Is there a cash-flow timing premium?

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Abstract

Equity duration is a measure of discount-rate sensitivity driven by both, stock-specific *cash-flow timing* and stock-specific *discount-rate levels*. Established measures of equity duration using market-price information derive their predictive power for returns from using market-implied discount rate levels. We introduce new measures of pure cash-flow timing which disentangle discount-rate level from cash-flow timing information. Our results indicate an unconditionally flat relationship between timing and average returns. However, it turns out that in recessions (expansion episodes), there is a negative (positive) relation between cash-flow timing and average stock returns.

Keywords: Equity duration, cash flow timing, term structure of equity, cross-section of expected returns

JEL: G12, G17, G23

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1 Introduction

Recent empirical evidence indicates an unconditionally flat relation between stock returns and the timing of cash-flows to equity. Structural models, which are estimated using data from a large cross-section of stocks (Giglio et al., 2021; Jankauskas et al., 2021), suggest that stocks with cash-flows in the more distant future have lower returns only in recessions. Unconditionally, these papers find the term structure of equity to be flat (or slightly upward-sloping). In sharp contrast, the direct evidence on the joint distribution of individual stocks' equity duration and mean returns indicates a strong negative relation (Dechow et al., 2004; Weber, 2018; Gonçalves, 2021).

In this paper, we reconcile these findings by investigating the conceptual and empirical relation between stock-specific equity duration, cash-flow timing and discount rates. Analogously to bond duration (Macaulay, 1938), equity duration is best understood as a measure of a stock's *discount-rate sensitivity* rather than the *timing of its cash flows*, which is just one determinant of sensitivity besides the *level of discount rates*. Discount-rate levels enter established empirical duration measures via the use of market prices that are functions of discount rates. This is problematic because of the mechanically negative relation between a stock's discount rate level and its discount-rate sensitivity: A stock's price $P = \frac{D}{R}$ is a hyperbolic function of its discount rate R. Intuitively, the price declines when the discount rate rises ($\frac{\partial P}{\partial R} < 0$) but it declines more strongly for low levels of R, i.e., $\frac{\partial^2 P}{\partial R^2} > 0$. That is, for low discount rates (c.p. high prices), prices are more sensitive to changes in discount rates. Hence, sorts on market-implied discount-rate sensitivity generate mechanically negative sorts on expected returns, irrespective of the shape of the equity term structure.

We find that unconditionally negative return spreads between high and low duration stocks are only driven by discount-rate levels, rather than cash-flow timing. Conversely, measures of pure cash-flow timing – which yield comparable spreads in future cash flow growth – have an unconditionally flat relation to mean returns. However, we do find a negative relation between cash-flow timing and returns in recessions, while the relation tends to be positive in expansions. These results are qualitatively consistent with the implication of consumption-based asset pricing models with regime-switching dynamics (see, e.g., Bansal et al., 2021).

The link between discount rate levels and discount rate sensitivity follows from the discounted cash flow representation of asset prices. The price of an asset can be expressed as the sum of (expected) future cash flows, each discounted at the applicable discount rate: $P_t = \sum_{s=1}^{T} \frac{C_{t+s}}{R^s}$.[1] The sensitivity of prices with respect to changes in the discount rate is typically assessed using *duration* (DUR). Initially introduced for bonds by Macaulay (1938), DUR can be estimated for equity (see Dechow et al., 2004; Weber, 2018; Gonçalves, 2021) using observables. It is given by:

$$DUR_t = \frac{1}{P_t} \cdot \sum_{s=1}^{T} s \cdot \frac{C_{t+s}}{R^s} = \sum_{s=1}^{T} s \cdot \frac{C_{t+s}}{R^s} \left(\sum_{s=1}^{T} \frac{C_{t+s}}{R^s} \right)^{-1} = \sum_{s=1}^{T} w_s \cdot s \tag{1}$$

Expressed verbally, duration gives the weighted average payment date of an asset. The weights $w_s = \frac{C_{t+s}}{R^s} / \left(\sum_{s=1}^{T} \frac{C_{t+s}}{R^s} \right)$ are determined by each discounted payment's contribution to the total sum of discounted cash flows, i.e., the price P_t. This weighting implies that a stock's duration is not only determined by the timing of its cash flows but also by the level of its discount rate, which we formally derive in Section 2.1. This entanglement becomes relevant once we study the relation of duration measures and mean returns.

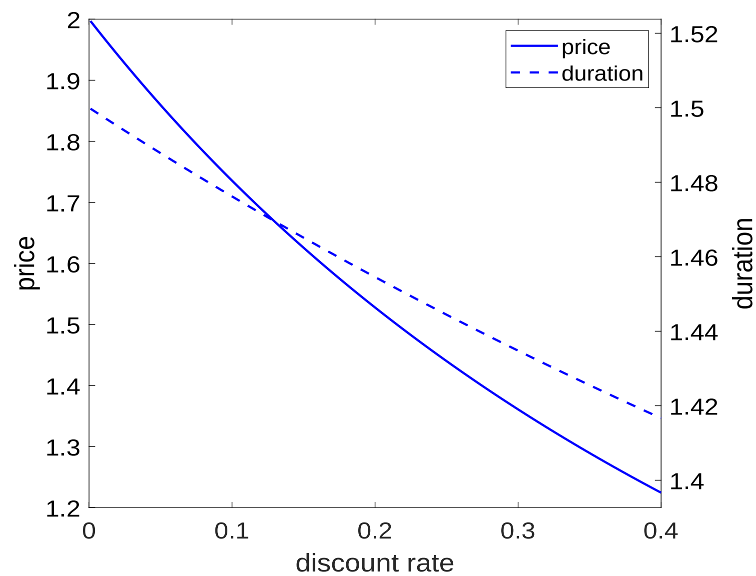
Intuitively, the issue stems from the convexity of discounting and is easily seen from a two-period model. In Figure 1, we plot the time zero price of assets (solid blue line) along with their duration (dashed blue line) as a function of their discount rate. All assets have identical payoffs of one in each period ($C_1 = C_2 = 1$). When computing duration as in (1), the payoff in $t = 1$ gets a weight of $\frac{R^{-1}}{R^{-1}+R^{-2}} = \frac{1}{1+R^{-1}}$, whereas the payoff in $t = 2$ gets a weight of $\frac{R^{-2}}{R^{-1}+R^{-2}} = \frac{1}{R+1}$, i.e., weights decrease over time but are increasing (decreasing) in the discount rate for early (late) cash flows. Hence, when holding the timing of cash flows equal, duration decreases in the discount rate. Graphically, comparing two assets with the exact same cash-flow

[1] Here, P_t denotes the price of the asset at t, C_τ is the cash flow at τ and $R_{t,\tau}$ denotes the time t discount rate applicable to time τ cash flows which for ease of exposition we assume to be flat, i.e. $R_{t,\tau} = R^{\tau-t}$.

profile but different discount rates (points on the blue lines in Figure 1) shows that the cheaper asset (with the higher expected return) has a lower duration. This is indicated by the dashed blue line that is decreasing in the discount rate, along with the asset's price (solid blue line).

Figure 1: Prices, discount rates and duration

This figure shows the price of assets with payoffs $C_1 = C_2 = 1$ but different discount rate levels and plots the corresponding duration measure. The price is given by $P = {}^1\!/_R + {}^1\!/_{R^2}$, and duration by $DUR = \frac{1}{1+R^{-1}} + \frac{2}{1+R}$.



Because they use market prices (that reflect discount rates), equity duration measures (see, e.g., Dechow et al., 2004; Weber, 2018; Gonçalves, 2021) mechanically assign long (short) duration to expensive (cheap) stocks that have low (high) expected returns. Thus, standard duration measures do not give an unbiased measure of cash-flow timing. Hence, studying their correlation with mean returns is not suitable for drawing conclusions about the relation between cash-flow timing and expected returns. This notwithstanding, we want to emphasize that this is not a critique of equity duration measures per se. Our concern becomes only relevant once we relate equity duration measures to mean returns. Equity duration measures are useful in other applications as measures of discount-rate sensitivity.

We proceed as follows: First, we discuss the concept of duration in more detail from a theoretical angle, where we abstract from empirical issues and highlight that duration and discount rate levels are inevitably linked. Then, we point out how established empirical duration measures confound information on cash-flow timing and discount rate levels. We show how to overcome this entanglement of discount-rate and cash flow timing information by replacing market-price information in the respective measures. Specifically, the seminal measure by Dechow et al. (2004) and Weber (2018) uses market prices in lieu of cash flow forecasts after a finite forecast horizon and fully assigns higher prices to higher future cash flows (rather than lower discount rates). In our versions of this duration measure, we replace the market price with the price implied by the forecasts of the model. The resulting measures forecast cash flows just as well as the original measures but does not induce a mechanical relation to mean returns. Gonçalves (2021) equity duration uses a market-implied discount rate, yielding a mechanically negative relation to mean returns. Moreover, when estimating the vector autoregressive process (VAR) used for forecasting cash flows in a pooled regression, one may end up confounding cross-sectional persistence with time-series persistence in cash flows. This may lead to an over-estimation of cash flow growth of high market-to-book stocks and hence to a link between high market prices and long duration that is not driven by cash-flow timing. We overcome these issues by replacing market-implied discount rates with a uniform discount rate, using firm fixed effects in the VAR estimation, or leaving out market prices in the forecasts. Again, the resulting measures yield similar spreads in cash-flow growth but do not have any mechanical relation to mean returns.

