Equity Return Expectations and Portfolios: Evidence from Large Asset Managers

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Abstract

The largest asset managers in the world report their expectations publicly in capital market assumptions. We collect these expectations and revisit the relationships between subjective equity premium expectations, equity valuations, and financial portfolios. In contrast to the well-documented extrapolative expectations of retail investors, asset managers' subjective equity premium expectations are countercyclical: they are high when valuations are low and low when valuations are high. Asset managers' expectations are reflected in their portfolios: focusing on allocation mutual funds, we find that asset managers with larger US equity premium expectations manage funds that invest significantly more in US equities. Overall, asset managers' expectations and portfolios are generally consistent with standard rational expectations asset pricing and standard portfolio choice models.

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1 Introduction

Existing research on subjective equity return expectations challenges standard finance theories. First, subjective equity return expectations have been found to be procyclical: they are high when equity valuations are high and low when equity valuations are low (see, e.g., De Bondt, 1993; Vissing-Jorgensen, 2003; Amromin and Sharpe, 2014; Greenwood and Shleifer, 2014). As such, they stand in contrast to the relationship between realized returns and valuations that rational expectations asset pricing models match (see, e.g., Campbell and Cochrane, 1999; Bansal and Yaron, 2004; Gabaix, 2012; Wachter, 2013). Second, the link between investors' expectations and their financial portfolios is statistically significant, but on average small relative to standard portfolio choice models (see, e.g., Ameriks, Kézdi, Lee, and Shapiro, 2020; Giglio, Maggiori, Stroebel, and Utkus, 2021). While these challenges have been documented in multiple datasets covering retail investors, little evidence exists for institutional investors—the largest investors in today's equity markets.[1]

In this paper, we revisit the relationships between subjective equity premium expectations, equity valuations, and financial portfolios using data on large professional asset management firms. Large asset managers report their return expectations across various asset classes publicly on their websites in capital market assumptions. The asset managers in our sample manage a vast amount of capital—more than USD 40 trillion as of 2021—and their publications are backed by their substantial business reputations. As asset managers are subject to regulatory filings and make voluntary disclosures, we can test whether their expectations are reflected in their portfolios.

We argue that asset managers' subjective expectations are much easier to reconcile with standard finance theories than retail investors' subjective expectations. We find that as-

[1] The fraction of the equity market directly held by households and individuals steadily declined from more than 90% just after the Second World War, through 50% in 1980, to 20% in 2010 (see, e.g., Stambaugh, 2014). Over the same period, the equity ownership of institutional investors has steadily increased.

set managers' equity premium expectations are countercyclical, being high when valuations are low and low when valuations are high. As such, asset managers' subjective equity premium expectations mirror the objective equity premium expectations implied by predictive regressions of realized excess equity returns on valuation ratios (see, e.g., Cochrane, 2011). Moreover, studying asset managers' allocation funds, we find a sensitivity of portfolios to beliefs close to the one implied by standard portfolio choice models under reasonable calibrations and significantly larger than the one documented for retail investors. Allocation funds invest primarily in equities and bonds and to a lesser extent in cash and other assets.

We begin our analysis by estimating regressions of asset managers' subjective equity premium expectations on common measures of objective equity premium expectations. In contrast to retail investors' expectations and consistent with standard rational expectations asset pricing models, we repeatedly find evidence that asset managers' subjective expectations mirror objective expectations.

First, we find that asset managers' subjective expectations mirror the relationship between realized excess equity returns and equity valuation ratios documented in the return predictability literature. A ten-percent-increase in Shiller's cyclically adjusted price-earnings ratio (CAPE), the inverse of which is a common measure of the objective equity return an investor can expect, is associated with a 68-basis-point decline in asset managers' long-term equity premium expectations. In contrast to subjective expectations from other sources (see, e.g., Nagel and Xu, 2021, and our results below), the magnitude of the coefficient estimate is essentially the same when we regress realized ten-year excess returns on the CAPE.

Second, as opposed to building objective equity premium measures from valuation ratios, Martin (2017) and Knox and Vissing-Jorgensen (2022) argue that the objective equity premium can be inferred from option prices. Asset managers' equity premium expectations correlative positively with such a market-implied equity premium, consistent with the notion that asset managers could be the marginal investors in these markets.

Third, while the modal capital market assumption has a horizon of exactly ten years, there is variation. Some managers also provide a term structure of subjective equity return expectations.[2] For instance, BlackRock—the largest asset manager in the world with around USD 10 trillion in assets under management—as of September 2020 expected annualized US equity returns of 4.1%, 4.4%, 5.0%, 5.8%, 6.3%, 6.6%, 6.8%, 7.1%, and 7.3% over horizons of 5, 7, 10, 15, 20, 25, 30, 40, and 50 years, respectively. We use variation in forecast horizons to speak to the literature on the equity term structure. The slope of the term structure of realized equity returns is procyclical, being upward sloping when valuations are high and downward sloping when valuations are low (van Binsbergen, Hueskes, Koijen, and Vrugt, 2013). Again, we find that this pattern is mirrored in asset managers' subjective expectations.

To evaluate whether asset managers' portfolios reflect their expectations, we focus on asset managers' allocation funds. According to the asset managers, capital market assumptions are used to assess portfolio risk as well as assist in portfolio construction. Indeed, we provide evidence that they are. We find that a one-percentage-point increase in the long-term US equity premium expectation is associated with a two- to four-percentage-point larger allocation to US equities in the cross-section of funds. These coefficient estimates can be compared with a 0.69 coefficient estimate presented by Giglio et al. (2021), who study Vanguard investors. Additionally identifying the coefficient estimates using within-fund variation leads to lower coefficient estimates, presumably due to the presence of tight investment mandates (see, e.g., Koijen and Yogo, 2019; Gabaix and Koijen, 2021). However, the coefficient estimates are still about four times larger than the ones documented for retail investors using within-investor variation. Thus, the sensitivity of portfolios to expectations is significantly

[2] Most of the value of equities is concentrated in claims on long-term as opposed to short-term cash flows. Thus, studying the term structure of equity return expectations—in particular, studying long-term expectations in addition to the commonly studied short-term expectations—is important (see, e.g., Brunnermeier, Farhi, Koijen, Krishnamurthy, Ludvigson, Lustig, Nagel, and Piazzesi, 2021).

greater for professional asset managers than for retail investors.

Further evidence on the presence of investment mandates comes from tactical allocation funds. The typical allocation fund has a mandate to invest about 60% of its assets in equities and about 40% in bonds, and may be constrained by this mandate. Tactical allocation funds have the most leeway to allocate freely across asset classes as their purpose is to precisely do so: their purpose is to the time the markets. Consistent with the notion that investment mandates matter, we find that the sensitivity of portfolios to expectations is even larger for tactical allocation funds.

The allocation funds in our sample managed USD 743 billion as of 2021. To put this amount into perspective, the actual respondents to the survey of Vanguard investors of Giglio et al. (2021) managed around USD 1 billion and their sample of individuals who could potentially be contacted represents about USD 2 trillion.[3] Asset managers' expectations likely affect capital beyond USD 743 billion. For instance, it is easy to verify that the capital market assumptions of various providers are frequently discussed on investment forums such as Bogleheads and that they enter into the return assumptions of some of the largest US public pension funds such as the California Public Employees' Retirement System.

Some readers may contend that the negative relationship between asset managers' return expectations and equity valuations is to be expected as some asset managers could use valuations to infer expected returns. First, such a procedure would be consistent with expectations formation under rational expectations. Second, asset managers' expectations formation, in fact, appears to be more nuanced. If asset managers were simply inferring expected returns from valuations, expected returns across managers should be homogeneous. However, we instead find considerable heterogeneity in expectations. This persistent heterogeneity in expectations seems to be a general feature of expectations and is not confined

[3]Their sample consists of around 2,000 respondents in each wave with an average wealth of USD 500,000 in Vanguard accounts.

to the asset managers in our sample (see, e.g., Giglio et al., 2021; Laudenbach, Weber, and Wohlfart, 2021).

Asset managers' expectations differ from most other subjective expectations studied in the literature in two important dimensions. First, they represent the expectations of a new set of investors. Second, asset managers' expectations primarily represent long-term return expectations as opposed to the commonly studied short-term return expectations (see, e.g., Greenwood and Shleifer, 2014). We compare asset managers' equity premium expectations to the one- and ten-year return expectations of chief financial officers (CFOs) and professional forecasters, and conclude that our results differ mostly because of the former dimension. While we find no evidence of procyclical equity premium expectations on the part of professional forecasters and CFOs, asset managers' expectations are the only expectations in consideration that consistently correlate negatively with equity valuations.

The rest of this paper is organized as follows. The next paragraphs review the related literature. Section 2 describes the data. Section 3 shows that asset managers' equity premium and equity return expectations are countercyclical. Section 4 connects expectations to the portfolios of allocation funds. Section 5 contrasts asset managers' expectations with CFOs' and professional forecasters' expectations. Section 6 summarizes and concludes.

Related literature First, we relate to the literature on subjective equity return expectations, which typically documents extrapolative expectations (see, e.g., De Bondt, 1993; Vissing-Jorgensen, 2003; Bacchetta, Mertens, and van Wincoop, 2009; Amromin and Sharpe, 2014; Greenwood and Shleifer, 2014; Da, Huang, and Jin, 2021; Nagel and Xu, 2021; Beutel and Weber, 2022). While this literature has predominantly focused on retail investors, whether return expectations are extrapolative does not appear to be a matter of retail investing versus institutional investing alone: Andonov and Rauh (2020) find that public pension funds extrapolate from past performance.[4] They identify the effect of past returns on return expectations from the cross-section of pension plans (as each pension plan has a different realized return), whereas we use time-series variation. Somewhat surprisingly, we are among the few to show that some subjective expectations vary negatively with equity valuations (see also Welch, 2000; Glaser and Weber, 2005; Ghosh and Roussellet, 2020). In contemporaneous work, Wang (2020) shows that Wall Street analysts' return expectations are countercyclical.

As a corollary, asset managers' expectations are consistent with the conventional wisdom that equity prices move primarily because of discount rate variation and not because of expected cash-flow variation. In contrast, recent research on subjective expectations has challenged the conventional wisdom. For instance, De la O and Myers (2021) and Bordalo, Gennaioli, La Porta, and Shleifer (2020) argue that variation in analysts' subjective cash-flow growth expectations can explain most of the variation in equity prices and that subjective equity return expectations have low volatility.

Second, we add to the literature that connects subjective expectations with financial portfolios. This literature typically finds a statistically significant relationship between respondents' expectations and equity share (see, e.g., Vissing-Jorgensen, 2003).[5] However, this relationship is found to be economically small in multiple different studies and datasets (Fisher and Statman, 2000; Kézdi and Willis, 2011; Amromin and Sharpe, 2014; Merkle and Weber, 2014; Ameriks et al., 2020; Andonov and Rauh, 2020). Giglio et al. (2021) find that the sensitivity of portfolios to return expectations is small on average, but that it varies significantly in the cross-section of investors. We find an economically large relationship between expectations and portfolios in the cross-section of allocation funds.

[4]Using German microdata, Timmer (2018) finds that pension funds and insurance companies act countercyclical, whereas banks and investment funds act procyclical.

[5]Similarly, some authors find that higher equity return expectations increase equity market participation rates (see, e.g., Dominitz and Manski, 2007; Hurd, Van Rooij, and Winter, 2011). Relatedly, other authors link financial portfolios to risk preferences (see, e.g., Guiso, Sapienza, and Zingales, 2018) or lifetime experiences (see, e.g., Malmendier and Nagel, 2011).

Third, our paper also speaks to the literature on theoretical asset pricing models. Standard full-information rational expectations asset pricing models that generate countercyclical risk premia based on habit formation, long-run risks, or rare disasters (see, e.g., Campbell and Cochrane, 1999; Bansal and Yaron, 2004; Gabaix, 2012; Wachter, 2013) have been challenged by the literature on subjective equity return expectations.[6] To match existing evidence on both subjective expectations and asset prices, researchers have developed new models in which some or all agents have non-rational extrapolative expectations (see, e.g., Barberis, Greenwood, Jin, and Shleifer, 2015; Adam, Marcet, and Beutel, 2017; Barberis, Greenwood, Jin, and Shleifer, 2018; Jin and Sui, 2019; Nagel and Xu, 2022). The subjective expectations of large asset managers are in principle consistent with standard rational expectations asset pricing models. However, the heterogeneity in asset managers' expectations and portfolios is perhaps better captured by models that allow for heterogeneous expectations as opposed to representative agent models. Relaxing the full-information assumption of full-information rational expectations asset pricing models, for instance through learning and differences in prior beliefs (see, e.g., Collin-Dufresne, Johannes, and Lochstoer, 2016), could generate such heterogeneity.

