portfolios formed on the forecasted earnings-to-price ratio (FEP) and the book to-market ratio (BM) in Panel A and individual stocks in Panel B. "Const" is the intercept. MKTRF, PMU, SMB, and HML are the market, FEP, size, and value factors, respectively. In Panel A and Columns 5-8 of Panel B (shown as "Stock" in the Beta row), the factor loadings are calculated by regressing the excess test-asset return on the factors using rolling windows of previous 36 months requiring at least 12 months of observations, while in Columns 1-4 of Panel B (shown as "Portfolio" in the Beta row) we assign the portfolio loadings to member stocks. FEP, SIZE, and BM in Panel B are the lagged characteristics of individual stocks. The estimation is by the two-pass Fama-MacBeth (1973) procedure. The sample period is from January 1978 through December 2014. Reported are the time series average coefficients from the monthly second-pass cross-sectional regressions, with t-statistics using the Shanken correction in parentheses. *, **, and *** represent significance at 10%, 5%, and 1%, respectively. "AdjRsq" is the adjusted R-squared from a single cross-sectional regression of average excess test asset returns on average lagged betas and characteristics.

Panel A: Portfolios

	1		2		3	
Const	0.84***	(2.83)	0.70**	(1.97)	0.61*	(1.90)
MKTRF	-0.32	(-0.85)	-0.38	(-0.95)	-0.38	(-0.96)
PMU			0.64***	(3.35)	0.67***	(3.46)
SMB					0.11	(0.40)
HML					0.79***	(3.29)
AdjRsq	-0.04		0.66		0.95	

Panel B: Individual stocks

	1		2		3		4		5		6		7		8	
Beta	Portfolio		Portfolio		Portfolio		Portfolio		Stock		Stock		Stock		Stock	
Const	0.73**	(2.55)	0.68**	(2.05)	0.23	(0.87)	-0.32	(-1.19)	0.48**	(2.53)	0.45**	(2.45)	0.37**	(2.29)	-0.16	(-0.91)
MKTRF	-0.24	(-0.73)	-0.39	(-1.12)	0.00	(0.00)	0.10	(0.31)	0.04	(0.15)	0.02	(0.08)	0.09	(0.31)	0.14	(0.50)
PMU			0.90***	(5.15)	0.89***	(5.05)	0.54***	(3.19)			0.07	(0.45)	0.05	(0.29)	0.02	(0.12)
SMB					0.39*	(1.76)	0.30	(1.41)					0.08	(0.41)	0.10	(0.52)
HML					0.70***	(3.11)	0.31	(1.45)					0.16	(0.92)	0.12	(0.70)
FEP							4.31***	(5.24)							3.53***	(5.14)
SIZE							1.02	(0.71)							0.00	(0.64)
BM							0.62***	(4.07)							0.37***	(4.62)
AdjRsq	0.00		0.00		0.01		0.06		0.01		0.01		0.05		0.04	

Table 6: Characteristic- and loading-balanced portfolios. Every month, 27 portfolios are formed as the intersection of independently sorted terciles of the forecasted earnings-to-price ratio (FEP), the book-to-market ratio (BM), and the stock's FEP-factor loading (βPMU) and held for a month. In Panel A, EXRET is the value-weighted monthly excess return in percent. N is the average number of stocks. BM, FEP, and βPMU are the average equally weighted pre-ranking attributes of individual stocks within each portfolio. Subpanel (1) in Panel B shows the average excess returns of the nine zero-cost portfolios long high βPMU stocks and short low βPMU stocks within the corresponding BM-FEP intersection. "Average" at the bottom of the subpanel is the average equally weighted excess return of those nine value-weighted long-short portfolios with balanced BM and FEP characteristics. Subpanels (2) and (3) permute the BM, FEP, and βPMU attributes as shown in their titles. The sample period is from January 1978 through December 2014. The t-statistics are shown in parentheses. *, **, and *** represent significance at 10%, 5%, and 1%, respectively.