We find that the relation between returns and the measures of pure timing, which we introduce in this paper, is negative only in recessions, slightly positive in marked expansion episodes and unconditionally flat. These findings are consistent with the predictions of the classic asset pricing literature featuring long-run risks or habit formation. In contrast, the original duration measures which yield a mechanical relation to discount rates yield negative spreads, irrespective of the business cycle. Sorts on all types of measure yield similar spreads in realized future cash flow growth.

Our paper contributes to the literature on equity cash-flow duration starting with Dechow et al. (2004) who adapted the concept of duration (Macaulay, 1938) to the equity setting. As described above, the Dechow et al. (2004) equity duration assumes that, after a finite forecast horizon, the remaining market value of the stock is paid out as a level perpetuity. Thus, market prices enter the calculation and conflate a measure of timing with one of discount rates. Weber (2018) thoroughly studies the relation between Dechow et al. (2004)-type duration and expected stock returns in the cross section. He finds a negative relation between equity duration and mean returns and suggests a behavioral explanation based on mispricing. In line with this reasoning, we find that the negative relation is solely driven by discount rates. However, our findings indicate that the heightened valuations are unrelated to timing because sorts on pure cash-flow timing do not generate unconditional return spreads. Gonçalves (2021) builds on Dechow et al. (2004) but extends the forecast horizons to 1000 years using a VAR and assigns to each stock its market price-implied discount rate. He finds a negative relation to mean returns and suggests that this can be explained by a reinvestment risk premium. While this measure gives an arguably more accurate measure of duration, the use of market prices to determine discount rates induces a negative cross-sectional relation between the measure and mean returns, irrespective of the true shape of the term structure. We show that unconditionally, there is no significant relation between versions of Gonçalves (2021) equity duration that do not use market prices and mean returns. In a recent contribution, Gormsen and Lazarus (2019) relate analysts' cash-flow forecasts to stock characteristics commonly used as cross-sectional return predictors. They find a negative relation between CAPM alphas and long-term growth forecasts (or its fitted values) but not for excess returns in portfolio sorts. In contrast, we rely on broadly available accounting variables to forecast cash flows and avoid the use of market prices that contain discount-rate information. Other duration measures in the literature are either conceptually similar to Dechow et al.'s (see, e.g. Chen, 2011; Chen and Li, 2018), do not consider cash flows to shareholders (Schröder and Esterer, 2016) or are not forward-looking (see, e.g., Da, 2009). We discuss these measures in Section 2.2.5.

Our paper reconciles single-stock measures of cash flow timing with the recent literature on the equity term structure. In particular, our results are in line with Giglio et al. (2021) who estimate a stochastic discount factor using cross-sectional data and find a mostly flat term structure of equity risk premia. In a related paper, Jankauskas et al. (2021) estimate future cash-flows of stocks using analyst forecasts and fit the parameters of a term structure model by matching forecast-implied prices with market prices.

Conversely, while we acknowledge that there may be a disconnect between the aggregate market term structure and the returns on stocks with different cash-flow timing, our findings differ somewhat from what one would expect given the earlier literature on the unconditional term structure of the equity premium (Van Binsbergen et al., 2012; Van Binsbergen and Koijen, 2017). Using dividend strips data from 1996 to 2009, they find an on average downward-sloping term structure. As in Van Binsbergen et al. (2012), we do find that CAPM betas increase and CAPM alphas decrease with timing. However, we do not find an unconditionally negative relation to mean returns. This is because, as we show in Section 5, there is a rich cross-sectional factor structure related to cash-flow timing that the CAPM alone cannot capture, e.g. the relation to investment. The Fama and French (2015) model which does capture this factor structure yields insignificant alphas. Similar to Cochrane (2017), Bansal et al. (2021) argue that the dividend strip data is not representative for the long-run balance of economic growth. They find that the term structure is indeed downward-sloping only in recessions and upward-sloping in expansions, in line with recent findings by Ulrich et al. (2022) who use analyst forecasts to estimate dividend growth. Our results are qualitatively consistent with these predictions.

On a related note, we show that previous evidence using market price contaminated measures of duration should not be interpreted as evidence for either a downward or an upward-sloping equity term structure. In this vein, our paper is related to recent findings that cast doubt on the duration-based explanation of the value premium, such as Golubov and Konstantinidi (2019) or Chen (2017). Contrary to the received wisdom that stocks with low book-to-market equity ratios have late cash-flow timing, we find that there is no positive relationship between discount-rate free measures and the market-to-book ratio in the cross section. This is driven by the joint cross-sectional distribution of profitability (with low profitability pointing towards late timing), investment (with high investment pointing towards late timing) and the book-to-market ratio which tends to be low for stocks with low profitability.

2 Duration, empirical measures of duration and the cross-section of stock returns

In the following, we first discuss duration from a conceptual point of view and examine its relation to discount rates from a theoretical perspective, abstracting from empirical issues that we turn to subsequently in Section 2.2. These empirical issues are driven by the interpretation of duration as a measure of cash-flow timing when using discount rate-contaminated market price information. All commonly employed measures of duration induce such a mechanical relation. This includes the duration measures employed in Dechow et al. (2004), Weber (2018) and Gonçalves (2021). Therefore – while there is nothing wrong with the measures per se – measures that use market-price information do not provide clear-cut evidence regarding the joint cross-section of cash flow timing and expected returns (or the overall term structure of the equity premium).

2.1 Duration

Macaulay (1938) duration aims to quantify the timing of a bond's cash flows and thereby also the lockup of capital and consequently the sensitivity of the bond price with respect to changes in the interest rate. Specifically, DUR as defined in Equation (1) provides a weighted average payment date with each weight w_s determined by the contribution of each payment C_s to the total value of the bond $P = \sum_s \frac{C_{t+s}}{R^s}$, $w_s = \left(\sum_s \frac{C_{t+s}}{R^s}\right)^{-1} \frac{C_{t+s}}{R^s}$. This weighting is not innocuous when relating the cross section of duration to that of returns. This is because duration is decreasing in the discount rate. Therefore, on average, and irrespective of cash-flow timing, there is a mechanically negative relation between duration and mean returns. This issue has nothing to do with estimating any of the inputs for the duration formula. Even if we perfectly knew all inputs (and we'll see in the next subsection that this is a difficult task), we would find that more expensive assets with low discount rates, have higher duration. We overcome this issue in this paper by excluding market price-related information in the computation of duration.

Formally, the issue can be seen from the derivative of DUR with respect to R (here we already plug in the true price of the asset, $P = \sum_s \frac{C_s}{R^s}$ with $t = 0$ for notational convenience).

$$\frac{\partial DUR}{\partial R} = -\left(\sum_{s=1}^{T} \frac{C_s}{R^s}\right)^{-2} \left(-\sum_{s=1}^{T} s \cdot \frac{C_s}{R^{s+1}}\right) \sum_{s=1}^{T} s \frac{C_s}{R^s} - \left(\sum_{s=1}^{T} \frac{C_s}{R^s}\right)^{-1} \sum_{s=1}^{T} s^2 \frac{C_s}{R^{s+1}} \tag{2}$$

$$= \frac{1}{R} DUR^2 - \left(\sum_{s=1}^{T} \frac{C_s}{R^s}\right)^{-1} \left(\sum_{s=1}^{T} s^2 \frac{C_s}{R^{s+1}}\right) \tag{3}$$

$$= \frac{1}{R} \left(\sum_{s=1}^{T} \frac{C_s}{R^s}\right)^{-2} \left[\left(\sum_{s=1}^{T} s \frac{C_s}{R^s}\right)^2 - \left(\sum_{s=1}^{T} s^2 \frac{C_s}{R^s}\right) \sum_{s=1}^{T} \frac{C_s}{R^s}\right] \tag{4}$$

The expression in (4) is negative if the term in square brackets is negative. This term can be expressed as

$$\sum_{s=1}^{T} \left(s \frac{C_s}{R^s}\right)^2 + 2 \sum_{i<j, j\leq T} i \frac{C_i}{R^i} j \frac{C_j}{R^j} - \sum_{s=1}^{T} \left(s \frac{C_s}{R^s}\right)^2 - \sum_{i<j, j\leq T} (i^2 + j^2) \frac{C_i}{R^i} \frac{C_j}{R^j} \tag{5}$$

$$= \sum_{i<j, j\leq T} \frac{C_i}{R^i} \frac{C_j}{R^j} (2ij - i^2 - j^2) = -\sum_{i<j, j\leq T} \frac{C_i}{R^i} \frac{C_j}{R^j} (i - j)^2, \tag{6}$$

which is negative for all $T > 1$ and when there are positive payments in different periods i and j. Intuitively, cash flows C_s with higher values of s that would raise DUR to a higher level get less weight when the discount rate is higher. Consequently, when comparing two assets with the same expected cash-flows but different discount rates (for example because one is more risky than the other), one would always assign the longer duration to the one with the lower discount rate and hence the higher price. Thus, DUR is a biased measure of cash-flow timing (even if we knew all expected cash flows and the true discount rate). In the next subsection, we discuss how established measures of equity duration mix up the influence of discount rates and cash-flow timing and suggest measures of pure cash-flow timing based on the original measure by Dechow et al. (2004) and Gonçalves (2021).