2 Data

2.1 Expectations from capital market assumptions

We manually collect asset managers' return expectations for different asset classes from public reports on their websites (sometimes using archive.org) or obtain them directly from asset managers after requesting them. Our approach to data collection is simple: we exten-

[6] As is common in the macroeconomics literature on expectations (see, e.g., Coibion and Gorodnichenko, 2015), we write that these models are *full-information* rational expectations models. We do so to emphasize that rejecting these models may be due the full-information assumption (i.e., the assumption that agents know all the parameters of the model with certainty) or the rational expectations assumptions. Put differently, rejecting these models does not necessarily imply that investors are "irrational."

sively search for reports and initially include any report we find. We collect capital market assumptions from 43 providers, but focus on the sample of 22 providers that manage allocation funds and, thus, for which we can connect expectations with portfolios. We discuss the full sample of providers in the Internet Appendix.

The capital markets assumptions are fairly standardized across asset managers, but display some heterogeneity. Most asset managers provide their expectations as geometric averages for several asset classes (e.g., US equities). Sometimes the stated asset classes are not exactly the same. For instance, one manager may forecast the S&P 500 return, another forecasts the return on broad US equities, while a third forecasts the return on large-cap US equities. We focus on forecasts for large-cap US equities and generally assume that minor differences in asset classes are negligible (e.g., a forecast for broad US equities is equivalent to an unobserved forecast for the S&P 500, that is, large-cap US equities). We group asset managers' expectations into the following asset classes: US (large-cap) equities, international developed markets (DM) equities, emerging markets (EM) equities, and US cash.

The stated forecast horizons in our data take the following values: 1, 3, 3–5, 5, 5–10, 7, 10, 10–15, 10–20, 10+, 15, 20, 25, 30, 40, and 50 years. However, most asset managers provide one forecast close to a ten-year horizon. Specifically, 28% of forecasts are reported for a horizon of exactly ten years and most other forecasts are close to ten years as well (e.g., 7-year forecasts make up 20% of the sample). The very short-term and very-long term forecast horizons are from managers that provide a term structure of expectations. We convert expectations stated for a horizon range to a real number using the midpoint of the range; for example, a horizon of 10–20 years becomes 15 years. Appendix A contains additional details on the data construction.

Asset managers report their expectations as of a specific day at least once a year and sometimes more frequently. The highest frequency of reports is quarterly and many asset managers updated their expectations after the decline in equity valuations in March 2020.

The earliest report we collect is from 1997. Unfortunately, we do not have access to all reports for a given manager, particularly before 2010. Moreover, many asset managers have started publishing capital market assumptions only recently (e.g., BlackRock started in 2018). For these two reasons, the data have some gaps for given managers and are sparse in the cross-section in earlier years.

2.2 Portfolio data

Data on asset managers' actively-managed US-domiciled allocation funds are from Morningstar. We focus on these funds as we expect them, ex ante, to have the most leeway to respond to their expectations. Note that asset managers typically manage multiple funds. We identify the allocation funds of asset managers using Morningstar's *GlobalBroadCategoryGroup* and *BrandingName* variables. We drop target-date funds.[7] We believe that the asset allocations of target-date funds are driven primarily by the target date and not by return expectations across asset classes. Of particular interest is a variable that states the percentage of the fund's assets invested in US equities (*AssetAllocUSEquityNet*). This variable is constructed by Morningstar based on the underlying holdings of the fund and we have no discretion over it. Some funds make their holdings available to Morningstar at the end of each month, while other funds report their holdings only at the end of each quarter. The latter is the mandated reporting frequency of the Securities and Exchange Commission.

As asset managers report their expectations at best quarterly, it seems reasonable to assume that these expectations are valid for a certain time period when matching the data on subjective expectations with the portfolio data. Moreover, if funds react to expectations, they may need some time to adjust their portfolios. In our baseline analysis, we assume that expectations are valid for three months after they have been published. If a manager

[7] The remaining funds belong to the following categories: US Fund Allocation–15% to 30% Equity, US Fund Allocation–30% to 50% Equity, US Fund Allocation–50% to 70% Equity, US Fund Allocation–70% to 85% Equity, US Fund Allocation–85%+ Equity, US Fund Tactical Allocation, and US Fund World Allocation.

provides a term structure of expectations, we select the expectation that is closest to ten years.

2.3 Other data

We retrieve the CAPE from Robert Shiller's webpage. Since the CAPE is available monthly, we match expectations (reported on a given day) with the CAPE from the previous month to ensure that it enters the asset manager's information set at the time of the forecast. Benjamin Knox and Annette Vissing-Jorgensen kindly shared their data on option-implied equity premia. Treasury yields are from the Federal Reserve Economic Data at the Federal Reserve Bank of St. Louis.

2.4 Summary statistics

We construct the equity premium expectation by subtracting the horizon-matched (log) Treasury yield from the (geometric) equity return expectation. Some horizons for equity return expectations do not have a corresponding Treasury yield (e.g., the 15-year horizon). In such cases, we interpolate between the nearest available Treasury yields to obtain the corresponding Treasury yield. Since there are no Treasury bonds with maturities longer than 30 years, we do not construct equity premia for the (few) 40- and 50-year equity return expectations in our data.

Alternatively, we construct the equity premium expectation by subtracting the return expectation on cash over the same horizon (e.g., the expected annualized return on cash over the next ten years) from the equity return expectation. The advantage of this measure is that the equity premium expectation is then entirely constructed from subjective expectations; the disadvantage is that the return on cash for a given horizon is not the risk-free asset (in nominal terms) as reinvestment rates are uncertain.

Table 1 shows summary statistics. The total number of US equity return expectations is 383. Out of these 383 forecasts, 181 are for a horizon of less than ten years, 179 are for a horizon of ten or more years but less than or equal to 30 years, and 23 are for horizons longer than 30 years. Equity premium expectations are markedly heterogeneous. For instance, the minimum equity premium expectation is −6.50%, whereas the maximum expectation is 11.54%. This is because of systematic differences across asset managers, systematic differences across forecast horizons, and differences in equity valuations over time. Some asset managers are generally more pessimistic than others, leading to negative equity premium forecasts. Other managers are generally more optimistic, particularly for short-term horizons when valuations are low, leading to large equity premium expectations. For instance, the 11.54% forecast is from April 2020 for a three-year horizon, implicitly forecasting a quick recovery in equity valuations from the COVID-19-induced market sell-off.

In Panel F, the table also shows summary statistics for the US equity share and non-US equity share of asset managers' allocation funds. There are 186 such funds that managed a combined USD 743 billion as of 2021. The average fund invests 34.24% of its assets in US equities and 18.61% of its assets in international equities; the remaining assets are mostly invested in bonds (38.26%, not tabulated), with a smaller share in cash (4.36%) and other assets (4.43%).

3 How cyclical are asset managers' expectations?

3.1 Equity premium expectations and equity valuation ratios

Following the literature on equity return predictability, the literature on subjective equity return expectations typically estimates a time-series regression of equity return expectations on valuation ratios (see, e.g., Equation (2) in Greenwood and Shleifer, 2014). We follow this literature, but modify our baseline specification in several ways.

We first estimate a regression of equity premium expectations, constructed as expected equity returns less horizon-matched Treasury yields, on the logarithm of the CAPE:

$$\mathrm{F}_{i,t}[r^e_{t\to t+h}] = \alpha_{i,h} + \beta \, \ln(\mathrm{CAPE}_t) + \varepsilon_{i,t,h}, \tag{1}$$

where $\mathrm{F}_{i,t}[r^e_{t\to t+h}]$ is the subjective equity premium expectation (forecast) of asset manager i on day t over the period from t to $t+h$, and $\varepsilon_{i,t,h}$ is an error term for a forecast horizon, h.

Two comments are in order. First, our data capture expectations across different horizons and from different forecasters at different points in time. Since the question "How do expectations change as valuation ratios change?" is inherently a question to be answered using time-series variation, we also include a manager-times-horizon fixed effect, $\alpha_{i,h}$. The coefficient estimate for β is then identified from time-series variation in expectations in response to variation in the CAPE for a given manager and a given forecast horizon. As most managers only forecast returns over one particular horizon, the manager-times-horizon fixed effect is similar to a simple manager fixed effect.

Second, we use the CAPE as the valuation ratio. We prefer the CAPE over the price-dividend ratio as share repurchases, which are not included in ordinary dividends, have become an increasingly common way to return cash to shareholders over our sample period. We prefer the CAPE over a price-earnings ratio without the cyclical adjustment as much of the variation in the unadjusted price-earnings ratio is driven by earnings as opposed to prices, a fact well known since the introduction of the CAPE (see Campbell and Shiller, 1988, 1998).[8] The CAPE averages the past ten years of earnings in the denominator to smooth out predictable variation in earnings.

Specification (1) in Panel A of Table 2 shows the results. We cluster standard errors by

[8] Campbell and Shiller (1998) write: "There are, however, various spikes in the price-earnings ratio that do no show up in the dividend-price ratio. These spikes occur when recessions temporarily depress corporate earnings."

both year-month and manager.[9] The coefficient estimate on the logarithm of the CAPE is –6.17, implying that a ten-percent increase in the price-earnings ratio is associated with a 62-basis-point lower equity premium expectation. This coefficient estimate is economically large and closely mirrors the coefficient estimate implied by standard predictive regressions using realized returns. In the Internet Appendix, we regress realized ten-year excess returns on the logarithm of the CAPE and find a coefficient estimate of –6.06. Thus, asset managers' subjective expectations are countercyclical and consistent with the notion that much of the variation in equity prices is driven by discount rate variation.

Before discussing the economic magnitude of the coefficient estimate in more detail, we first present various perturbations of the baseline specification. Specification (2) shows similar results when we restrict the sample to expectations that are closest to a horizon of ten years for a given manager and date. Each manager then enters the sample only once for a given date and the manager-times-horizon fixed effect in specification (2) is a simple manager fixed effect.[10] The adjusted R^2 value in (2) is 87%. Most of the variation in expectations is explained by manager fixed effects, echoing the persistent cross-sectional dispersion in expectations that has been documented for retail investors (see, e.g., Giglio et al., 2021). For instance, for the sample in specification (2), manager fixed effects explain about 80% of the variation, whereas year-quarter fixed effects only explain about 5% (not tabulated).

Specification (3) shows the results when we consider nominal equity return expectations. The coefficient estimate remains negative, but is slightly larger. We prefer to focus on equity premia, as they are the key objects in rational expectations asset pricing models and the return predictability literature. Constructing subjective equity premia as equity return expectations less Treasury yields is justified as long as Treasury yields enter investors'

[9] Clustering only by year-month yields lower standard errors.

[10] There are two observations for which the distinction between manager-times-horizon fixed effects and manager fixed effects makes a difference, as two managers change the forecast horizon and the two observations drop out as singletons with manager-times-horizon fixed effects. For a similar reason, the regression in (1) has only 356 observations, whereas the summary statistics show 360.

information sets, which we believe is a reasonable assumption for professional asset managers.

Specification (4) uses the equity premium constructed entirely from subjective expectations, the equity return expectation over the return expectation on cash over the same horizon. The coefficient estimate remains negative, with a slightly larger standard error.

As in Greenwood and Shleifer (2014), Panel B of Table 2 adds the past twelve-month return of the S&P 500 as an explanatory variable. The coefficient estimates on past returns are all zero: in contrast to retail investors, asset managers do not pay attention to past returns beyond those incorporated in the CAPE. As we subtract the log Treasury yield on the left hand side in specifications (1) and (2), we also add the log Treasury yield as an explanatory variable on the right hand side. Note that we are not interested in causality and so it is unnecessary to add further variables. The question is not whether a larger valuation ratio *leads* to lower return expectations.

3.2 Economic magnitudes

In fact, perhaps the key economic question is not even whether subjective expectations co-vary negatively with valuation ratios per se, but whether subjective expectations move one-to-one with "rational" expectations. What a "rational" expectation is depends on a specific model. Standard full-information rational expectations asset pricing models imply that subjective return expectations co-vary as much with valuation ratios as do realized equity returns (see, e.g., Campbell and Cochrane, 1999; Bansal and Yaron, 2004; Gabaix, 2012; Wachter, 2013). We have shown that this is the case above, but a more direct test is to build a model-implied expectation and then to regress the subjective expectation on the model-implied expectation. If subjective expectations are rational in the sense that they conform with the specific model, the coefficient estimate in this regression is one.[11]

We use two approaches to build "rational" (i.e., objective) equity premium expectations.

[11] Moreover, in theory the constant is zero and the R^2 value is 100%.