Panel A: 27 portfolios formed on BM, FEP, and PMU beta

Rank								
BM	FEP	βPMU	EXRET (%)		N	BM	FEP	βPMU
1	1	1	-0.36	(-1.21)	126.3	0.31	0.034	-1.03
1	1	2	-0.25	(-0.94)	106.0	0.32	0.036	0.09
1	1	3	-0.11	(-0.30)	104.8	0.28	0.035	1.55
1	2	1	-0.01	(-0.04)	89.1	0.37	0.082	-0.86
1	2	2	0.09	(0.35)	103.0	0.37	0.083	0.11
1	2	3	0.27	(0.87)	106.7	0.34	0.084	1.34
1	3	1	-0.01	(-0.01)	26.1	0.37	0.179	-0.88
1	3	2	0.72 *	(1.96)	36.7	0.38	0.164	0.12
1	3	3	1.13 ***	(2.76)	47.8	0.38	0.166	1.33
2	1	1	0.21	(0.69)	104.3	0.75	0.037	-0.80
2	1	2	0.06	(0.21)	104.1	0.76	0.039	0.08
2	1	3	0.16	(0.50)	61.2	0.74	0.037	1.14
2	2	1	0.56 *	(1.96)	145.3	0.76	0.086	-0.71
2	2	2	0.41 *	(1.66)	203.4	0.77	0.088	0.09
2	2	3	0.52 *	(1.78)	122.1	0.75	0.089	1.06
2	3	1	0.96 ***	(2.93)	73.7	0.79	0.162	-0.71
2	3	2	1.05 ***	(3.66)	131.4	0.80	0.159	0.12
2	3	3	0.91 ***	(2.74)	120.1	0.78	0.167	1.13
3	1	1	0.74 **	(2.09)	53.5	1.48	0.034	-0.71
3	1	2	0.56 *	(1.81)	73.5	1.53	0.036	0.09
3	1	3	0.55	(1.53)	40.7	1.61	0.034	1.01
3	2	1	0.83 ***	(2.63)	75.2	1.44	0.088	-0.66
3	2	2	0.72 ***	(2.75)	129.7	1.46	0.089	0.10
3	2	3	0.91 ***	(2.79)	66.0	1.52	0.090	0.99
3	3	1	1.24 ***	(3.83)	69.3	1.84	0.194	-0.65
3	3	2	1.23 ***	(4.40)	154.7	1.58	0.177	0.12
3	3	3	1.14 ***	(3.42)	105.6	1.68	0.211	1.03

Panel B: Excess returns (%) of attribute-balanced portfolios

(1) BM and FEP-balanced PMU beta portfolios

		BM					
		1		2		3	
	1	0.26	(0.97)	-0.05	(-0.19)	-0.18	(-0.72)
FEP	2	0.28	(1.20)	-0.04	(-0.18)	0.08	(0.32)
	3	1.13 ***	(2.88)	-0.05	(-0.21)	-0.10	(-0.42)
Average		0.15	(0.89)				

(2) BM and PMU-beta-balanced FEP portfolios

		BM					
		1		2		3	
	1	0.36	(1.10)	0.75 ***	(3.82)	0.50 **	(2.29)
βPMU	2	0.97 ***	(3.52)	1.00 ***	(5.09)	0.67 ***	(3.71)
	3	1.23 ***	(3.75)	0.75 ***	(2.96)	0.58 **	(2.54)
Average		0.76 ***	(6.01)				

(3) FEP and PMU-beta-balanced BM portfolios

		FEP					
		1		2		3	
	1	1.10 ***	(4.20)	0.84 ***	(3.53)	1.24 ***	(4.26)
βPMU	2	0.81 ***	(3.07)	0.63 ***	(3.02)	0.51 **	(1.97)
	3	0.66 **	(2.05)	0.64 **	(2.28)	0.01	(0.03)
Average		0.72 ***	(4.20)				