2.2 Empirical measures of equity duration

As opposed to bond coupons and principal payments, equity cash flows are unknown and thus have to be forecast. It is therefore considerably more difficult to compute the weighted average payment date of a stock as compared to computing bond duration. Similarly, the equity discount rate is not observable but has to be estimated.

In the following, we discuss measures of equity duration that have been proposed in the literature. We pay particular attention to how a stock's true discount rate enters the respective duration measures and thereby leads to a mechanical relation between the measure and expected stock returns. The details of the empirical estimation are left to Section 3.

2.2.1 Dechow et al. (2004) and Weber (2018) equity duration: $\boldsymbol{DUR^{DSS}}$

Dechow et al. (2004) first transferred the concept of duration to equity, which was later adapted by Weber (2018) for studying the cross-section of duration and stock returns. It is based on decomposing a firm's net distributions to shareholders CF ("cash flows") into two distinct parts, earnings and changes to book equity:

$$CF_t = E_t - (BE_t - BE_{t-1}), \tag{7}$$

with earnings E and book equity BE. When earnings exceed the change in book equity, $BE_t - BE_{t-1}$, the firm distributes cash to shareholders, i.e., cash flows to shareholders are positive. But the firm can also *receive net cash flows* from shareholders, i.e. by selling shares on the stock market which would result in a rise in book equity and therefore decrease cash flows to shareholders in (7). Equation (7) can be expressed in terms of return on equity, ROE, and equity growth, EG, by factoring out BE_{t-1}.

$$CF_t = BE_{t-1} \cdot \left[\frac{E_t}{BE_{t-1}} - \frac{(BE_t - BE_{t-1})}{BE_{t-1}} \right] = BE_{t-1} \cdot \Big[ROE_t - EG_t \Big] \tag{8}$$

To forecast future cash flows CF, Dechow et al. (2004) assume that ROE and EG follow mean reverting processes, which are modeled by the following first-order auto-regressive processes:

$$ROE_t = \beta_{roe} + \rho_{roe} ROE_{t-1} + \varepsilon_t^{roe} \tag{9}$$

$$EG_t = \beta_{eg} + \rho_{eg} EG_{t-1} + \varepsilon_t^{eg} \tag{10}$$

Dechow et al. (2004) as well as Weber (2018) forecast cash flows for horizons T of 10 and 15 years, respectively. After this finite forecasting horizon, the present value of these forecast payments, $\sum_{s=1}^{T} \frac{CF_{t+s}}{R^s}$, is subtracted from the price (equaling present value of all future cash flows) and assumed to be paid out as a level perpetuity. Such a perpetuity has duration $T + \frac{R}{R-1}$. Hence, the Dechow et al. (2004) duration for each stock j at time t can be computed as:

$$DUR_{j,t}^{DSS} = \frac{1}{P_{j,t}} \cdot \Bigg[\underbrace{\sum_{s=1}^{T} \frac{s \cdot CF_{j,t+s}}{R^s}}_{\text{Finite horizon}} + \underbrace{\left(T + \frac{R}{R-1}\right) \cdot \left[P_{j,t} - \sum_{s=1}^{T} \frac{CF_{j,t+s}}{R^s} \right]}_{\text{Infinite horizon}} \Bigg] \tag{11}$$

The discount rate R is assumed to be the same for all stocks. At first sight, this circumvents the problem of higher discount rates for some stocks leading to mechanically lower DUR. But DUR^{DSS} attributes a high observed market price, P, in Equation (11) entirely to high cash flows in the distant future, rather than to a stock's low discount rate level. This is because DUR^{DSS} rises monotonically in P:

$$\frac{\partial DUR_j^{DSS}}{\partial P_j} = \frac{\left(T + \frac{R}{R-1}\right) \sum_{s=1}^{T} \frac{CF_{j,t+s}}{R^s} - \sum_{s=1}^{T} \frac{s \cdot CF_{j,t+s}}{R^s}}{P_j^2} > 0, \tag{12}$$

because, by definition, $s \leq T$. Intuitively, higher prices might reflect higher future cash flows and thus justify a positive relation between DUR and market prices. However, P_j is also a decreasing function of the true discount rate $\tilde{R}_j$. Hence, two stocks V and G with the exact same cash flow profile $\{CF_t\}$ but with growth stock G being more expensive than value stock V, G will be assigned a higher DUR^{DSS} than V and will tend to have lower returns going forward. While innocuous in many applications, this relation becomes problematic when studying the cross-sectional relation of cash-flow timing and returns (which reflect $\tilde{R}_j$). Our results presented in Section 4 show that indeed the cross-sectional return spread generated by sorts on DUR^{DSS} as shown by Dechow et al. (2004) and Weber (2018) is not driven by the cash flow forecasts but by the relation between $\tilde{R}_j$ and $DUR_j = f(P(\tilde{R}_j))$ as a function of $\tilde{R}_j$.

2.2.2 Versions of the Dechow et al. (2004) equity duration without market-implied information

We propose the following two variations of the equity duration measure used by Dechow et al. (2004) and Weber (2018) to disentangle the influence of discount rates and cash-flow timing. To do so, we replace the only source of discount rate information, i.e., each stock's market price P_j with the price implied by the model forecasts:

Duration with forecast-implied prices (uniform long-run growth): $\boldsymbol{DUR^{DSS-FIP}}$. For the first measure of *cash-flow timing*, we replace the price in Equation (11) with a price that is implied by three components: the cash flow forecasts used in the first part of (11), a uniform discount rate, and a long-run growth forecast equal to the long-run mean implied by the auto-regressive processes. We call this measure $DUR^{DSS-FIP}$ (*Dechow et al. (2004) duration with forecast-implied prices*).

$$DUR_{j,t}^{DSS-FIP} = \frac{1}{P_{j,t}^{FIP}} \cdot \left[\sum_{s=1}^{T} \frac{s \cdot CF_{j,t+s}}{(1+r)^s} + \left(T + \frac{1+r}{r-g} \right) \cdot \left[P_{j,t}^{FIP} - \sum_{s=1}^{T} \frac{CF_{j,t+s}}{(1+r)^s} \right] \right] \tag{13}$$

where $P_{j,t}^{FIP}$ corresponds to the price of stock j that is implied by the model, i.e.

$$P_{j,t}^{FIP} = \sum_{s=1}^{T} \frac{CF_{j,t+s}}{(1+r)^s} + \frac{CF_{j,T} \cdot (1+g)}{(1+r)^T \cdot (r-g)}, \tag{14}$$

where g is the model implied long-run cash-flow growth of six percent and $T = 15$. Note that the uniform long run growth rate for cash flows to equity does not introduce cross-sectional variation. Thus, cross-sectional variation is solely driven by the cash flow forecasts for the first 15 years. Moreover, we assume for both versions that cash flows after the finite forecasting horizon are distributed as a *growing* perpetuity. Thus, Equation (13) differs slightly from DUR^{DSS} in Equation (11), because Dechow et al. (2004) and Weber (2018) assume that cash flows after the forecasting horizon T are distributed as a level perpetuity. Results, however, are quantitatively similar.

Duration with forecast-implied prices (stock-specific long-run growth): $DUR^{DSS-TZZ}$. We want to make sure that any potentially inferior performance of versions of the Dechow et al. (2004) is not due to discarding information about cash-flows beyond the forecast horizon T. Specifically, we use a variety of forecast variables to estimate a stock-specific long-run growth rate g used in Equation (14) by applying a LASSO approach as in Tengulov et al. (2019). The resulting measure is called $DUR^{DSS-TZZ}$ *(Dechow et al. (2004) duration with forecast-implied prices including stock-specific long-run growth rates a la Tengulov-Zechner-Zwiebel)*. Moreover, we want to avoid having a mechanical relation between the long-run growth rate g and discount rates in this measure of *cash-flow timing*. Therefore, we exclude predictors based on market information from Tengulov et al. (2019) when we estimate the long-run growth rate g. We also estimate a version that uses market price information and find qualitatively similar results.