The first approach builds an objective expectation based on a simple present value model using the CAPE as an input (see, e.g., Campbell and Thompson, 2008). The second approach builds an objective expectation by using the fitted values of the full-sample predictive regression of realized ten-year excess returns on the logarithm of the CAPE shown in the Internet Appendix. Since the objective equity premium expectations we construct are long-term objective equity premium expectations, we focus on the subjective expectations that are closest to a ten-year horizon.

Specifications (1) and (2) of Table 3 show that the coefficient estimates in regressions of subjective equity premium expectations on objective equity premium expectations are close to and not statistically different from one. We note that if the objective expectations are measured with error, the coefficient estimates are biased towards zero. The one-to-one relationship between subjective expectations and objective expectations appears exceptional, not only in the context of existing research on subjective equity return expectations (which typically finds a negative correlation between subjective and objective expectations, see Table 5 in Greenwood and Shleifer, 2014). In a broader context of a large literature on behavioral inattention, Gabaix (2019) reports coefficient estimates that are on average about 0.44 in similar specifications.

Lastly, building an objective expectation based on a full-sample regression is of course an unfair benchmark: real-time investors do not have access to the information contained in the full sample. One could construct an objective equity premium expectation using only information that is available to investors in real time, as do Nagel and Xu (2021), and test whether the coefficient estimate is even closer to one. Such a procedure focuses on relaxing the full-information assumption of full-information rational expectations models. Since the regression using realized returns uses data since 1871 and since most of our subjective expectations are from post 2000, it seems unlikely that our results would change materially were we to build a regression-based forecast available in real time.

3.3 Option-implied equity premia

As is evident from the discussion above, building models of objective equity return expectations is challenging and prone to misspecification. It requires assumptions on the valuation ratio, the sample period used to estimate regressions of realized excess returns on the valuation ratio, and other assumptions (see Section 3.5 for a further discussion).

Martin (2017) shows that a lower bound on the short-term equity premium can be obtained from option prices and argues that the bound is approximately tight. Thus, to some extent, objective equity premia are directly observable from market prices. However, note that the option-implied expectation is a short-term (i.e., one-year) expectation as opposed to the long-term subjective expectations that we study, a feature that Knox and Vissing-Jorgensen (2022) exploit to study a novel decomposition of stock returns. To give additional credence to our findings, we also examine the correlation between asset managers' subjective expectations and the lower bound on the short-term equity premium based on options data.

Figure 1 plots the equity premium expectations of six selected asset managers (Amundi, BlackRock, J.P. Morgan, Morningstar, Northern Trust, and State Street) over time together with the option-implied measure on a given day. Consistent with our previous analysis, the objective and subjective measures are highly correlated. For instance, when the option-implied equity premium spiked in March 2020 and reversed quickly thereafter, so did Amundi's, BlackRock's, Morningstar's, and State Street's return expectations. Knox and Vissing-Jorgensen (2022) analyze this correlation more systematically and report a 0.72 correlation between the option-implied measure and asset managers' equity premium expectations.

3.4 Term structure of equity premium expectations

The capital market assumptions that we study are not standardized. One feature of our data is that there is variation in the forecast horizon. Most of this variation is across asset managers, that is cross-sectional, but five managers also provide a term structure of expectations.

We use variation in the forecast horizon to speak to the literature on the equity term structure (see, e.g., van Binsbergen, Brandt, and Koijen, 2012).[12] In the Internet Appendix, we find a term structure of equity premium expectations that is flat on average, consistent with the mixed evidence using realized returns (van Binsbergen et al., 2012; van Binsbergen and Koijen, 2017; Boguth, Carlson, Fisher, and Simutin, 2019; Bansal, Miller, Song, and Yaron, 2021). We do, however, find that the term structure of subjective equity premium expectations is procyclical. That is, it is upward-sloping in expansions and downward-sloping in recessions, consistent with the predictions of rational expectations asset pricing models.[13]

To illustrate this result, Figure 2 plots fitted values from a regression of asset managers' subjective equity premium expectations on the forecast horizon, the CAPE, and an interaction between the CAPE and the forecast horizon for two different values of the CAPE. First, to reiterate on the results from the previous subsections, equity return expectations

[12]Following van Binsbergen et al. (2013), we can define the (forward) equity yield at time t with maturity h as

$$\mathrm{E}_t[r_{t\to t+h}] - \mathrm{E}_t[g_{t\to t+h}],$$

where $\mathrm{E}_t[r_{t\to t+h}]$ is the expected return on equity at time t from t to $t+h$ and $\mathrm{E}_t[g_{t\to t+h}]$ is the expected dividend growth at time t from t to $t+h$. Equity yields can be obtained from the futures price of derivatives called dividend futures. However, the key economic quantity of interest, the expected return, cannot be inferred from market prices alone. The expected return from time t to $t+h$ is the appropriate discount rate for a dividend payment in h days. To study the expected return, researchers typically need to take a stance on the expected growth rate. We directly observe subjective equity return expectations. These are the relevant discount rates across horizons and so we do not need to model expected dividend growth.

[13]Habit (see, e.g., Campbell and Cochrane, 1999) and long-run risk models (see, e.g., Bansal and Yaron, 2004) imply that the slope is positive on average, upward-sloping in expansions, and downward-sloping in recessions. Rare disaster models (see, e.g., Barro, 2006; Gabaix, 2012) imply that the term structure of equity premia is flat; see van Binsbergen et al. (2012).

are higher when the CAPE is low than when the CAPE is high. Second, for low (high) values of the CAPE, the term structure is downward (upward) sloping. As such, asset managers' subjective equity premium expectations are rational in the sense that they mirror another pattern in realized equity returns.

3.5 Conceptual framework

The formation of some asset managers' return expectations is not entirely a black box. In their capital market assumptions, some asset managers discuss their expectations in terms of three components: i) earnings yield times payout ratio, ii) repricing, and iii) earnings growth. We can understand these labels from the following accounting identity of a log return (see Ferreira and Santa-Clara, 2011; Rangvid, 2017, and our Appendix B for a derivation):

$$r_{t+1} = dp_{t+1} + \Delta pe_{t+1} + \Delta e_{t+1}, \tag{2}$$

where $dp_{t+1} = \ln(1 + D_{t+1}/P_{t+1})$ is the log of one plus the dividend-price ratio, $\Delta pe_{t+1} = \ln(P_{t+1}/E_{t+1}) - \ln(P_t/E_t)$ is the log change in the price-earnings ratio, and $\Delta e_{t+1} = \ln(E_{t+1}) - \ln(E_t)$ is the log change in earnings. Similarly, the expected return can be decomposed into the expectations of the three terms and we note that all components are unobserved as of time t.

One way to understand the challenge of building an objective return expectation and to understand the heterogeneity in subjective return expectations is through the lens of Equation (2). Differences in the expected future dividend yield, the expected change in the price-earnings ratio, as well as expected future earnings growth could all contribute to the observed differences in subjective return expectations.

As a particular example, consider the case of Grantham, Mayo, & van Otterloo (GMO) and BlackRock in December 2020. In December 2020, GMO's seven-year nominal equity forecast was –2.2% per year, whereas BlackRock's corresponding nominal equity forecast was 5.9% per year.[14] How can these forecasts be so different? While neither GMO nor BlackRock reveal their exact methodologies and implementations, the reason that GMO is more pessimistic appears to be primarily because of lower long-run price-earnings ratio expectations. Specifically, GMO expects the price-earnings ratio to mean-revert to around 16 (see the GMO white paper from August 2017), far below its December 2020 value of 33.73.

4 Are asset managers' expectations reflected in their portfolios?

4.1 Baseline regressions of portfolios on expectations

Standard portfolio choice models make clear predictions for the coefficient estimate in a regression of equity shares on subjective equity premium expectations. In the standard mean-variance model with one risky asset, the portfolio weight on the risky asset is

$$w = \frac{1}{\gamma}\frac{\mu}{\sigma^2}, \tag{3}$$

where γ is constant relative risk aversion, μ is the equity premium, and σ^2 is equity market variance. Thus, according to this simple model, the coefficient estimate in a regression of portfolio weights on subjective equity premium expectations should be equal to $1/(\gamma\sigma)$. Of course, γ is unobserved but, fixing σ, we can determine whether the implied γ is reasonable. The historical standard deviation of (one-year) equity returns is about 16% and a reasonable value of γ perhaps has an upper bound of 10. In that case the coefficient estimate in the

[14] GMO provided a real equity forecast of –4.4% per year over the next seven years and a long-term inflation forecast of 2.2% per year.

regression should be about 3.91.

However, previous research that focuses on retail investors has mostly found lower coefficient estimates in cross-sectional regressions of portfolio shares on subjective equity premium expectations. Kézdi and Willis (2011) find a 0.30 estimate, Amromin and Sharpe (2014) find a 0.33 estimate, Ameriks et al. (2020) find a 0.45 estimate, and Giglio et al. (2021) find a 0.69 estimate. An exception are Beutel and Weber (2022) who report a 1.35 coefficient estimate in a comparable specification and a 2.84 coefficient estimate in their instrumental variables specification.

We follow this literature and estimate a regression of fund j's monthly share invested in US equities on the monthly long-term US equity premium expectation of asset manager i to which fund j belongs

$$\text{US Equity Share}_{j(i),t} = \theta_t + \delta\, \mathrm{F}_{i,t}[r^e_{t\to t+h}] + \eta_{j(i),t}. \tag{4}$$

Several comments are in order. First, θ_t denotes a set of year-month fixed effects. Including such time fixed effects implies that the coefficient estimate is identified purely from cross-sectional variation in expectations and equity shares, as is common in the literature.[15] In particular, valuation ratios such as the CAPE are absorbed, as these are constant for a given cross-section.

Second, previous research often estimates a Tobit regression as the equity share of individual investors is typically censored at 0% and 100% (see, e.g., Vissing-Jorgensen, 2003; Giglio et al., 2021). We estimate a linear regression as some funds, albeit rarely, enter short positions (see Table 1).

Third, note that we focus on the share invested in US equities, which is generally different

[15]With time fixed effects, the coefficient estimate is equal to a weighted average across year-months of the coefficient estimates from month-by-month cross-sectional regressions of equity shares on expectations. The weighting scheme places larger weights on months with more observations and months for which expectations have larger cross-sectional variation.

from the overall equity share, as most funds also invest in international equities (see Table 1).

Fourth, in our baseline analysis we assume that expectations are valid for three months after they have been published. For instance, if a manager publishes expectations at the end of December, we assume that they are valid until the end of March in the next year. One concern with forward filling asset managers' expectations is that such a procedure artificially inflates the number of observations in our regressions as the independent variable is constant for a given manager. We cluster standard errors by asset manager to account for the correlation of errors for a given manager. We additionally cluster standard errors by year-month.[16]

Specification (1) of Table 4 estimates Equation (4) and shows that a one-percentage-point increase in the US equity premium expectation is associated with a 2.05-percentage-point larger US equity share, which is significantly larger than most of the previous estimates in the literature. The coefficient estimate is statistically significant.

The simple model in Equation (3) of course cannot fully describe asset managers' portfolio choice. For one, asset managers invest in multiple risky assets as opposed to a single one. With multiple risky assets, standard portfolio choice models prescribe portfolio weights of

$$w = \frac{1}{\gamma}\Sigma^{-1}\mu, \tag{5}$$

where Σ is the variance-covariance matrix of risky asset returns and μ is now a vector of risk premiums. Thus, to identify the effect of subjective US equity premium expectations on US equity shares in this simple extension, one should also control for the variance-covariance

[16] The standard errors are generally lower when we cluster by fund and year-month or just by year-month. Moreover, the Internet Appendix also presents robust results when we eliminate the fund dimension of the panel by averaging across funds for a given asset manager in a given year-month. When we do not forward fill expectations, the sample is further reduced whenever asset managers do not report expectations at the same time that they report portfolios.

matrix and all other risky asset return expectations. Not doing so could lead to (downward) biased coefficient estimates.[17]

Of course, controlling for all these additional inputs is not feasible as most asset managers do not provide their entire variance-covariance matrix expectations and return expectations on all risky asset classes. Thus, we are facing a trade-off between controlling for additional expectations and reducing the sample size. With this trade-off in mind, we additionally control for return expectations on developed markets equities and emerging markets equities. In this case, the sample of asset managers is reduced by six managers, but we cover expectations on worldwide equity returns. Return expectations on bonds are largely subsumed by our focus on equity premia and the year-month fixed effects. Variances and correlations are arguably easier to estimate than are expected returns and thus vary less across asset managers.