Table 7: Annual rebalancing strategies. Every year in a month shown in the "Month" column, 25 portfolios are formed as the intersection of independently sorted quintiles of the forecasted earnings-to-price ratio (FEP) and the book-to-market ratio (BM) and held for 12 months. The BM-controlled FEP portfolio is defined as the equally weighted average of the five excess value-weighted BM portfolio returns within an FEP quintile. FEP-controlled BM portfolios are defined similarly. The "5-1" column shows the spread between the value-weighted returns of the two extreme quintile portfolios. "Alpha" is the three-factor alpha in percent, measured as the intercept from a regression of the spread return on a constant, the excess market return and size and value factors rebalanced monthly. The sample period is from January 1978 through December 2014. t-statistics are shown in parentheses. *, **, and *** represent significance at 10%, 5%, and 1%, respectively.

	BM-controlled FEP portfolios				FEP-controlled BM portfolios			
Month	5-1		Alpha		5-1		Alpha	
1	0.29 *	(1.73)	0.26	(1.52)	0.57 ***	(2.69)	-0.15	(-1.17)
2	0.22	(1.38)	0.21	(1.24)	0.68 ***	(3.23)	-0.09	(-0.77)
3	0.18	(1.17)	0.13	(0.85)	0.68 ***	(3.27)	-0.03	(-0.22)
4	0.39 **	(2.57)	0.34 **	(2.15)	0.60 ***	(2.91)	-0.10	(-0.82)
5	0.52 ***	(3.14)	0.43 **	(2.54)	0.46 **	(2.32)	-0.21 *	(-1.79)
6	0.51 ***	(3.08)	0.48 ***	(2.81)	0.46 **	(2.35)	-0.19 *	(-1.66)
7	0.50 ***	(2.99)	0.42 **	(2.45)	0.61 ***	(3.10)	-0.10	(-0.89)
8	0.49 ***	(3.05)	0.37 **	(2.31)	0.63 ***	(3.08)	-0.10	(-0.91)
9	0.49 ***	(3.10)	0.44 ***	(2.66)	0.69 ***	(3.32)	-0.17	(-1.44)
10	0.49 ***	(2.94)	0.44 **	(2.58)	0.66 ***	(3.22)	-0.13	(-1.08)
11	0.51 ***	(2.99)	0.50 ***	(2.86)	0.60 ***	(2.92)	-0.18	(-1.55)
12	0.42 **	(2.48)	0.34 *	(1.94)	0.61 ***	(2.90)	-0.14	(-1.14)

Table 8: Subsample analysis. Every month, 25 portfolios are formed as the intersection of independently sorted quintiles of the forecasted earnings-to-price ratio (FEP) and the book-to-market ratio (BM) and held for a month. Panels A and B show the result for the first and second subsamples, respectively, as shown in the panel titles. The top subpanels show the value-weighted monthly excess return in percent. The "Cont" column shows the excess return on the BM-controlled FEP portfolio, defined as the equally weighted average of the five excess value-weighted BM portfolio returns within an FEP quintile. The "Cont" row shows the excess returns on the FEP-controlled BM portfolios defined similarly. The bottom subpanels show the three-factor alpha in percent, measured as the intercept from a regression of the excess portfolio return on a constant, the excess market return and size and value factors rebalanced monthly. "GRS-F(n, d)" is the Gibbons-Ross-Shanken (GRS) F-statistic (with the numerator and denominator degrees of freedom n and d, respectively) for the hypothesis that the 25 FEP-BM portfolio alphas jointly equal zero. The GRS statistics for the controlled portfolios are defined similarly. p-values are shown in square brackets. *, **, and *** represent significance at 10%, 5%, and 1%, respectively.