2.2.3 Gonçalves (2021) equity duration: DUR^{GON}

Gonçalves (2021) further develops the concept of cash-flow duration by extending the forecast horizon to a thousand years using a VAR model and by endogenizing the employed discount rate. In particular, the discount rate for each stock is calibrated such that the present value of the forecast cash flows equals the observed market price. While this matching procedure does yield a coherent estimate of cash flow duration, it is still the case that with identical expected cash flows, the measure would assign a longer duration to the stock with the higher market price. In addition, using market prices to forecast cash flows in a VAR potentially confounds the cash flow forecasts with discount rate information. Consequently, there is a mechanically negative relation between the Gonçalves (2021) duration measure and expected returns.

The measure builds upon the same clean surplus accounting relation as Dechow et al. (2004) in Equation (7), which is reformulated in exponential terms:

$$\frac{\mathbb{E}_t[CF_{t+h}]}{BE_t} = \mathbb{E}_t\left[\frac{E_{t+h}}{BE_t} - \frac{BE_{t+h} - BE_t}{BE_t}\right] = \mathbb{E}_t\left[\left(1 + \frac{E_{t+h}}{BE_{t+h-1}} - \frac{BE_{t+h}}{BE_{t+h-1}}\right)\prod_{\tau=1}^{h-1}\frac{BE_{t+\tau}}{BE_{t+\tau-1}}\right]$$
$$= \mathbb{E}_t\left[\left(e^{CPROF_{t+h} - EG_{t+h}} - 1\right)\cdot e^{\sum_{\tau=1}^{h} EG_{t+\tau}}\right] \tag{15}$$

where $CPROF_t$ is the natural logarithm of earnings (here defined as net payouts plus the change in book equity) scaled by book equity of the previous period and EG_t is the natural logarithm of book equity growth. Following Vuolteenaho (2002) and Campbell et al. (2010), Gonçalves (2021) estimates future values for $CPROF$ and EG in Equation (15) with the following VAR:

$$s_{j,t} = \Gamma s_{j,t-1} + u_{j,t} \tag{16}$$

where $u_{j,t} \overset{i.i.d.}{\sim} \mathcal{N}(0, \Sigma)$ and $s_{j,t}$ is a vector of firm characteristics i including a constant, $CPROF$, EG and ten other predictors, including some that are based on market prices (see Section 3.3 for details). Note that Γ and Σ do not vary across firms. Thus, cross-sectional variation in the cash-flow forecasts at t is determined by the state variables $s_{j,t}$. Using estimates Γ and Σ, scaled expected cash flows can be expressed as

$$\frac{\mathbb{E}_t[CF_{t+h}]}{BE_t} = \left(e^{(\mathbf{1}_{CPROF} - \mathbf{1}_{EG})'\Gamma^h \cdot s_t + v_1(h)} - 1\right)\cdot e^{\mathbf{1}'_{EG}\left(\sum_{\tau=1}^{h}\Gamma^\tau\right)\cdot s_t + h\cdot v_2(h)}, \tag{17}$$

where $\mathbf{1}_x$ is defined as a selector vector such that $\mathbf{1}_x s_t = x_t$. Moreover, v_1 and v_2 are parameters that do not vary in the cross-section, because they only depend on Γ, Σ and h. After forecasting future expected cash flows, Gonçalves (2021) estimates discount rates $dr_{j,t}$ by choosing it such that each firm's (j) model-implied market-to-book ratio equals the observed market-to-book ratio $\frac{ME_{j,t}}{BE_{j,t}}$:

$$\frac{ME_{j,t}}{BE_{j,t}} = \sum_{h=1}^{\infty} \left(e^{(\mathbf{1}_{CPROF} - \mathbf{1}_{EG})' \Gamma^h \cdot s_{j,t} + v_1(h)} - 1 \right) \cdot e^{\mathbf{1}'_{EG} \left(\sum_{\tau=1}^{h} \Gamma^\tau \right) \cdot s_{j,t} + h \cdot v_2(h) - h \cdot dr_{j,t}} \tag{18}$$

In this step, one takes the cash flow forecast from (17) as given and assigns stocks with high prices a relatively low discount rate. Consequently, these low discount rates translate into high values of duration, calculated as:

$$DUR_{j,t}^{GON} = \left(\frac{BE_{j,t}}{ME_{j,t}} \right) \sum_{h=1}^{\infty} h \left(e^{(\mathbf{1}_{CPROF} - \mathbf{1}_{EG})' \Gamma^h s_{j,t} + v_1(h)} - 1 \right) e^{\mathbf{1}'_{EG} \left(\sum_{\tau=1}^{h} \Gamma^\tau \right) s_{j,t} + h \cdot v_2(h) - h dr_{j,t}} \tag{19}$$

Unlike in Dechow et al. (2004), where discount-rate information enters through stock prices (and price differences are thus entirely attributed to differences in cash flows), Gonçalves (2021) estimates the market discount rate by matching cash-flow forecasts to market prices. Thereby, market prices enter the duration measure in Equation (19) explicitly through different discount rates, giving an arguably more accurate estimate of cash-flow duration. However, as shown in Section 2.1 above, simply because *any* duration measure depends on the level of the discount rate used to compute the measure, DUR^{GON} yields a mechanical relation between duration and expected returns that has nothing to do with the timing of cash-flows but with the relation between the discount rate and the discount rate sensitivity. Gonçalves (2021) also suggests other measures, namely the "expected payback period" (EPP) and a log-linearized version of duration, (*llDur*) that do not require a discount rate to be specified. However, these do not give a discount-rate free assessment of cash-flow timing, either.[2] Again, none of this is problematic if we understand duration as a measure of discount rate sensitivity driven by the absolute level of discount rates rather than by cash-flow timing. However, this means that we must not interpret

[2]The *expected payback time*, EPP, is the number of years until the cumulative sum of forecast cash flows equals the market value. With a higher market value, this number is higher. Consequently, when considering two stocks with the same forecasted cash flows but different prices, the stock with the higher market value is assigned the longer duration. The second measure, $llDur$, is explicitly the negative of the log-linear approximation of the derivative of the stock's market value with respect to the discount rate (which in itself depends on the market-to-book ratio, a function of market discount rates).

these findings in the context of the term structure of equity.

2.2.4 Versions of the Gonçalves (2021) equity duration with varying degrees of market-implied information

As for the Dechow et al. (2004) measure, we take out discount-rate related information from the Gonçalves (2021) duration measure to distinguish between discount rate-driven and timing-driven duration.

Gonçalves (2021) duration with a uniform discount rate: $DUR^{GON-UDR}$ Most obviously, discount rate information enters into the Gonçalves (2021) equity duration measure in (19) through firm specific discount rates $dr_{j,t}$ which are calibrated to match the respective market price. Therefore, we start off by replacing these stock specific discount rates for each stock by a uniform discount rate $dr_{j,t}$ of 12%. Moreover, we replace the price of each stock $P_{j,t}$ with the forecast-implied price calculated with the same discount rate of 12% for all stocks. We call this measure $DUR^{GON-UDR}$ (*Gonçalves (2021) duration with a uniform discount-rate*).

Gonçalves (2021) duration with firm fixed effects in the VAR: DUR^{GON*}, $DUR^{GON-UDR*}$. Second, discount rate specific variation enters into the Gonçalves (2021) measure by including market prices in the state variable vector s in the VAR (16). This can lead to a systematic relation between the cash-flow forecasts and discount rates and thus, confound DUR^{GON} with discount-rate information. This becomes relevant once we consider that the VAR in Gonçalves (2021) is estimated with pooled regressions.

Chen et al. (2013) show that one ends up confounding persistence in the time series with persistence in the cross section, when estimating VAR coefficients in a panel setting without controlling for unconditional cross-sectional differences between stocks. In the setting of DUR^{GON} (and $DUR^{GON-UDR}$), and when investigating the link of duration and returns, the problem can arise when discount-rate contaminated variables are related to cross-sectional differences in the levels of cash flows. For instance, it is well known that growth stocks have higher earnings to book equity, as compared to value stocks. This *cross-sectional* relation persists in future periods, i.e. growth stocks continue to be more profitable than value stocks. However, there is only little persistence in the *time series*: as shown by Fama and French (1995) and Chen (2017), the profitability of growth stocks tends to decline whereas that of value stocks tends to increase. I.e., there is only little persistence and value stocks have larger earnings *growth*. Crucially, duration aims to captures the dynamics (early vs. late), rather than the level of cash flows. Therefore, mistaking the cross-sectional persistence *in levels* for time-series persistence *in dynamics* will inflate the estimated future cash flows to stocks with high values of variables that are positively related to high cash flow *levels* in the cross section. If such a predictor is moreover mechanically related to discount rates this could yield a negative link between returns and duration that is not due to later cash-flow timing. The results by Fama and French (1995) and Chen (2017) suggest that this could be the case for the book-to-market ratio.