Controlling for these additional expectations seems important. Specification (2) of Table 4 shows a regression of the US equity share on US equity, developed markets equity, and emerging markets equity premium expectations. The coefficient estimate on US equity premium expectations increases from 2.05 to 4.06. The coefficient estimate on developed markets equity premium expectations is significantly negative, indicating a substitution effect within the equity part of a fund's portfolio. Funds of asset managers with higher developed markets equity premium expectations allocate less to US equities. The Internet Appendix provides some evidence that the money used to finance a higher US equity share comes from money invested in international equities.

The increase in the coefficient estimate on US equity premium expectations is not due to sample selection: specification (3) restricts specification (1), which does not control for

[17]For example, consider the case with two risky assets. It is straightforward to verify that the weight on one risky asset decreases in the risk premium of the other risky asset if the correlation between the two is positive. In practice, this can lead to a downward bias in the coefficient estimate on US equity premium expectations if the regression of US equity shares on US equity premium expectations omits expectations on the other asset class, say international equities.

the additional expectations, to the sample of the 16 asset managers that provide additional expectations on international equity returns. The coefficient estimate decreases back to 2.28.

We illustrate the results of this subsection in Figure 3. Analogous to Figure 2 of Giglio et al. (2021), Figure 3 shows a conditional binscatter plot of US equity shares and US equity premium expectations, conditional on year-month fixed effects and emerging as well as developed markets equity premium expectations.

4.2 Unobserved fund heterogeneity

The allocation funds in the sample—though they have in common that they all invest in a mix of equities, bonds, and cash—are heterogeneous. In particular, they may have different investment mandates. For instance, some funds could be restricted to invest in US assets while other funds may be restricted to have a minimum or maximum share of assets invested in equities. Investment mandates could be correlated with expectations and portfolios: perhaps an asset manager with low equity return expectations launches few funds with a 60% or 80% target equity allocation. Such a correlation between investment mandates and expectations would not necessarily be uninteresting, but it would mute the effect of expectations on portfolios for a given fund. To account for fund-specific heterogeneity, we estimate our specifications with fund fixed effects.

Specifications (1) to (3) in Table 5 are analogous to (1) to (3) in Table 4, but add fund fixed effects. The magnitudes of the coefficient estimates are about halved, but the coefficient estimates remain statistically significant.[18] For instance, in specification (2) the coefficient estimate drops to 2.16.

The lower sensitivity of portfolios to expectations using within-investor variation is not confined to the asset managers in our sample, but appears to be a more general feature:

[18]When we forward fill expectations up to twelve months as opposed to three, the Internet Appendix shows that the magnitudes of the coefficient estimates are similar, but that the standard errors are larger.

Giglio et al. (2021) report a sensitivity of 0.23 in a specification that identifies the coefficient estimate using within-investor variation. They note that trading frictions can explain differences relative to the coefficient estimates purely identified from cross-sectional variation. The obvious trading friction for the allocation funds in our sample is their investment mandates (see also Koijen and Yogo, 2019; Gabaix and Koijen, 2021).

4.3 Tactical allocation funds

To further gauge the effect of investment mandates, we study tactical allocation funds. These funds are less restricted by their investment mandates. The purpose of tactical allocation funds is to time entry and exit into different asset classes to generate abnormal returns. We expect the response of portfolios to expectations to be even larger for tactical allocation funds. The caveat is that there are only eleven such funds in the sample. These funds managed USD 33 billion as of 2021.

Table 6 confirms that the sensitivity of US equity shares to US equity premium expectations is stronger for tactical allocation funds. In specification (1), which includes both year-month fixed effects as well as return expectations on international equities, a one-percentage-point increase in US equity premium expectations is associated with a $3.89 + 5.80 = 9.69$ larger US equity share for a tactical fund. This estimate is about 20 times larger than the estimates for individual investors in the literature, more than double the estimate for a non-tactical fund in specification (1), and consistent with the notion that investment mandates mute the response of portfolios to expectations.

5 CFOs' and professional forecasters' return expectations

The expectations considered here so far differ from the subjective expectations typically studied in the literature in two important ways. First, asset managers' expectations represent the expectations of market participants that have not been studied previously. Second, asset managers forecast returns predominantly over long-term horizons (e.g., ten years) as opposed to the short-term (e.g., one-year) forecasts typically studied in the literature. In addition, we focus on equity premium expectations—the key objects in standard rational expectations asset pricing models and the return predictability literature—as opposed to nominal equity return expectations.

To investigate why our results differ, we contrast asset managers' return expectations to the expectations of CFOs and professional forecasters, two surveys for which long-term expectations are available. Quarterly S&P 500 return expectations of CFOs are from a survey administered by John Graham and Campbell Harvey (see, e.g., Ben-David, Graham, and Harvey, 2013), annual S&P 500 ten-year return expectations of professional forecasters are from the Survey of Professional Forecasters conducted by the Philadelphia Fed, and semi-annual one-year forecasts of the level of the S&P 500 are from the Livingston Survey, which is also administered by the Philadelphia Fed. We note that the one- and ten-year forecasts of professional forecasters correspond to different sets of professional forecasters. Additional details on the surveys of CFOs and professional forecasters are in the Internet Appendix.

5.1 CFOs

To begin with, the top panel of Figure 4 plots the time series of average CFO equity premium expectations for one- and ten-year horizons together with the CAPE. Somewhat surprisingly, CFOs' one-year equity premium expectations appear countercyclical, spiking after the dot-com bubble burst in the early 2000s and after the great financial crisis in 2008. For CFOs' ten-year equity premium expectations, the pattern is less clear.

Specifications (1) and (2) of Table 7 show regressions of CFOs' expectations on the logarithm of the lagged CAPE and confirm the visual evidence. One-year equity premium expectations are negatively correlated with the CAPE (the coefficient estimate is -2.09), whereas the coefficient estimate on the CAPE is statistically zero for the ten-year expectations.

Greenwood and Shleifer (2014) document *procyclical* one-year return expectations for the same survey. How can the results be so different? The reason seems to be their focus on nominal equity return expectations. Specification (3) has nominal one-year equity return expectations as the dependent variable and the coefficient estimate on the log CAPE is significantly positive. This specification is similar to specification (9) in Table 3 of Greenwood and Shleifer (2014). Using a slightly different sample period and specification, their coefficient estimate on the valuation ratio (the price-dividend ratio in their case) of 3.40 is close to our estimate of 3.47. Specification (4) shows the same pattern for CFOs' nominal ten-year equity return expectations.[19]

Of course, procyclical interest rates drive some of the results in Table 7. That is, Treasury yields are low in recessions and high in expansions, contributing to variation in equity premia. Table 7 implies that, for instance, in recessions Treasury yields move more than do CFOs' one-year subjective nominal equity return expectations: as valuations decline, CFOs' nominal equity return expectations decline in specification (3), but Treasury yields decline

[19] Nagel and Xu (2021) report a -0.47 coefficient estimate when regressing CFOs' one-year equity premium expectations on a log repurchase-adjusted dividend-price ratio. Since their independent variable is the dividend-price ratio as opposed to the price-dividend ratio, the coefficient estimate has the opposite sign relative to a regression using realized returns. Why are our results different? The dependent variable in this regression is the same, the sample period is essentially the same, so the difference must be due to the valuation ratio.

more, such that CFOs' equity premium expectations increase in specification (1). As we have mentioned before, we prefer to focus on equity premia. That Treasury yields drive variation in subjective equity premium expectations does not lead to a mismeasurement of subjective equity premium expectations as long as Treasury yields are in CFOs' information sets.

5.2 Professional forecasters

The bottom panel of Figure 4 plots the average equity premium expectation of professional forecasters. Similar to CFOs' expectations, professional forecasters' one-year equity premium expectations appear to be countercyclical, spiking enormously after the great financial crisis. This time, however, variation in Treasury yields can hardly explain the observed countercyclicality: one-year equity premium expectations of above 30% after the financial crisis are too large to be explained by declining Treasury yields alone. As with CFOs, there is no obvious correlation between the ten-year equity premium expectations of professional forecasters and the CAPE.

Table 8 shows regressions of professional forecasters' expectations on the log lagged CAPE. In contrast to CFOs' expectations, for the professional forecasters we have access to the underlying panel of forecasts. We include forecaster fixed effects in these regressions to identify the coefficient estimates using time-series variation. Panel A of Table 8 confirms the visual evidence shown in the bottom panel of Figure 4. Both one-year equity premium and one-year nominal equity return expectations are countercyclical. In fact, professional forecasters' one-year equity premium expectations appear *too* countercyclical relative to the (long-term) objective benchmark introduced earlier. Panel B of Table 8 shows the results for professional forecasters' ten-year expectations. The coefficient estimates on the CAPE are statistically zero in all specifications, consistent with the bottom panel of Figure 4.

Using the same Livingston survey, De la O and Myers (2021) document a zero correlation between the one-year equity return expectations of professional forecasters and the price-dividend and price-earnings ratio. How can the results be so different? Apart from differences in the sample period, the exact construction of the valuation ratio seems to matter as is evident from the discussion in Hillenbrand and McCarthy (2021) and their Figure B.5.[20] If anything, this discussion highlights again that it is challenging to model expected returns, for investors and researchers alike. One would not want to conclude that subjective expectations do not appear countercyclical, simply because the valuation ratio is misspecified and not used in practice. The CAPE is readily available from Shiller's website and a widely accepted measure of equity valuations. From the bottom panel of Figure 4 it is obvious that professional forecasters' one-year equity premium expectations are countercyclical in the sense that they co-vary negatively with the CAPE.

What to conclude? Both CFOs' and professional forecasters' one-year equity premium expectations co-vary negatively with the CAPE, but their ten-year expectations do not. Thus, one conclusion is that asset managers' return expectations are the only expectations in consideration that consistently co-vary negatively with the CAPE. Another conclusion is that our focus on equity premium expectations and the CAPE as opposed to nominal equity return expectations and other predictors leads us to find no evidence that subjective expectations co-vary positively with equity valuation ratios, a result that was emphasized in previous work.

6 Conclusion

Understanding the expectations and portfolios of the largest investors is central to understanding asset prices (see, e.g., Heyerdahl-Larsen and Illeditsch, 2021). Among the largest

[20] De la O and Myers (2021) use a sample from 1952 to 2016. We use a sample from 1990 to 2020. The survey was conducted differently before 1990. The Philadelphia Fed no longer maintains the series before 1990 and "advises researchers to use these series with caution." Nagel and Xu (2021) report a 1.01 coefficient estimate on their log repurchase-adjusted dividend-price ratio using the sample since 1952. Note that their left-hand-side variable is constructed slightly differently, as they scale the S&P 500 forecast by the "zero-month" forecast, whereas we scale by the actual S&P 500 level on the day the forecast was made.

investors in today's financial markets are professional asset management firms.

Large asset managers' expectations, in contrast to the commonly studied subjective expectations of retail investors, are countercyclical: they are high when equity valuations are low and low when valuations are high, consistent with the relationship between realized equity returns and valuations. Moreover, asset managers' expectations are reflected in their portfolios: managers with larger US equity premium expectations manage funds that invest significantly more in US equities. Thus, asset managers' expectations and portfolios are generally consistent with standard rational expectations asset pricing models that generate countercylical equity risk premia as well as with standard portfolio choice models.

Beyond the scope of this paper is a theory that reconciles the wealth-weighted expectations and portfolios of different types of investors to assess whose marginal expectations are reflected in equity prices. Perhaps such a theory could extend the work of Koijen and Yogo (2019) to incorporate subjective expectations. Central components could be retail investors' expectations and how retail investors allocate money to asset managers, asset managers' investment mandates and incentives, and the sensitivity of expectations to portfolios. Developing a theory that incorporates expectations and portfolio holdings from an array of different types of retail and institutional investors appears to be a promising area for future research.

A Data appendix

A.1 Capital market assumptions

Grouping expectations into asset classes Asset managers use different names and indices to refer to the asset classes they forecast. We group asset managers' return expectations into the following asset classes: US all-cap equities, US large-cap equities, international developed markets equities, emerging markets equities, US cash, and US inflation.

We initially make a distinction between US all-cap equities (e.g., the Russell 3000 Index) and US large-cap equities (e.g., the S&P 500 or the Russell 1000 Index) as some asset managers forecast both. However, the vast majority forecast only one of the two, so that in our analysis we combine the two asset classes and simply refer to them as "US equities." When managers forecast both, we take the forecast for US large-cap equities. The typical indices for international developed markets equities and emerging markets equities are the MSCI EAFE Index and the MSCI Emerging Markets Index. US cash typically stands for the three-month Treasury bill.

Geometric versus arithmetic average returns We assume that returns are stated as geometric averages as opposed to arithmetic averages unless otherwise specified. Two managers provide expectations expressed only as arithmetic averages, but these managers also provide volatility forecasts. We convert arithmetic averages to geometric averages assuming returns are lognormally distributed. In that case, the geometric mean is the arithmetic mean less half of the squared volatility forecast.