Panel A: 1/1978-12/1996

Excess return (%)

		BM						
		1	2	3	4	5	5-1	Cont
	1	-0.64 *	-0.21	0.26	0.69	0.96 **	1.60 ***	0.21
	2	0.11	-0.11	0.34	0.46	0.75 *	0.64 *	0.31
FEP	3	0.46	0.26	0.53	0.62 *	0.69 *	0.23	0.51
	4	0.85	0.58	0.53	0.79 **	0.88 **	0.03	0.72 **
	5	0.49	0.74	0.75 *	1.24 ***	1.27 ***	0.77	0.90 **
	5-1	1.13 ***	0.95 **	0.49	0.55 *	0.30		0.69 ***
	Cont	0.25	0.25	0.48	0.76 **	0.91 **	0.66 **	

Three-factor alpha (%)

		BM						
		1	2	3	4	5	5-1	Cont
	1	-0.61 ***	-0.75 ***	-0.65 ***	-0.58 *	-0.42	0.19	-0.60 ***
	2	0.16	-0.58 ***	-0.44 *	-0.55 **	-0.54 **	-0.70 **	-0.39 **
FEP	3	0.59 **	0.00	-0.12	-0.39 **	-0.62 ***	-1.21 ***	-0.11
	4	0.83 **	0.30	-0.05	-0.09	-0.31	-1.14 ***	0.13
	5	0.42	0.43	-0.01	0.37 *	0.09	-0.33	0.26
	5-1	1.03 **	1.17 ***	0.63 *	0.95 ***	0.51		0.86 ***
	Cont	0.28	-0.12	-0.25 *	-0.25 *	-0.36 **	-0.64 ***	

GRS-F(25, 200): 1.15 [p = 0.294]

BM-controlled FEP portfolios: GRS-F(5, 220): 3.40 [p = 0.006]

FEP-controlled BM portfolios: GRS-F(5, 220): 2.76 [p = 0.019]

Panel B: 1/1997-12/2014

Excess return (%)

		BM						
		1	2	3	4	5	5-1	Cont
	1	-0.24	-0.01	0.00	0.34	0.83	1.06 **	0.18
	2	-0.07	0.03	0.31	0.74 *	1.26 **	1.33 ***	0.46
FEP	3	0.08	0.38	0.71 *	0.74 *	0.94 **	0.86 **	0.57
	4	0.53	0.62	0.74 *	1.17 ***	1.04 **	0.51	0.82 **
	5	0.84	1.31 **	1.16 **	1.32 ***	1.47 ***	0.63	1.22 **
	5-1	1.07 **	1.32 ***	1.16 ***	0.98 ***	0.65 **		1.03 ***
	Cont	0.23	0.47	0.58	0.86 **	1.11 **	0.88 ***	

Three-factor alpha (%)

		BM						
		1	2	3	4	5	5-1	Cont
	1	0.19	-0.22	-0.58 **	-0.60 **	-0.20	-0.39	-0.28
	2	-0.02	-0.14	-0.08	0.00	0.19	0.22	-0.01
FEP	3	0.10	0.07	0.21	0.02	0.09	0.00	0.10
	4	0.37	0.19	0.14	0.42	0.10	-0.27	0.24
	5	0.33	0.75 **	0.46 *	0.45	0.40	0.07	0.48 **
	5-1	0.14	0.97 **	1.04 ***	1.05 ***	0.60 **		0.76 ***
	Cont	0.19	0.13	0.03	0.06	0.11	-0.08	

GRS-F(25, 188): 1.25 [p = 0.203]

BM-controlled FEP portfolios: GRS-F(5, 208): 2.62 [p = 0.025]

FEP-controlled BM portfolios: GRS-F(5, 208): 0.36 [p = 0.877]

Figure 1: Fitted returns of the 25 portfolios sorted on FEP and BM. This figure plots the fitted returns (on the vertical axis) from a single regression of average test asset returns (on the horizontal axis) on average lagged rolling betas. The test assets are 25 portfolios formed as the intersection of independently sorted forecasted earnings-to-price ratio (FEP) quintiles and book-to-market ratio (BM) quintiles. The betas are calculated using rolling windows of previous 36 months requiring at least 12 months of observations. The regressors are the rolling beta of the excess market return and an intercept and in Panel A. Panel B additionally includes the rolling beta of the FEP factor (PMU). Panel C further includes the rolling betas of the size and value factors. "Adj. R^2" is the adjusted R-squared of the single regression.