To see whether the pooled estimation approach for the VAR in Equation (16) indeed overestimates the time series persistence in cash flows, we estimate the VAR using stock-fixed effects over the whole sample, as suggested by Chen et al. (2013). We denote the corresponding duration measures estimated that way as DUR^{GON*} and $DUR^{GON-UDR*}$.

Gonçalves (2021) duration with no market information: $\boldsymbol{DUR^{GON-NMI}}$. Finally, to make sure that none of the above issues taints a clean measure of discount-rate free cash-flow timing, we exclude state variables in s which are based on market information: Specifically, we do not include the book-to-market ratio, payout yield, sales yield (i.e. the sales-to-price ratio) and market leverage. To obtain a measure of pure *cash-flow timing* we repeat the steps from $DUR^{GON-UDR}$. This includes assigning a uniform discount rate of 12% and replacing the market price with the forecast implied price for all stocks.[3] Hence, market price information does not enter this measure at all. We denote this measure $DUR^{GON-NMI}$ (*Gonçalves (2021) duration with no market price information*). We also estimate a version of this measure with firm-fixed effects in the VAR ($DUR^{GON-NMI*}$).

[3]Results using other discount rates are similar (not tabulated).

2.2.5 Other duration measures

Over the years, several adaptations of duration measures have been introduced. Chen (2011) adapts the Dechow et al. (2004) measure such that cash-flows to equity in (7) reflect default risk. Moreover, he replaces the uniform discount rate with one that, similarly to DUR^{GON}, calibrates stock-specific discount rates such that discounted future cash-flows match the respective stock price. Consequently, the measure introduces a mechanical relation to discount rates. We label this measure as DUR^{CH} in the following. Similar to versions of the Dechow et al. (2004) duration measure, we construct a version of the Chen (2011) duration measure with a uniform discount rate of 12% and forecast implied prices for all stocks: DUR^{CH-FIP}. On top of these alternations, we estimate forecast implied prices with stock specific growth rates in the spirit of Tengulov et al. (2019). We denote this measure as DUR^{CH-TZZ}.

In a more recent contribution, Chen and Li (2018) build on the Dechow et al. (2004) equity duration measure and modify it in two ways. Firstly, Chen and Li (2018) include additional forecast variables to predict return on equity and book equity growth. Secondly, the authors assume that the net payouts from the infinite horizon are distributed as a growing perpetuity. We denote this measure of equity duration by DUR^{CL}. The general issue of including discount-rate information through market prices is not tackled. Therefore, we repeat the same alternations as in $DUR^{DSS-FIP}$ and $DUR^{DSS-TZZ}$ and investigate two versions of the Chen and Li (2018) duration measure excluding market information. We denote these measures DUR^{CL-FIP} and DUR^{CL-TZZ}.

Da's (2009) measure of duration does not use discount rate information but is based on ex-post observations of cash flows and therefore not apt for testing the relation between cash-flow timing and *expected* stock returns.

In a recent contribution, Gormsen and Lazarus (2019) relate "duration" to various stock market anomalies. It is worth noting that their notion of duration actually refers to analysts' long-term growth forecasts, i.e. forecast for earnings over the next five years and is therefore conceptually different from duration in the sense of Macaulay. Most of the broad cross-sectional analysis in that paper is based upon the fitted values of a regression of analyst growth forecasts on well-known cross-sectional return predictors such as CAPM betas. They find a negative relation between CAPM alphas and long-term growth (or its fitted values) but not for excess returns in portfolio sorts. Recent evidence by Jylha and Ungeheuer (2021) suggests that analysts' forecasts of long-run cash-flow growth are not only biased upwards but also "mechanically" related to stocks' CAPM betas.[4] It is hence unclear if the use of analysts' long-term growth forecasts is only informative about cash-flow timing or rather also a measure of potentially priced correlation with the market. Finally, Schröder and Esterer (2016) suggest equity duration and timing measures based on the dynamics of residual income. This approach differs from estimating the dynamics of future cash flows to shareholders which has a direct relation to stock prices and is the focus of this paper.

To conclude, established measures of equity duration such as those by Dechow et al. (2004) or Gonçalves (2021) do not only measure cash-flow timing but also depend on the level of discount rates. We show that these measures are negatively related to discount rates by construction. Thus, these measures do not allow us to make clean inference regarding the relation between cash-flow timing and expected returns. To infer this relation, we disentangle cash-flow timing and discount-rate information in these measures: We construct two versions for the Dechow et al. (2004) equity duration measure which do not include discount rate information and thus, are measures of *cash-flow timing*: $DUR^{DSS-FIP}$ and $DUR^{DSS-TZZ}$. We repeat this analysis for the Gonçalves (2021) equity duration measure where discount rate information enters through stock-specific discount rates and market based variables in the VAR. While our measure $DUR^{GON-UDR}$ only assumes a uniform discount rate but leaves the VAR untouched, we also introduce $DUR^{GON-NMI}$ which does not depend on market-implied discount rates at all and can be understood as a measure of pure cash-flow timing. Finally, we also address the criticism in Chen et al. (2013) that pooled estimates of VARs overestimate the persistence of cash-flow dynamics by including firm fixed effects in the VAR (measures DUR^{GON*}, $DUR^{GON-UDR*}$,

[4]Jylha and Ungeheuer (2021) show that analysts systematically assign higher long-run cash-flow growth to stocks with higher beta and argue that this is in order to reconcile higher betas with higher stock prices.

$DUR^{GON-NMI*}$).

3 Details on the construction of the duration measures

In this section, we describe the data we use and provide additional details on the construction of all empirical measures of equity duration discussed in Section 2. We precisely follow Weber (2018) and Gonçalves (2021) to construct the original measures DUR^{DSS} and DUR^{GON}.

3.1 Data

We obtain data on stock prices, shares outstanding and returns, which we adjust for delisting following Shumway (1997), from the Center for Research in Security Prices (CRSP). Our sample consists of all common U.S. stocks with share codes 10 and 11 that are listed on NYSE, Amex or Nasdaq. Stocks in the financial and utility sectors (SIC codes 4900-4999 and 6000-6999) are excluded because they typically have different balance sheet patterns compared to stocks in industrial sectors. Nevertheless, our results are robust to their inclusion (not tabulated). We obtain annual accounting data from Compustat and match them for fiscal years ending in $t-1$ to return data from July in year t to June in year $t-1$ (see Fama and French, 1992). Moreover, we only include Compustat observations that have at least two previous observations in this database to avoid a backfilling bias (Fama and French, 1992). Data on the Chicago Fed National Activity Index (CFNAI), the NBER recession indicator, GDP-growth, the one-month and 10-year treasury yield are from the Federal Reserve Bank of St. Louis. Lastly, we use data for the Fama and French (2015) factor model from Kenneth French's website.[5]

3.2 Details for Dechow et al. (2004)-type equity durations

To forecast future cash-flows to shareholders with Equation (8), (9) and (10), we start by estimating the autoregressive parameters ρ_{roe} and ρ_{eg} separately from a pooled regression over

[5] We thank Kenneth French and the Federal Reserve Bank of St. Louis for providing these datasets.

the full sample period. Our estimates can be found in Table 1 and are fairly similar to those of Weber (2018).[6] We use income before extraordinary items (IB) divided by book-equity for ROE in (9). The definition of book equity follows Davis et al. (2000) and we provide details in Appendix **??**. Moreover, we follow Dechow et al. (2004) or Weber (2018) and use sales growth data (item SALE) for EG to estimate the AR (1) coefficient for book equity growth in (10). As in Dechow et al. (2004), we assume that ROE reverts to the long-run cost of equity (μ_{roe}) of 12 % and equity growth (EG) to the long-run macroeconomic growth rate (μ_{eg}) of 6 %. Thereafter, we plug in ROE and EG measured at time t into the AR 1 processes (9) and (10) to forecast future cash-flows to shareholders at time $t+1$ in Equation (8). In this step, EG is measured by book equity growth. As in Weber (2018), we repeat this procedure for a finite forecasting horizon of 15 years.