Real versus nominal returns We assume that returns are stated in nominal terms unless otherwise specified. Two managers (AQR and GMO) provide only real return forecasts, but most of the time also provide an inflation forecast. We construct implied nominal equity return forecasts by adding expected inflation to the expected real return. Sometimes the forecast for inflation is stated over a different horizon from the forecast for, say, US equities. We still subtract the inflation forecast in such cases, implicitly assuming that the term structure of inflation expectations is flat.

US dollar versus other currencies We assume that expectations are stated in US dollars (USD) unless otherwise specified. When expectations are stated in multiple currencies, we collect the USD expectations.

Dates If no exact date for the report and only a year-month is specified, we use the last day of the previous month as the data date. If no exact date for the report and only a year is specified, we use the last day of December of the previous year as the data date.

Forecast horizons We convert expectations stated for a horizon range to a number using the midpoint of the range. One asset manager stated a forecast for a "10+"-year horizon, which we take to mean exactly ten years.

Vanguard Vanguard reports a range between two values. We take the average of these two values to obtain a point estimate.

A.2 Portfolio data

Acquisitions We identify asset managers in Morningstar using Morningstar's *Branding-Name* variable. There is no time series available for this variable; only the latest value is stored in the Morningstar data. Sometimes, one asset manager acquires another asset manager. We manually identify three acquisitions in the sample: the acquisition of One Group by J.P. Morgan in July 2004, the acquisition of Pioneer by Amundi, which was completed by 2018, and the acquisition of Legg Mason by Franklin Templeton in July 2020. In such cases, going forward only the acquirer's *BrandingName* is stored in Morningstar for both the acquirer's and the target's funds. To avoid assigning the wrong expectations to the target manager's funds before the acquisition date, we manually correct the target manager funds' *BrandingName* before the acquisition date.

Index funds and exchange-traded funds We drop index funds identified by the *Index-Fund* variable. We also drop any exchange-traded fund, which we identify by searching for the string "ETF" in a fund's name.

Target-date funds and tactical allocation funds We identify a target-date fund by searching for the string "Target-Date" in a fund's *MorningstarCategory.* Funds' assignments to categories may change over time and we generally work with the version of the category variable that has a time series available, but fill in the latest value if the fund is in existence and the historical category assignment is missing.

We identify a tactical allocation fund whenever it belongs to the *MorningstarCategory* US Fund Tactical Allocation. As the *MorningstarCategory* varies over time, so does our dummy variable for whether a fund is a tactical allocation fund or not.

Data errors We drop one observation for which the share invested in U.S. equities is 750%, which we assume to be a data error.

A.3 List of asset managers and sample composition

Table A1 lists the asset managers in our sample and decomposes the number of observations in our main regressions by asset manager.

Columns (1) and (2) refer to specifications (1) and (2) of Table 2. These specifications relate asset managers' US equity premium expectations to the CAPE. The number of observations per asset manager in specification (1) is determined by i) the first date a manager started publishing expectations, ii) the frequency with which these expectations are published), and iii) whether for a given date the asset manager provides expectations over several horizons (a term structure).

To understand these components, we consider three examples. First, GMO started publishing expectations as early as 2005 on a quarterly basis (at least we think their reports could have been published quarterly initially). Since 2005, around 64 quarters have passed, so we are likely missing around 17 reports. In particular, we are missing most reports before 2008.

Second, J.P. Morgan started publishing capital market assumptions in 1997. We have access to the complete time series since 1997, but in column (1) J.P. Morgan contributes only 24 observations as J.P. Morgan provides expectations only once a year.

Third, following correspondence BlackRock told us that they started publishing capital market assumptions only in 2018.[21] Nonetheless, in column (1) they contribute a relatively large number of 78 observations as BlackRock publishes expectations quarterly and over several horizons for a given quarter.

In Column (2), the sample is restricted to one equity premium forecast per asset manager per date. By comparing Columns (1) and (2) it is apparent which managers provide a term structure of expectations.

Columns (3) and (4) refer to specifications (2) and (3) in Table 4. The number of observations per asset manager in column (3) is determined by i) the first date a manager started publishing capital market assumptions, ii) the number of allocation funds a manager

[21] We did find one capital market assumptions report from the BlackRock Investment Institute from 2016, which we include in the sample.

manages, iii) how long these funds exist, iv) whether these funds report their holdings only quarterly or every month, and v) how frequent an asset manager reports their expectations (e.g., quarterly versus annually).

In Column (4) the sample is restricted to observations for which expectations on international developed and emerging market equities are available. By comparing Columns (3) and (4) of Table A1 it is apparent which managers do not provide both international developed and emerging markets equity forecasts. The managers who do not provide these additional forecasts often provide some other forecasts of international equities. For instance, DWS forecasts emerging markets equity returns, but then provides separate forecasts for different countries/regions in the MSCI EAFE Index (e.g., Europe, the United Kingdom, and Japan) as opposed to forecasting the MSCI EAFE Index itself. We believe that these forecasts are potentially too different from the other forecasts stated for international developed equities (as proxied by the MSCI EAFE Index) and emerging markets equities (as proxied by the MSCI Emerging Markets Index), so we implicitly drop them.

Table A1: List of asset managers

Asset manager	Number of observations (1)	(2)	(3)	(4)	(5)
Amundi	37	13	152	0	2.89
AQR	9	9	71	47	0.19
BlackRock	78	11	263	171	53.41
BMO	3	3	60	60	0.69
BNY Mellon	5	5	68	68	4.45
Columbia Threadneedle	2	2	106	106	25.45
DWS	8	8	148	0	4.29
Franklin Templeton	5	5	214	49	101.04
GMO	47	47	276	276	15.92
Graystone Consulting / Morgan Stanley	7	5	21	9	0.55
Invesco	10	10	202	202	26.99
J.P. Morgan	24	24	558	558	39.39
Morningstar	16	16	50	50	0.50
Northern Trust	10	10	16	0	0.13
PIMCO	3	3	19	19	23.66
Pioneer Investments	6	2	48	0	0.00
StateStreet	65	19	82	68	0.21
T. Rowe Price	3	3	48	0	69.48
UBS	3	3	8	8	0.53
Vanguard	6	6	160	0	345.66
Voya	6	6	372	372	18.48
Wells Fargo Investment Institute	3	3	141	141	9.46
Total	356	213	3083	2204	743.39

The table lists the asset managers in the sample and decomposes the number of observations in key regressions by asset manager. Column (1) refers to specification (1) in Table 2. Column (2) refers to specification (2) in Table 2. Column (3) refers to specification (2) in Panel A of Table 4. Column (4) refers to specification (1) in Panel A of Table 4. Column (5) shows the 2021 assets under management (AUM) for funds in the sample in column (3) in billions of USD. BMO refers to Bank of Montreal Global Asset Management, GMO to Grantham, Mayo, & van Otterloo, and PIMCO to Pacific Investment Management Company.

B Derivation of return identity

This appendix derives the accounting identity (2) in the main text; see also Ferreira and Santa-Clara (2011) and Rangvid (2017) for similar derivations and the use of the identity to forecast equity returns. While in the main text we focus on earnings as the fundamental, the decomposition holds for any fundamental.

Let R_{t+1} denote the simple return between dates t and $t+1$. Consider the gross return:

$$\begin{aligned} 1 + R_{t+1} &= \frac{P_{t+1} + D_{t+1}}{P_t} \\ &= \frac{D_{t+1}}{P_t} + \frac{P_{t+1}}{P_t}, \end{aligned}$$

where P_t is the price at date t and D_t is the dividend at date t. Note that the gross return is decomposed into an income component and a capital gain component.

Let F_t denote a fundamental (e.g., dividends, earnings, or GDP). Rewrite the gross return:

$$\begin{aligned} 1 + R_{t+1} &= \frac{D_{t+1}}{P_{t+1}} \frac{P_{t+1}}{P_t} + \frac{P_{t+1}}{P_t} \\ &= (1 + D_{t+1}/P_{t+1}) \frac{P_{t+1}}{P_t} \\ &= (1 + D_{t+1}/P_{t+1}) \frac{P_{t+1}}{P_t} \frac{F_{t+1}/F_{t+1}}{F_t/F_t} \\ &= (1 + D_{t+1}/P_{t+1}) \frac{P_{t+1}/F_{t+1}}{P_t/F_t} \frac{F_{t+1}}{F_t}. \end{aligned}$$

Taking logs yields:

$$r_{t+1} = dp_{t+1} + \Delta pf_{t+1} + \Delta f_{t+1},$$

where $r_{t+1} = \ln(1+R_{t+1})$, $dp_{t+1} = \ln(1+D_{t+1}/P_{t+1})$, $\Delta pf_{t+1} = \ln(P_{t+1}/F_{t+1}) - \ln(P_t/F_t)$, and $\Delta f_{t+1} = \ln(F_{t+1}) - \ln(F_t)$. Hence, the log return can be decomposed into three terms: 1. the log of one plus next date's dividend-price ratio; 2. the log change in the price-fundamental ratio; and 3. the log change in the fundamentals. Similarly, the expected log return can be decomposed into the expectations of the three terms.

Finally, note that (2) in the main text is shown for earnings as the fundamental.

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Table 1: Summary statistics

	N	Mean	Median	SD	Min	Max
Panel A: US equity premium (over yield)						
All horizons	360	3.10	3.86	2.76	−6.49	11.54
<10-year horizon	181	2.36	3.43	3.41	−6.49	11.54
≥10-year horizon	179	3.84	4.13	1.58	−1.20	7.43
Panel B: US equity return (nominal level)						
All horizons	383	5.12	5.69	2.64	−5.10	11.80
<10-year horizon	181	3.96	5.08	3.09	−5.10	11.80
≥10-year horizon	202	6.16	6.53	1.55	−0.10	9.30
Panel C: US equity premium (over cash)						
All horizons	343	3.11	3.90	2.83	−6.50	11.50
<10-year horizon	164	2.18	3.21	3.61	−6.50	11.50
≥10-year horizon	179	3.97	4.40	1.39	−0.70	6.25
Panel D: DM equity premium (over yield)						
All horizons	234	3.81	4.00	2.21	−1.49	9.24
<10-year horizon	111	3.10	3.25	2.56	−1.49	9.24
≥10-year horizon	123	4.46	4.57	1.58	0.23	8.80
Panel E: EM equity premium (over yield)						
All horizons	318	5.35	5.56	1.95	−1.53	13.24
<10-year horizon	168	5.14	5.30	2.17	−1.53	13.24
≥10-year horizon	150	5.58	5.72	1.65	1.69	13.13
Panel F: Equity shares						
US equity share	3101	34.38	32.48	18.71	−16.22	99.73
Non-US equity share	3101	18.55	16.59	13.27	−22.95	99.49

The table shows number of observations and summary statistics (mean, median, standard deviation, minimum, and maximum) for asset managers' expectations of US equity premium (over a matched yield), US equity return (nominal level), US equity return over the subjective return on cash over the same horizon, developed markets equity premium (DM, over a matched yield), and emerging markets equity premium (EM, over a matched yield). The table also shows the shares invested in US equities and non-US equities for asset managers' allocation funds. The statistics are expressed in % per year.

Table 2: Subjective equity return expectations and CAPE

	Equity premium (over yield)		Equity return (nominal level)	Equity premium (over cash)
	All horizons	Closest to 10 years		
	(1)	(2)	(3)	(4)
Panel A: CAPE				
ln(CAPE)	-6.128^{***}	-6.770^{***}	-4.831^{*}	-5.372^{*}
	(2.045)	(2.367)	(2.377)	(2.639)
N	356	213	379	338
Adjusted R^2	0.780	0.869	0.810	0.780
Manager×Horizon FE	Yes	Yes	Yes	Yes
Panel B: CAPE, past return, and risk-free rate				
ln(CAPE)	-5.309^{**}	-6.237^{**}	-5.309^{**}	-5.546^{*}
	(2.521)	(2.736)	(2.521)	(2.964)
Past 12-month return	−0.001	−0.007	−0.001	0.011
	(0.008)	(0.007)	(0.008)	(0.010)
Risk-free rate	-0.694^{***}	-0.472^{***}	0.306	-0.437^{*}
	(0.196)	(0.161)	(0.196)	(0.241)
N	356	213	356	315
Adjusted R^2	0.825	0.886	0.811	0.797
Manager×Horizon FE	Yes	Yes	Yes	Yes

The table shows panel regressions of asset managers' US equity return expectations on the logarithm of the cyclically adjusted price-earnings ratio (CAPE). Panel A shows regressions with the CAPE only; Panel B shows regressions with the CAPE, the past twelve-month return of the S&P 500 index, and the matched yield as the risk-free rate. Specifications (1) and (2) are for equity premia over yield (nominal equity forecast minus a matched nominal yield), specification (3) for the nominal level of equity returns, and specification (4) for equity premia over cash (nominal equity forecast minus nominal cash forecast over the same horizon). Specification (1) includes equity premium expectations for all horizons; specification (2) includes, for a given date, only one equity premium expectation per asset manager (the one closest to a horizon of 10 years). All specifications include a manager-times-horizon fixed effect, but the fixed-effect coefficients are not reported. Standard errors (in parentheses) are clustered by year-month and manager. *, **, and *** denote 10%, 5%, and 1% significance levels, respectively, for the null hypothesis of a zero coefficient. N refers to the total number of observations.

Table 3: Subjective and objective equity return expectations

	Equity premium	
	(1)	(2)
Valuation-based equity premium	1.069***	
	(0.222)	
Regression-based equity premium		1.117***
		(0.391)
N	207	213
Adjusted R^2	0.853	0.869
Manager×Horizon FE	Yes	Yes

The table shows panel regressions of asset managers' US equity premium expectations (nominal equity forecast minus a matched nominal yield) on measures of objective equity premium expectations. Specification (1) uses a valuation-based measure of objective equity premium expectations, constructed as $\mu = \ln(1 + 1/\text{CAPE}) - \ln(1 + r)$ where r is the real ten-year Treasury yield. Specification (2) uses fitted values from specification (1) in Table B1 in the Internet Appendix. The specification in the Internet Appendix regresses realized ten-year excess returns on the log CAPE using data from 1871 to 2021. All specifications include a manager-times-date fixed effect, but the fixed-effect coefficients are not reported. Standard errors (in parentheses) are clustered by year-month and manager. *, **, and *** denote 10%, 5%, and 1% significance levels, respectively, for the null hypothesis of a zero coefficient. N refers to the total number of observations.

Table 4: US equity share and subjective equity return expectations

	US equity share		
	(1)	(2)	(3)
US expectations	2.046***	4.054***	2.276***
	(0.286)	(0.307)	(0.253)
DM expectations		−4.925***	
		(1.279)	
EM expectations		2.045*	
		(0.996)	
N	3083	2204	2204
Adjusted R^2	0.075	0.139	0.095
Year-month FE	Yes	Yes	Yes

The table shows panel regressions of the US equity shares of asset managers' allocation funds on US, developed markets (DM), and emerging markets (EM) equity return expectations. Return expectations are equity premia (nominal equity forecast minus a matched nominal yield). All specifications include a year-month fixed effect. Standard errors (in parentheses) are clustered by year-month and manager. *, **, and *** denote 10%, 5%, and 1% significance levels, respectively, for the null hypothesis of a zero coefficient. N refers to the total number of observations.

Table 5: US equity share and subjective equity return expectations (fund fixed effect)

	US equity share		
	(1)	(2)	(3)
US expectations	1.097**	2.166***	1.799***
	(0.468)	(0.632)	(0.349)
DM expectations		−0.733	
		(0.585)	
EM expectations		0.268	
		(0.420)	
N	3080	2202	2202
Adjusted R^2	0.888	0.892	0.892
Fund FE	Yes	Yes	Yes
Year-month FE	Yes	Yes	Yes

The table shows panel regressions of the US equity shares of asset managers' allocation funds on US, developed markets (DM), and emerging markets (EM) equity return expectations. Return expectations are equity premia (nominal equity forecast minus a matched nominal yield). All specifications include a fund fixed effect and a year-month fixed effect. Standard errors (in parentheses) are clustered by year-month and manager. *, **, and *** denote 10%, 5%, and 1% significance levels, respectively, for the null hypothesis of a zero coefficient. N refers to the total number of observations.

Table 6: US equity share and subjective equity return expectations with tactical funds

	US equity share	
	(1)	(2)
US expectations	3.891***	1.776**
	(0.209)	(0.652)
Tactical fund	−51.742***	−24.489*
	(8.761)	(12.772)
US expectations×Tactical fund	5.796***	5.866***
	(1.881)	(1.862)
DM expectations	−3.427***	−0.441
	(0.480)	(0.568)
EM expectations	1.073*	0.111
	(0.513)	(0.409)
N	2204	2202
Adjusted R^2	0.213	0.895
Fund FE	No	Yes
Year-month FE	Yes	Yes

The table shows panel regressions of US equity shares of asset managers' allocation funds on US, developed markets (DM), and emerging markets (EM) equity return expectations, allowing for specific sensitivity to tactical funds. Returns expectations are equity premia (nominal equity forecast minus a matched nominal yield). The variable "Tactical fund" is a dummy variable that takes a value of one if the equity share is for a tactical allocation fund. The specifications include the tactical fund dummy itself as well as interacted with the US equity return expectations. The specifications allow for a year-month fixed effect. Specification (2) also includes a fund fixed effect. Standard errors (in parentheses) are clustered by year-month and manager. *, **, and *** denote 10%, 5%, and 1% significance levels, respectively, for the null hypothesis of a zero coefficient. N refers to the total number of observations.

Table 7: CFOs' expectations and CAPE

	Equity premium (1)	Equity return (2)
Panel A: 1-year horizon		
ln(CAPE)	-2.089^{**}	3.468^{***}
	(0.976)	(0.875)
Constant	10.525^{***}	-5.603^{*}
	(3.169)	(5.891)
N	75	75
Adjusted R^2	0.208	0.277
Panel B: 10-year horizon		
ln(CAPE)	0.506	3.014^{**}
	(0.548)	(1.488)
Constant	2.006	−2.658
	(1.783)	(4.766)
N	75	75
Adjusted R^2	0.043	0.017

The table shows time-series regressions of chief financial officers' (CFOs') US equity return expectations on the logarithm of the cyclically adjusted price-earnings ratio (CAPE). Specifications (1) and (3) are for one-year horizons; specifications (2) and (4) are for ten-year horizons. Specifications (1) and (2) are for equity premia (equity return minus either a one- or ten-year yield); specifications (3) and (4) are for equity returns. Standard errors (in parentheses) are Newey and West (1987) standard errors with four lags. *, **, and *** denote 10%, 5%, and 1% significance levels, respectively, for the null hypothesis of a zero coefficient. N refers to the total number of observations.

Table 8: Professional forecasters' expectations and CAPE

	Equity premium (1)	Equity return (2)
Panel A: 1-year horizon		
ln(CAPE)	-13.561^{***}	-11.027^{***}
	(4.666)	(4.487)
N	1318	1318
Adjusted R^2	0.295	0.246
Forecaster FE	Yes	Yes
Panel B: 10-year horizon		
ln(CAPE)	-0.495	0.377
	(0.503)	(0.579)
N	681	681
Adjusted R^2	0.232	0.284
Forecaster FE	Yes	Yes

The table shows panel regressions of professional forecasters' US equity return expectations on the logarithm of the cyclically adjusted price-earnings ratio (CAPE). Panel A shows expectations over one-year horizons; Panel B shows expectations over ten-year horizons. Specification (1) is for equity premia (equity return minus either a one- or ten-year yield); specification (2) is for equity returns. All specifications include a forecaster fixed effect but the fixed-effect coefficients are not reported. Standard errors (in parentheses) in Panel A are clustered by semi-year and forecaster, and in Panel B by year and forecaster. *, **, and *** denote 10%, 5%, and 1% significance levels, respectively, for the null hypothesis of a zero coefficient. N refers to the total number of observations.

Figure 1: Equity premium expectations

The figure shows ten-year US equity premium expectations for six asset managers (red filled circles) and, matched by date, Martin's (2017) one-year lower bound of the equity premium (green filled squares). The six asset managers are Amundi, BlackRock, J.P. Morgan, Morningstar, Northern Trust, and State Street.

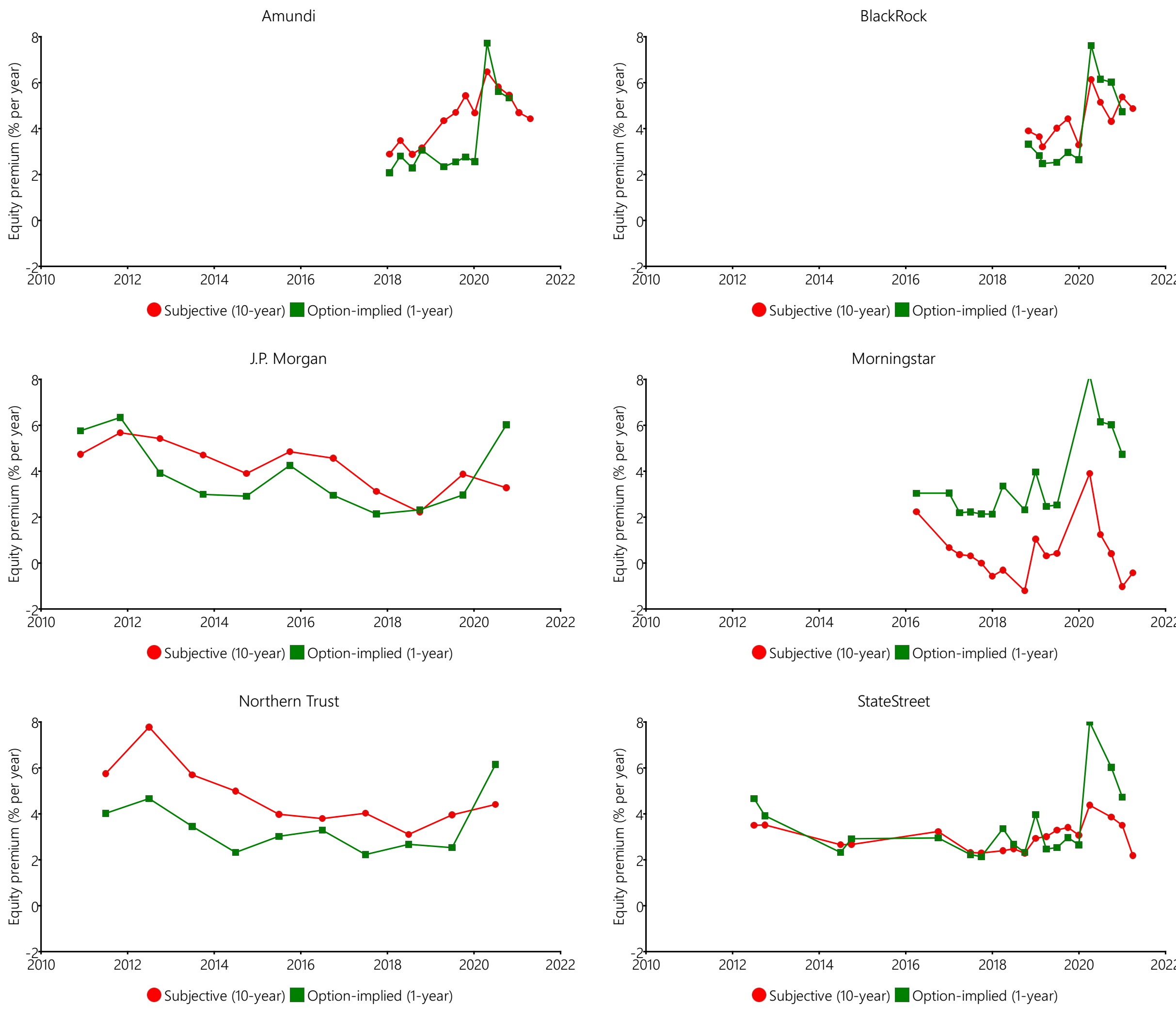


Figure 2: Fitted US equity return expectations against forecast horizons
The figure shows fitted lines of US equity premium expectations over horizons based on estimates in specification (3) of Table C1. The blue solid line with filled squares and the red solid line with filled diamonds are conditional on a cyclically adjusted price-earnings ratio (CAPE) of 22 and 34, respectively.