Then we estimate the following three versions of the Dechow et al. (2004) equity duration measure: First, we obtain the original measure DUR^{DSS} in Equation (11) using the forecast cash-flows CF, together with a uniform discount rate of 12%, and the market price P from CRSP. Second, we obtain an estimate for $DUR^{DSS-FIP}$ in Equation (13) based on the cash-flow forecast CF, a constant discount rate of 12% and a model implied price P^{FIP}. We assume a model-implied and uniform long-run growth rate g of 6% when estimating forecast-implied prices in Equation (14). Third, we calculate $DUR^{DSS-TZZ}$ precisely as $DUR^{DSS-FIP}$ with the only difference that we account for stock specific long-rung growth rates g when estimating forecast implied prices. In general, we follow Tengulov et al. (2019) to estimate g and provide details on the estimation procedure and the selected explanatory variables in Appendix D.[7]

[6] We obtain quantitatively similar results if we either use the parameters in Dechow et al. (2004) or Weber (2018). Moreover, we estimate the AR (1) parameters ρ_{ROE} and ρ_{BEG} on distinct industry levels (Fama and French 17,30 or 49 industries) and with an expanding window. Using these industry specific AR (1) parameters or industry specific AR (1) parameters with an expanding window, yields quantitatively very similar results compared to what we tabulate in Section 4.

[7] Note that 9.4% of observations for $DUR^{DSS-FIP}$ and 5.5% of observations for $DUR^{DSS-TZZ}$ have negative forecast-implied prices in our sample. We exclude these observations.

3.3 Details for Gonçalves (2021)-type equity durations

We closely follow Gonçalves (2021) in all steps and start by forecasting future cash-flows to shareholders in Equation (17) with the following 12 state variables for the vector $s_{j,t}$:

Valuation Measures

Book-to-Market: $BM_{i,t} = log\left(\frac{BE_{i,t}}{ME_{i,t}}\right)$

Payout Yield: $POY_{i,t} = log\left(1 + \frac{PO_{i,t}}{ME_{i,t}}\right)$

Sales Yield: $SY_{i,t} = log\left(\frac{SALE_{i,t}}{ME_{i,t}}\right)$

Capital Structure Measures

Market Leverage: $MLEV_{i,t} = log\left(\frac{BD_{i,t}}{ME_{i,t} + BD_{i,t}}\right)$

Book Leverage: $BLEV_{i,t} = log\left(\frac{BD_{i,t}}{AT_{i,t}}\right)$

Cash Holdings: $CASH_{i,t} = log\left(\frac{CHE_{i,t}}{AT_{i,t}}\right)$

Growth Measures

BE Growth: $EG_{i,t} = log\left(\frac{BE_{i,t}}{BE_{i,t-1}}\right)$

Asset Growth: $AG_{i,t} = log\left(\frac{AT_{i,t}}{AT_{i,t-1}}\right)$

Sales Growth: $SG_{i,t} = log\left(\frac{SALE_{i,t}}{SALE_{i,t-1}}\right)$

Profitability Measures

Clean Surplus Prof.: $CPROF_{i,t} = log\left(1 + \frac{PO_{i,t} + \Delta BE_{i,t}}{BE_{i,t-1}}\right)$

Return on Equity: $ROE_{i,t} = log\left(1 + \frac{E_{i,t}}{\frac{1}{2}BE_{i,t} + \frac{1}{2}BE_{i,t-1}}\right)$

Gross Profitability: $GPA_{i,t} = log\left(1 + \frac{G_{i,t}}{\frac{1}{2}AT_{i,t} + \frac{1}{2}AT_{i,t-1}}\right)$

where BE is book equity defined as in Davis et al. (2000) and ME is market equity from CRSP. We follow Boudoukh et al. (2007) to construct net payouts (PO), as described in the Appendix **??**. SALE and AT correspond to the COMPUSTAT items sales and total assets, respectively. BD represents total book debt defined as the sum of items DLTT and DLC, while CHE are cash holdings (item CHE). E corresponds to income before extraordinary items (item IB) and G measures gross profits (SALE - COGS) as described in Novy-Marx (2013) . We follow Gonçalves (2021) and deflate all raw level quantities by the Consumer Price Index (CPI).[8]

Thereafter, we estimate Γ and the covariance matrix of firm-demeaned residuals (Σ) from the VAR in Equation (16) by pooling together all observations with an expanding window. Specifically, we estimate Γ line by line with Fama and MacBeth (1973) cross-sectional

[8] We follow Gonçalves (2021) and impose the following selection criteria: Any negative item $AT, BE, ME, SALE, CHE, BD$ and DVC is set to missing. Moreover, we set to missing values of $BE, CHE,$ andBD larger than A. Similar to Vuolteenaho (2002) any BE value higher than $(50 \cdot ME)$ or smaller than $(\frac{1}{50} \cdot ME)$ is set to missing. Profitability ratios are trimmed at -99 %. Lastly, we winsorize all non-bounded state variables at the 1% and 99 % quantiles of their distributions in every fiscal year.

regressions that weight each cross-section with the corresponding number of firms in that cross-section. As in Gonçalves (2021), we exclude the 20% smallest stocks based on NYSE breakpoints when estimating the VAR. Moreover, we follow Gonçalves (2021) and obtain the intercepts in Γ such that the long-run expectations of the state variables in the vector $s_{j,t}$ equal the product of Γ and the vector of time-series averages of cross-sectional medians for each state variable. Note that market equity in the state variables for the VAR corresponds to the market equity at the end of each fiscal year. Estimates for Γ, Σ and the steady state growth rates over the full sample period can be found in Table E.1 in Appendix E. After calculating the VAR-implied parameters v_1 and v_2, we forecast future cash-flows to shareholders in Equation (19) for the next 1000 years.[9] In this step, accounting data is from calendar years ending in $t-1$ and market equity from the end of December in year $t-1$.

Then, we estimate the following three versions of the Gonçalves (2021) equity duration measure: First, we estimate the original DUR^{GON} measure in Equation (19) based on these forecast cash-flows and a stock specific discount rate $dr_{j,t}$ which we estimate by solving Equation (18) with a root-finding algorithm.[10] Second, we calculate $DUR^{GON-UDR}$ as in Equation (19) with the forecast cash-flows, a uniform discount rate of 12% and a forecast-implied price for all stocks. Lastly, we obtain estimates for $DUR^{GON-NMI}$ by repeating the exact same steps as for $DUR^{GON-UDR}$ except that we exclude the four state variables including market information: book-to-market, payout yield, sales yield and market leverage.[11] Finally, we estimate the measures DUR^{GON*}, $DUR^{GON-UDR*}$ and $DUR^{GON-NMI*}$ which are constructed in the same way as their counterpart without asterisk $(*)$ but where we estimate the VAR using

[9] Note that we follow Gonçalves (2021) and shrink the intercepts in Γ to the long-run medians when we calculate v_1 and v_2. This speeds up the convergence of the variance and covariance terms needed for v_1 and v_2. Details on the adjustment can be found in the Appendix of Gonçalves (2021).

[10] Due to a finite forecast horizon of 1000 years we apply the same approximation for the calculation of equity duration as Gonçalves (2021). Moreover, we obtain rank correlations of roughly 90 % between our DUR^{GON} estimate and the original equity duration estimates published by Andrei Goncalves. However, we note that small changes in the definition of state variables and in the construction of the VAR can lead to different outcomes. The reasons are twofold: Firstly, small estimation differences in the VAR can have a substantial effect on the convergence of the VAR parameters v_1 and v_2. Secondly, the VAR is estimated with an expanding window.

[11] Note that roughly 3.6% of of forecast-implied prices for $DUR^{GON-UDR}$ and 2.5% for $DUR^{GON-NMI}$ become negative in our sample. We exclude these observations.

firm fixed effects.

3.4 Sorting portfolios

To infer the relation of these equity duration measures with expected returns, we sort the cross-section of stocks into deciles based on NYSE breakpoints of the corresponding measure. We rebalance these portfolios monthly to control for delisting. The sample for DUR^{DSS} and $DUR^{DSS-FIP}$ starts in January 1964. In contrast, the sample for $DUR^{DSS-TZZ}$, DUR^{GON}, $DUR^{GON-UDR}$ and $DUR^{GON-NMI}$ (as well as their counterparts with firm fixed effects in the VAR) begins in January 1974 to have sufficient observations to estimate the long-term growth rate g or Γ for the first cross-section in 1974. That said, we do not include data before 1962 in these estimations. Our sample ends in December 2020 for all measures.

4 Empirical analysis

Having established the duration measures, we now study their empirical properties. First, we test whether sorts on the measures indeed generate a spread in future cash-flow growth and second whether they also generate a spread in mean returns. We examine return spreads both unconditionally and conditional on whether economic growth is high or low because the slope of the equity term structure had been suggested to depend on the business cycle (Bansal et al., 2021). We pay particular attention to the differences between measures of pure cash-flow timing and those that use market-implied discount rates.