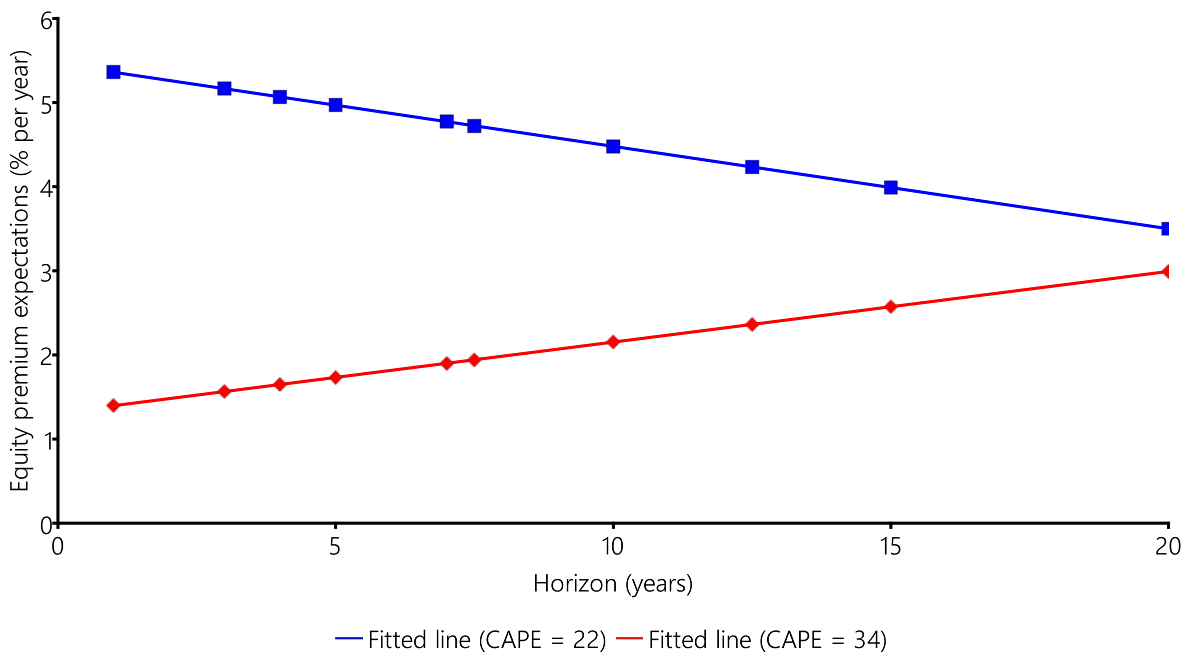


Figure 3: US equity shares and equity return expectations
The figure shows a conditional binscatter plot of US equity shares (the fraction of US equity in a fund's portfolio) and asset managers' US equity premium expectations, conditional on year-month fixed effects and developed as well as emerging market equity premium expectations (the controls). Before binning and plotting, we compute residuals from a regression of US equity shares and US equity premium expectations on the fixed effects and the controls. We add back the sample means of the US equity share and the US equity premium expectation. We then group the residualized US equity shares and US equity premium expectations into 18 equal-sized bins, compute the mean within each bin, and create a scatterplot of the resulting data points.

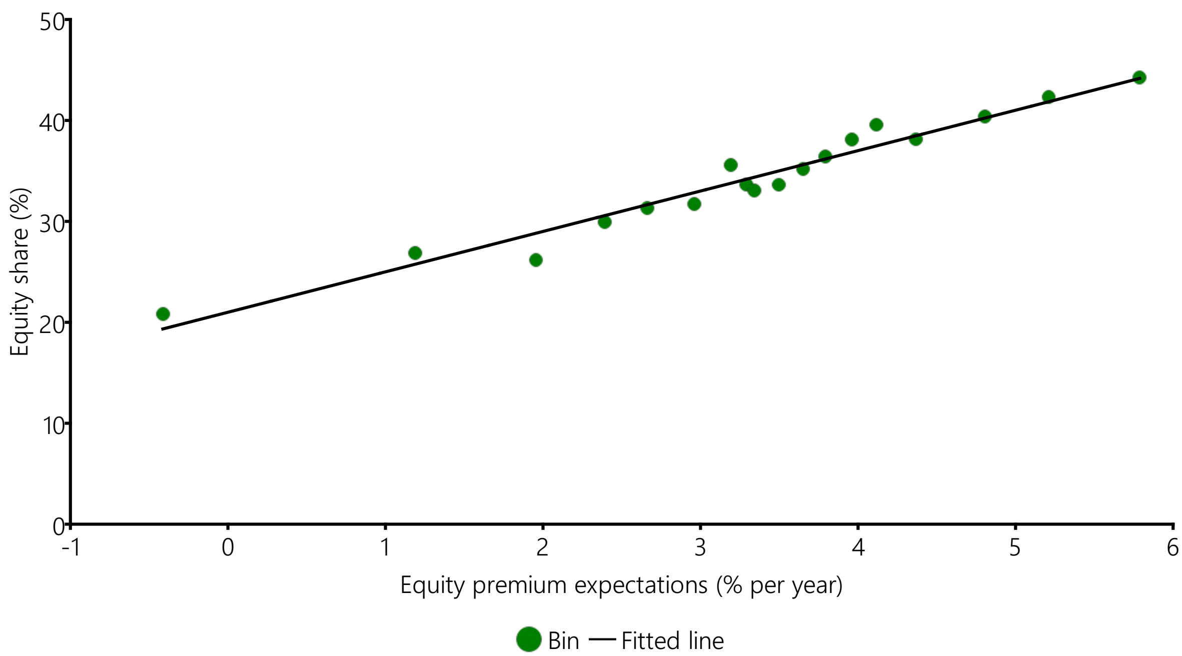
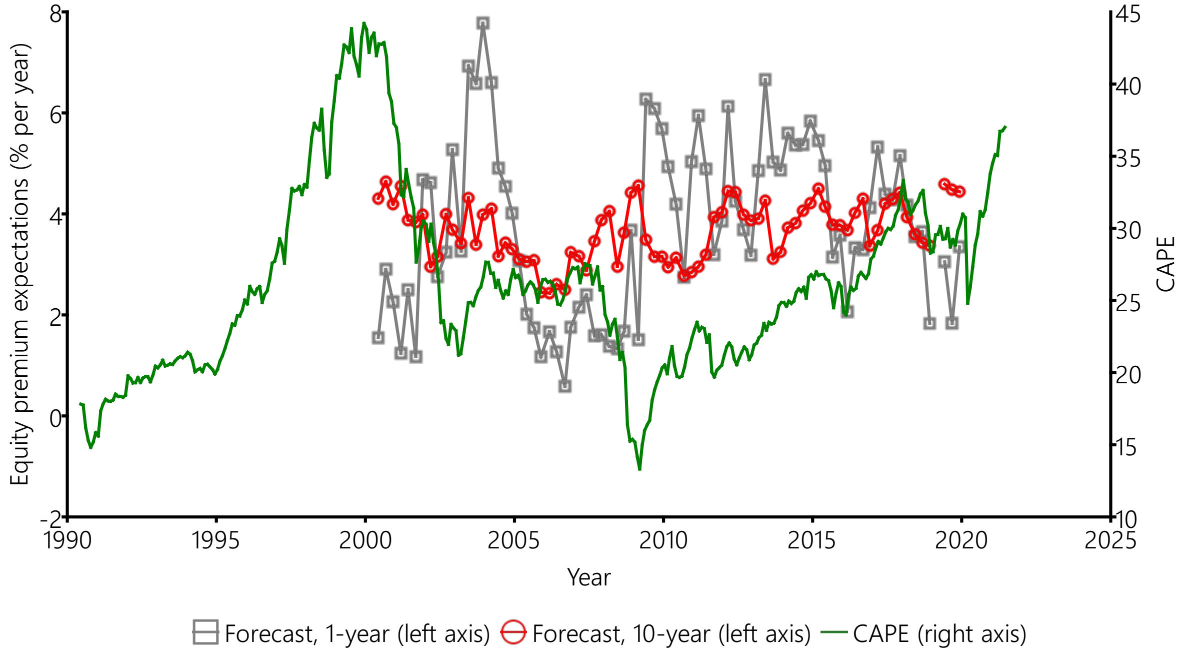
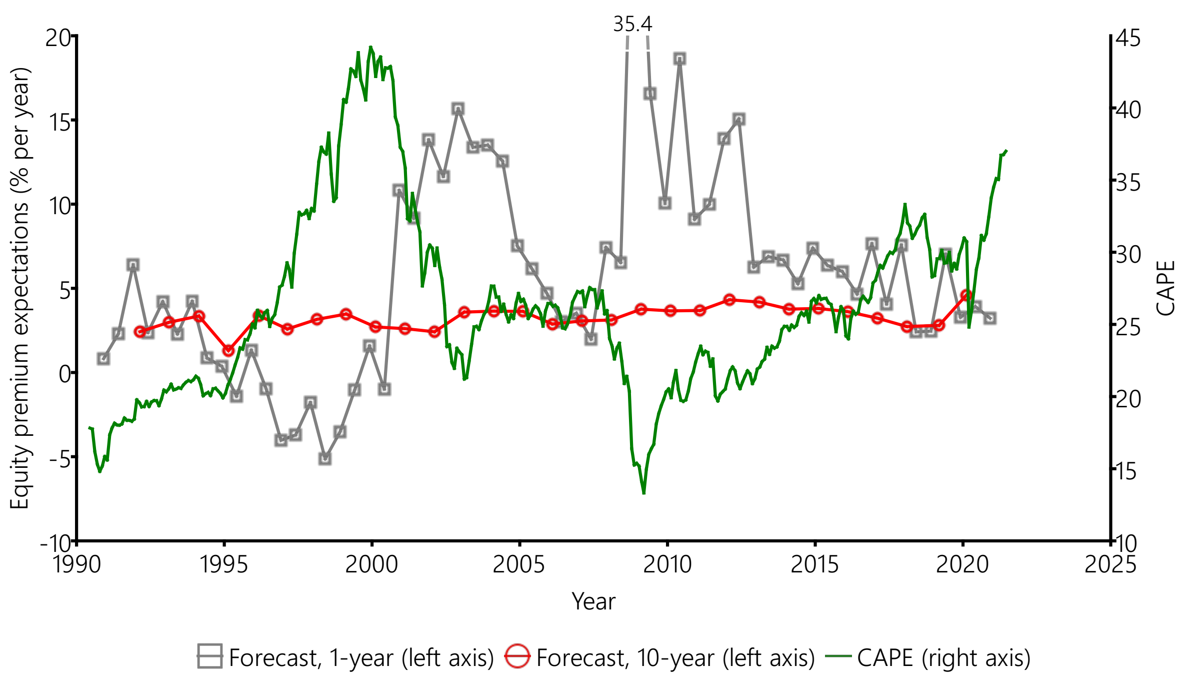


Figure 4: CFOs' and professional forecasters' expectations and CAPE
The top panel shows chief financial officers' (CFOs') average one- and ten-year US equity premium expectations (red circles and grey squares; left axis) and Shiller's cyclically adjusted price-earnings ratio (CAPE; solid blue line; right axis). The bottom panel shows the average one- and ten-year US equity premium expectations of professional forecasters (red circles and grey squares; left axis) and the CAPE (solid green line; right axis). The sample period for CFOs' expectations is from Q2:2000 to Q4:2018. The sample period for professional forecasters' expectations is from Q4:1990 to Q4:2020. One observation (35.4 for one-year professional forecasters) is outside the plotted ranges.





Internet Appendix for

"Equity Return Expectations and Portfolios: Evidence from Large Asset Managers"

Magnus Dahlquist and Markus Ibert

June 2022

A Capital market assumptions from additional providers

Table A1 shows regressions of equity return expectations on the log CAPE when capital market assumptions from additional providers are included in the sample. These additional providers, however, do not manage any US allocation mutual funds, so we cannot easily link their expectations to their portfolios. Nonetheless, their impact on portfolios may be large, as many of the additional providers are also asset managers or investment consultants. For instance, the sample includes Schroders (asset manager) and the top five general investment consultants (AonHewitt, Callan, Verus, RVKuhns, and NEPC) that are often hired by public pension funds (see Andonov and Rauh, 2020).

Table A1: Subjective equity return expectations and CAPE (all providers)

	Equity premium (over yield)		Equity return (nominal level)	Equity premium (over cash)
	All horizons	Closest to 10 years		
	(1)	(2)	(3)	(4)
Panel A: CAPE				
ln(CAPE)	-5.537^{***}	-5.921^{***}	-4.461^{**}	-5.075^{**}
	(1.672)	(1.849)	(1.830)	(2.187)
N	521	367	544	463
Adjusted R^2	0.783	0.858	0.829	0.790
Provider×Horizon FE	Yes	Yes	Yes	Yes
Panel B: CAPE, past return, and risk-free rate				
ln(CAPE)	-4.660^{**}	-5.271^{**}	-4.660^{**}	-5.017^{**}
	(1.926)	(2.095)	(1.926)	(2.397)
Past 12-month return	−0.004	−0.010	−0.004	0.007
	(0.007)	(0.005)	(0.007)	(0.008)
Risk-free rate	-0.751^{***}	-0.608^{***}	0.249	-0.429^{*}
	(0.149)	(0.138)	(0.149)	(0.189)
N	521	367	521	440
Adjusted R^2	0.843	0.895	0.831	0.807
Provider×Horizon FE	Yes	Yes	Yes	Yes

The table shows panel regressions similar to those of Table 2 in the main text, but expanded to all providers of return expectations. See the caption of Table 2 for more detailed information.

B Predictability regressions

Table B1 shows regressions of realized equity premia on the log CAPE. Specification (1), analogous to our baseline specifications in the main text, uses the realized ten-year equity return minus the ten-year US Treasury yield as the dependent variable. In contrast, specification (2) uses the the ten-year equity return minus the cumulative return of one-month returns on a constant-maturity ten-year US treasury bond. The standard errors allow for serial correlation up to 120 lags, as in Hansen and Hodrick (1980). These standard errors are larger than Newey and West's (1987) standard errors with 120 lags.

The coefficient estimates on the log CAPE are negative, as has been shown in previous work. The magnitudes of the coefficient estimates are close to the magnitudes of the coefficient estimates in the main text when we regress expectations of excess returns on the log CAPE.

Table B1: Predictability regressions

	Excess return (over yield)	Excess return (over bond return)
	(1)	(2)
ln(CAPE)	-6.059^{***}	-5.966^{***}
	(1.520)	(1.922)
Constant	20.905^{***}	20.661^{***}
	(4.281)	(6.226)
N	1572	1572
Adjusted R^2	0.229	0.218

The table shows predictability regressions of 10-year excess returns on the cyclically adjusted price-earnings ratio (CAPE). In specification (1), the excess return is the ten-year equity return minus the yield on a long-term bond; in specification (2), the excess return is the ten-year equity return minus the cumulative return of one-month returns on a long-term bond. Standard errors (in parentheses) allow for serial correlation up to 120 lags as in Hansen and Hodrick (1980), as well as for heteroskedasticity. *, **, and *** denote 10%, 5%, and 1% significance levels, respectively, for the null hypothesis of a zero coefficient. N refers to the total number of observations. The sample period is January 1871 to December 2021.

C Term structure of equity premium expectations

Table C1 shows regressions asset managers' US equity premium expectations on the forecast horizon as well as interactions of the forecast horizon with the CAPE. Specifications (1) and (2) show that the term structure of equity premium expectations is flat on average. In specification (2), the effect is entirely identified from those managers that provide a term structure of expectations on a given date. Specification (3) shows that the term structure of equity premium expectations is procyclical.

Table C1: Equity return expectations, price-earnings ratio, and forecast horizon

	Equity premium		
	(1)	(2)	(3)
Horizon	0.015	0.003	-1.390^{***}
	(0.028)	(0.038)	(0.412)
ln(CAPE)			-9.525^{***}
			(2.961)
ln(CAPE)×Horizon			0.418^{***}
			(0.126)
N	360	191	360
Adjusted R^2	0.700	0.530	0.778
Manager FE	Yes	No	Yes
Manager×Date FE	No	Yes	No

The table shows panel regressions of asset managers' US equity premium expectations (nominal equity forecast minus a matched nominal yield) on the logarithm of the cyclically adjusted price-earnings ratio (CAPE) and the forecast horizon, and their interactions. Specifications (1) and (3) include a manager fixed effect; specification (2) includes a manager-times-date fixed effect. Fixed-effect coefficients are not reported. Standard errors (in parentheses) are clustered by year-month and manager. *, **, and *** denote 10%, 5%, and 1% significance levels, respectively, for the null hypothesis of a zero coefficient. N refers to the total number of observations.

D Additional regressions of portfolios on expectations

D.1 Averaging across funds

In our baseline analysis, asset managers with more allocation funds constitute a larger share of the total number of observations. Alternatively, we average an asset managers' share invested in US equities across funds for a given year-month. We first take an average weighted by a fund's assets under management (AUM). Then, asset managers that manage more funds do not constitute a larger share of the sample and the fund dimension of the panel is eliminated such that one observation is identified by asset manager and year-month. Table D1 estimates specifications with year-month fixed effects, and with and without asset manager fixed effects. We cluster standard errors by both year-month and asset manager. Clustering by only year-month yields significantly lower standard errors. The results are similar to those presented in the main text.

Table D2 presents similar results when we take an equal-weighted as opposed to a value-weighted average.

D.2 Substitution effects

When a fund invests more in US equities, some portfolio shares in other assets must be smaller: the money to finance a larger US equity share must come from somewhere. In this subsection, we decompose a fund's portfolio into a share invested in US equities, a share invested in non-US equities, a share invested in bonds, a share invested in cash, and a share invested in other assets such that[1]

$$100\% = \mathrm{US\,Equity}(\%) + \mathrm{NonUS\,Equity}(\%) + \mathrm{Bond}(\%) + \mathrm{Cash}(\%) + \mathrm{Other}(\%). \quad (1)$$

These variables again come directly from Morningstar. Table D3 shows regressions of these components on US equity and international equity premium expectations. The negative coefficient estimate on US equity premium expectations in specification (1) indicates that some of the money allocated to US equities in response to increased US equity premium expectations comes from money allocated to international equities. There is some evidence that funds of asset managers with larger US equity premium expectations also invest less in cash and other assets, but the coefficient estimates are not statistically different from zero.

[1] For the vast majority of funds, these shares add up to 100%; however, for a minority of funds they do not because of data errors.

Table D1: US equity share and equity return expectations (AUM weighted)

	US equity share		
	(1)	(2)	(3)
Panel A: Without manager fixed effects			
US expectations	2.267***	4.353***	2.768***
	(0.432)	(0.967)	(0.359)
DM expectations		−5.086*	
		(2.438)	
EM expectations		1.920	
		(1.604)	
N	441	272	272
Adjusted R^2	0.072	0.313	0.146
Manager FE	No	No	No
Year-month FE	Yes	Yes	Yes
Panel B: With manager fixed effects			
US expectations	2.083***	3.029***	2.127***
	(0.496)	(0.959)	(0.462)
DM expectations		−2.292**	
		(0.900)	
EM expectations		1.165*	
		(0.646)	
N	441	272	272
Adjusted R^2	0.761	0.788	0.783
Manager FE	Yes	Yes	Yes
Year-month FE	Yes	Yes	Yes

The table shows panel regressions similar to those of Table 4 in the main text and Table 5 in this appendix, but the fund dimension of the panel is eliminated by taking a weighted average by AUM of US equity shares across funds for a given manager-year-month. Accordingly, the specifications include asset manager fixed effects as opposed to fund fixed effects. A given asset manager typically manages multiple funds. See the caption of Table 4 for more detailed information.

Table D2: US equity share and equity return expectations (equally weighted)

	US equity share		
	(1)	(2)	(3)
Panel A: Without manager fixed effects			
US expectations	2.256***	3.566***	2.472***
	(0.312)	(0.489)	(0.287)
DM expectations		−4.567**	
		(1.623)	
EM expectations		2.593**	
		(1.192)	
N	441	272	272
Adjusted R^2	0.168	0.410	0.209
Manager FE	No	No	No
Year-month FE	Yes	Yes	Yes
Panel B: With manager fixed effects			
US expectations	1.554***	2.354***	1.892***
	(0.468)	(0.580)	(0.437)
DM expectations		−1.893**	
		(0.716)	
EM expectations		1.256**	
		(0.484)	
N	441	272	272
Adjusted R^2	0.739	0.759	0.752
Manager FE	Yes	Yes	Yes
Year-month FE	Yes	Yes	Yes

The table shows panel regressions similar to those of Table 4 in the main text and Table 5 in this appendix, but the fund dimension of the panel is eliminated by taking an equally weighted average of US equity shares across funds for a given manager-year-month. Accordingly, it includes asset manager fixed effects as opposed to fund fixed effects. A given asset manager typically manages multiple funds. See the caption of Table 4 for more detailed information.

Table D3: Other asset class shares and equity return expectations

	Non-US equity (1)	Bonds (2)	Cash (3)	Other (4)
US expectations	-3.539^{***}	0.450	-0.482	-0.367
	(0.720)	(1.091)	(0.572)	(0.246)
DM expectations	1.966	2.728	-0.665	0.953
	(1.531)	(3.309)	(2.880)	(1.152)
EM expectations	-0.181	-1.870	0.178	-0.301
	(1.164)	(2.942)	(2.772)	(0.910)
N	2204	2204	2204	2204
Adjusted R^2	0.224	0.033	0.072	0.120
Year-month FE	Yes	Yes	Yes	Yes

The table shows panel regressions of the non-US equity share, the bond share, the cash share, and the share invested in other assets of asset managers' allocation funds on US, developed markets (DM), and emerging markets (EM) equity return expectations. Return expectations are equity premia (nominal equity forecast minus a matched nominal yield). Standard errors (in parentheses) are clustered by year-month and manager. *, **, and *** denote 10%, 5%, and 1% significance levels, respectively, for the null hypothesis of a zero coefficient. N refers to the total number of observations.

E CFOs' and professional forecasters' one-year forecast errors

E.1 Data

Quarterly S&P 500 return expectations of CFOs are from a survey administered by John Graham and Campbell Harvey and date back to June 2000 (see, e.g., Ben-David, Graham, and Harvey, 2013). For a given survey date, the data made available to us contain averages and medians of one- and ten-year return expectations.

We obtain annual S&P 500 ten-year return expectations of professional forecasters since Q1:1992 from the Survey of Professional Forecasters (SPF) conducted by the Philadelphia Fed. The survey of ten-year S&P 500 return forecasts is conducted in the first quarter of each year and has 29–53 respondents each year. We obtain deadline dates for each survey wave from the Philadelphia Fed.

We obtain one-year forecasts for the level of the S&P 500 since Q4:1990 from the Livingston Survey, which is also administered by the Philadelphia Fed. The Livingston Survey contains the forecasts of economists from industry, government, banking, and academia. There are two caveats with the survey. First, the identities of the professional forecasters in the SPF and in the Livingston Survey are not the same. Second, the Livingston Survey only asks about the level of the S&P 500. Hence, the imputed S&P 500 return expectations, which we obtain by adding the expected dividend yield of the S&P 500 on a given survey date to the capital gain component, contain measurement error. We approximate the expected dividend yield on a given day as the sum of realized dividends over the last twelve months multiplied by realized average annual dividend growth of the S&P 500 from 1946–2020 (1.064, see Adam, Marcet, and Beutel, 2017) divided by the level of the index on that day.

E.2 Forecast errors

Table E1 shows regressions of CFOs' one-year forecast errors for the S&P 500 on a constant, and on a constant and the CAPE. Specification (1) shows that CFOs' expectations are on average unbiased. The average forecast error is minus 5.5 basis points. Specification (2) shows that forecast errors are predictable by the CAPE. A one percent increase in the price-earnings ratio is associated with a 0.46-percentage-points lower forecast error.

Table E2 shows regressions of professional forecasters' one-year forecast errors for the

Table E1: CFOs' forecast errors

	Forecast error	
	(1)	(2)
ln(CAPE)		-46.296^{***}
		(8.021)
Constant	-0.055	149.471^{***}
	(3.284)	(25.658)
N	75	75
Adjusted R^2		0.278

The table shows quarterly time-series regressions of average chief financial officers' (CFOs') one-year forecast errors for the S&P 500 on the cyclically adjusted price-earnings ratio (CAPE). Specification (1) includes only a constant and thus measures the average forecast error. Specification (2) includes the CAPE. Standard errors (in parentheses) are Newey and West (1987) standard errors with four lags. *, **, and *** denote 10%, 5%, and 1% significance levels, respectively, for the null hypothesis of a zero coefficient. N refers to the total number of observations.

S&P 500 on a constant, and on a constant and the log CAPE. Specification (1) shows that professional forecasters' expectations are on average unbiased. The average forecast error is minus 2 percentage points but not statistically different from zero. Specifications (2) and (3) show that we cannot reject the null hypothesis that forecast errors are unpredictable by the log CAPE.

Table E2: Professional forecasters' forecast errors

	Forecast error		
	(1)	(2)	(3)
ln(CAPE)		−5.094	−7.216
		(7.582)	(7.688)
Constant	2.425	18.811	
	(2.216)	(23.675)	
N	1357	1357	1318
Adjusted R^2		0.004	0.098
Forecaster FE	No	No	Yes

The table shows panel regressions of the professional forecasters' one-year forecast errors for the S&P 500 on the cyclically adjusted price-earnings ratio (CAPE). Specification (1) includes only a constant and thus measures the average forecast error. Specifications (2) and (3) include the CAPE. Specification (3) also includes a forecaster fixed effect. Fixed effect coefficients are not reported. Standard errors (in parentheses) are clustered by semi-year and forecaster. *, **, and *** denote 10%, 5%, and 1% significance levels, respectively, for the null hypothesis of a zero coefficient. N refers to the total number of observations.

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