4.1 Cash flows

We start by "backtesting" whether the equity duration measures indeed generate spreads in realized cash-flow growth over five to ten years after portfolio formation. The results are presented in Table 2. To the extent that duration is related to the timing of cash flows, we would expect that stocks with higher duration have higher future earnings growth (Panels A and B)

and higher future cash-flow to equity growth (Panels C and D). As shown in Panel A, the two original measures of equity duration by Dechow et al. (2004) and Gonçalves (2021) generate an almost monotonic relation between the duration measures and earnings growth over the next 5 to 10 years after portfolio formation. This suggests that DUR^{DSS} and DUR^{GON} indeed measure the timing of future earnings. The picture is a bit less clear-cut for the growth in cash-flows to equity (CFEG), the measure of cash flows actually estimated in the models. As shown in Panel C, the generated spread is much lower compared to earnings growth but remains statistically significant for both established duration measures (DUR^{DSS} and DUR^{GON}). For the duration measures that do not use discount rate-confounded information, we see similarly marked spreads for earnings growth (Panel B) and overall significant spreads for CFEG (Panel D). Overall, both the discount-rate confounded and the alternative measures of pure cash-flow timing generate spreads in future cash-flow growth.

4.2 Unconditional Returns

Next, we study the unconditional relation of the equity duration measures to mean returns. In Table 3, we present monthly mean returns, Fama and French (2015) five-factor alphas, as well as annualized standard deviation, and Sharpe ratios for each of the duration-sorted portfolios. In Panel A, we show the results for the measures using market price information: the two original duration measures DUR^{GON} and DUR^{DSS}, and $DUR^{GON-NDR}$. DUR^{GON} and DUR^{DSS} exhibit a significantly negative relation between duration and subsequent mean returns and Sharpe ratios. This result is in line with the findings in the original papers by Dechow et al. (2004), Weber (2018) and Gonçalves (2021). Similarly, $DUR^{GON-NDR}$ also yields a negative spread but it is much smaller than for DUR^{GON}. This indicates that much of the spread generated by DUR^{GON} is due to matching discount rates to market prices.

That said, $DUR^{GON-NDR}$ may also yield a relation to mean return by using market prices in the VAR. Specifically, the pooled regression used to estimate the VAR may confound cross-sectional persistence in cash-flow *levels* and time-series persistence in cash-flow *dynamics*. The level-persistence is related to the book-to-market ratio (see the discussion in Section 2.2.4, along the lines of a similar argument in Chen et al. (2013)). Hence, the VAR will overestimate future cash flow growth to low book-to-market stocks. To test whether this issue affects our results, we estimate versions of DUR^{GON} and $DUR^{GON-NDR}$ (denoted as DUR^{GON*} and $DUR^{GON-NDR*}$) using firm fixed effects. The cash flow growth and returns on portfolios sorted on the resulting measures are shown in Appendix B. While the resulting cash flow growth is comparable to the measures estimated with pooled regressions, the returns on these portfolios do not feature any significant relation between duration and subsequent mean returns. This suggests that the spread in mean returns generated by $DUR^{GON-NDR}$ is due to an overestimation of the cash-flow growth of low book-to-market stocks.

The modified versions of the duration measures that do not use discount-rate contaminated information do not indicate a negative relation with mean returns (Panel B): The generated return spreads and Sharpe ratios for measures excluding market-implied discount rate information are small and statistically insignificant.[12] We do find negative spreads in CAPM alphas (see Table A.8). This is because later cash-flow timing raises discount-rate sensitivity and hence market betas. However, this exposure does not yield spreads in mean returns because other factor exposures are functions of cash-flow timing, too. For example, as we discuss in more detail in Section 5.3 below, late cash-flow timing stocks tend to have high investment, associated with low expected returns. It is therefore more suitable to consider Fama and French (2015) alphas. These are insignificant for all discount-rate free measures in line with the zero spread in mean returns. Additionally, we also find statistically insignificant spreads for longer holding periods up to five years as shown in Table A.11 in Appendix A. This suggests that the negative unconditional return spread documented in Panel A is most likely driven by the mechanical relation between duration and discount rates in the original measures. This is nicely illustrated in Figure 2 where we show the return spread in DUR^{DSS}-sorted portfolios with different forecasting horizons T. As we increase the forecasting horizon, the influence of the

[12]Moreover, results do not change if we estimate the VAR in $DUR^{GON-NMI}$ with firm fixed effects (see $DUR^{GON-NMI*}$ in Appendix B).

market price P vanishes such that for horizons $T > 30$, there is no significant spread left.

The finding that there is no unconditional relation between discount rate free equity duration measures and expected returns also carries over to the equity duration measures of Chen (2011) and Chen and Li (2018) mentioned in Section 2.2.5, see Table C.1 in Appendix A.

Summing up, we find that the negative relation of equity duration measures based on the construction of Dechow et al. (2004) or Gonçalves (2021) is mainly due to the discount-rate sensitivity which in turn is driven by discount rate levels. Alternative measures of pure cash-flow timing based on the construction of Dechow et al. (2004) or Gonçalves (2021) do not indicate a significant relation to subsequent mean returns. This is in line with an unconditionally flat term structure of equity.

4.3 Conditional Returns

We now turn to conditional returns. In expansion (recession) episodes, the empirical results by Giglio et al. (2021) and Ulrich et al. (2022) as well as the predictions of a long-run risk model with regime switching dynamics (Bansal et al., 2021) imply an upward (downward) sloping equity term structure. We start by considering returns conditional on low economic growth (r^{low}) in Table 4, where we focus on months where the Chicago Fed National Activity Index (CFNAI) is below the 25% quantile (corresponding to CFNAI=-0.27) of all observations.[13] Both the discount-rate contaminated measures (Panel A) and the measures that do not use discount-rate information (Panel B) generate negative spreads in duration-sorted portfolio returns when conditioning on such episodes of low growth. However, this negative relation tends to be more pronounced for the discount-rate free equity duration measures shown in Panel B. As shown in the rightmost column, the negative relation between duration and mean returns in recessions is significantly different from all other months for these measures. In Appendix A we show

[13]The CFNAI is calculated from 1967 to 2021 on a monthly basis by the Federal Reserve Bank of Chicago by weighting 85 monthly indicators of national economic activity. Thus, the CFNAI provides a single summary measure which identifies a common component in these indicators. Importantly, the CFNAI index closely tracks periods of economic expansion and contraction as shown by the Chicago Fed and as depicted in Figure A.1 in Appendix A.

analogous results for various definitions of low economic growth, including quarters with real GDP growth in the lowest decile in Table A.13 and NBER recessions in Table A.12. These results mostly indicate a negative relation for alternative measures of equity duration with expected returns, which is particularly strong for the Great Recession in 2008/09, the recession in 2001 and the recession of the early 90s (Figure A.2). All in all, our empirical results are mostly in line with the theoretical prediction of a negative sloping equity term structure in times of low growth as well as the recent empirical findings regarding this relation by Giglio et al. (2021).

Next, we consider returns during periods of high growth (r^{high}), defined analogously as months where the CFNAI is above the 25th quantile of all observations. The results are shown in Table 4. While the original, discount-rate contaminated duration measures indicate negative spreads, the duration measures that do not use discount-rate information generate mostly positive (mostly insignificant) spreads. In Table A.14, we show analogous results for quarters with high GDP growth. During such marked expansion episodes, we find overall positive spreads for our measures of cash-flow timing. Thus, our empirical results on conditional returns are in line with the empirical observation of a positive slope of the term structure during expansions (Van Binsbergen et al., 2013; Giglio et al., 2021; Bansal et al., 2021; Ulrich et al., 2022).

Summing up, our empirical evidence is consistent with the theoretical prediction of a negative (positive) slope of the equity term structure during recession (expansion) states. Note that the picture based on our conditional analysis is somewhat less clear-cut than e.g. in Giglio et al. (2021). This is not surprising for two reasons. First, by using single stocks rather than characteristics-sorted portfolios, our measure is necessarily more noisy. Secondly, we observe actual realized returns rather than model-implied expected returns when analyzing cash-flow timing on a stock level.

5 Discussion

5.1 Discount-rate sensitivity

As we have argued earlier, duration is best understood as measure of discount-rate sensitivity rather than a measure of cash-flow timing. From a theoretical perspective, as laid out in Section 2, this discount-rate sensitivity is driven by both, the timing of cash flows and the level of discount rates. Stocks' true discount rates are unobservable but the risk-free rate as one component of stocks' discount rates can be observed. We would expect that high (low) duration stocks react more (less) sensitively to changes in the risk-free rate and that the long (short) horizon risk-free rate has more impact on stocks with late (early) cash flows.

To see how interest rate sensitivity relates to the different duration measures, we regress (studentized) returns on duration-sorted portfolios on changes in the one-month treasury yield and the ten-year treasury yield. The results are shown in Table 5. Overall, coefficients on the short-run yield are negative. Moreover, coefficients are larger in absolute value for stocks with low duration and timing. Turning to the coefficients on changes in the long-term yield, we find only positive estimates, in line with a cash-flow channel where high long-term rates indicate high long-term growth. As one would expect, coefficients are large and statistically significant for stocks in the higher deciles of the discount-rate free timing measures. Strikingly, for DUR^{GON}, the pattern is reversed: Low DUR^{GON} stocks are more sensitive to long-term yield changes than high DUR^{GON} stocks. Comparing these results to the sorts on the market-to-book ratio indicates that this is likely due to the strong, positive correlation of DUR^{GON} with the market-to-book ratio that is driven by its use of market-implied discount rates (see Section 5.2 below). We find that value stocks have more exposure to (long-term) yield changes, in line with explanations of the value premium based on value stocks being more procyclical.

5.2 Relation of different duration measures and the market-to-book ratio

The pure timing measures $DUR^{DSS-FIP}$, $DUR^{DSS-TZZ}$ and $DUR^{GON-NMI}$ lead to a radically different sorting of stocks. As shown in Table 6, the pairwise rank correlation coefficients - which indicate to what extent the sorting according to different measures coincide - are high among the respective groups of discount-rate free and discount-rate contaminated measures. Conversely, the rank correlations are much lower between measures from different groups. In other words, a large part of the ranking according to DUR^{DSS} and DUR^{GON} is due to discount-rate levels. This is illustrated by the correlation of the duration measures with the book-to-market ratio. For instance, whereas DUR^{GON} has a rank correlation with the market-to-book ratio of 67%, it is roughly zero for $DUR^{GON-NMI}$, which does not use market price information. Discount-rate free measures based on DUR^{DSS} even have a positive rank correlation with the book-to-market ratio.

This is perhaps surprising given that the market-to-book ratio is often understood as a proxy for late cash-flow timing (Lettau and Wachter, 2007). It is less surprising when we consider that the time variation in valuation ratios is primarily related to variation in discount rates (see, e.g. Cochrane, 2008). Moreover, recent evidence by Golubov and Konstantinidi (2019) suggests that the value premium is not explained by cash-flow timing while Chen (2017) even finds that value stocks have similar cash-flow growth as growth stocks in buy-and-hold portfolios and markedly stronger cash-flow growth in the standard case of rebalanced portfolios. Whether growth stocks have higher future cash flows is a question beyond the scope of this paper. More importantly, however, note that duration is about the dynamics of cash flows over time rather than levels. So while growth stocks do have higher profitability on average – and may have higher *levels* of cash flows in the future that contribute to high market values – this is not necessarily important for the relative importance of distant future cash flows relative to near-future cash flows. In this context, Fama and French (1995) show that the profitability of growth stocks falls after the formation period while asset growth tends to rise. Both of these facts, should indicate that cash flows to shareholders are lower in the future relative to the present. Our results are in line with these findings.

There is a case to make for a negative relation between cash-flow timing and discount rates, even in absence of a downward-sloping equity term structure. Importantly, the reasoning behind this rests on causality going the other way, namely that firms with low discount rates can invest more and sustain lower current cash flows and therefore move more cash flows to the more distant future whereas firms with higher capital costs cannot afford to do so. In that case, despite inducing a mechanical relation, measures of discount rates would be a valuable cross-sectional predictor of cash-flow timing. The fact that the discount-rate contaminated duration measures DUR^{DSS} and DUR^{GON} are positively related to both the issuance ratio (in Panel A of Tables A.1 and A.2, respectively) and investment as measured by asset growth AG (Panel B of Tables A.1 and A.2, respectively) points in this direction.

5.3 Why is there no timing premium?

Examining the cross section of cash flow-timing and stock characteristics can shed light on why there is no (unconditional) timing premium. As a starting point, consider that cash flows to equity are given by $C = B\left(\frac{E}{B} - \frac{\Delta B}{B}\right)$. Stocks with currently low cash flows relative to the future have currently low profitability and high investment. As can be seen in Tables A.4-A.6, the discount rate-free measures generate negative sorts on profitability and positive sorts on investment. Note that highly profitable firms tend to invest much. Hence, perhaps because profitability is more persistent than investment, it has a stronger impact on discount-rate free duration measures and the spreads in asset growth tend to be weaker than those in productivity.

That said, both the spread in investment and that in profitability should (all else equal) lead to lower returns for late cash-flow timing stocks. But not all else is equal: highly profitable firms tend to be growth stock with high market-to-book equity values (see Table 8 in Fama and French, 2015). Moreover, late timing stocks have higher market betas. Therefore, while yielding significant Fama and French (1993) three-factor (FF3) model alphas (Table A.9), the Fama and

French (2015) five factor (FF5) alphas are insignificant because the RMW and CMA exposures are fully captured by the model. Discount-rate contaminated measures do not generate as clean a sort on profitability because they assign any stock with low discount rates to long duration portfolios, including growth stocks which tend to have high profitability and investment. Hence, sorts on these measures generate FF5 alphas.

6 Conclusion

We show that empirical measures of cash-flow duration derive their predictive power for returns from their mechanical relation with discount rates. Without this relation, there's no unconditionally monotonic relation between duration measures and subsequent returns.

We introduce versions of the Dechow et al. (2004); Weber (2018) and Gonçalves (2021) equity duration measures that do not use market prices. Importantly, our empirical analysis shows that while these measures do predict a spread in cash flows, they do not generate unconditional spreads in mean returns. Our findings indicate that in recessions (expansion periods), there is a negative (positive) spread in subsequent mean returns between stocks with high and low values of these discount-rate free duration measures.

We thereby provide stock-level evidence largely in line with the recent empirical findings of Giglio et al. (2021) and Jankauskas et al. (2021). Our results do not lend support to an unconditionally downward-sloping term structure of equity premia. Importantly, we show that the negative relation of established measures of equity duration with mean returns is due to the mechanical relation between duration measures and prices. We thereby reconcile the earlier findings on the joint distribution of returns and cash-flow duration measures with the recent evidence that suggests an unconditionally flat equity term structure.

Moreover, duration measures that do not use market-implied discount rate information are, if anything, slightly positively related to the book-to-market equity ratio. This result is in line with recent evidence by Chen (2017) and more seasoned evidence in Fama and French (1995) regarding the cash flow dynamics of value and growth stocks. This suggests that cash-flow timing does not explain the value anomaly. We can explain this finding within the framework of a five-factor model (Fama and French, 2015): We find that while having low profitability and high investment (pointing at low mean returns) stocks with late cash flows have high book-to-market ratios and higher market betas (all else equal suggesting high returns). On aggregate, these effects cancel out, leading to close to zero unconditional spreads between stocks with late and early average payout dates.

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Table 1: AR(1) parameters for Dechow et al. (2004)-type equity durations.

We document the parameters for the autoregressive processes of order one (AR(1)) for return on equity (ROE) from Equation (9) and book equity growth (EG) from Equation (10). μ corresponds the long run mean, β to the constant in the AR(1) process and ρ equals the AR(1) coefficient. It holds that $\mu = \frac{\beta}{1-\rho}$. We estimate these coefficients for ROE and EG separately from pooled autoregressions over the full sample period from January 1964 to December 2020.

	μ	β	ρ
ROE	0.120	0.031	0.741
EG	0.060	0.048	0.208

Table 2: Realized cash-flows of duration-sorted portfolios (in %).

We document measures of realized cash flows for portfolios sorted on equity duration measures. Realized EBITDA growth in Panel A corresponds to the average EBITDA growth of duration portfolios in the five $(t, t+5)$ and ten years $(t, t+10)$ after formation. Panel B documents realized cash flow to equity growth (CFEG) for duration portfolios. All growth rates are annualized and in percent per year. Newey and West (1987) corrected t-statistics with 6 lags are printed in brackets and the time period is from January 1964 to December 2020.

	D1	D2	D3	D4	D5	D6	D7	D8	D9	D10	**D10-D1**
Panel A: **Earnings growth: Equity duration measures incl. discount rate information**											
					DUR^{DSS} equity duration						
$\text{EBITDA}_{t,t+5}$	5.37	5.76	6.99	7.56	8.33	8.96	10.1	11.6	14.6	14.2	**8.85**
	(13.1)	(15.1)	(19.9)	(20.6)	(24.6)	(25.2)	(31.1)	(34.0)	(33.5)	(29.8)	**(22.3)**
$\text{EBITDA}_{t,t+10}$	6.02	6.46	6.94	7.20	7.77	8.04	8.81	9.86	11.6	11.5	**5.47**
	(20.4)	(27.7)	(33.1)	(30.5)	(34.1)	(37.6)	(43.4)	(43.8)	(39.3)	(35.6)	**(22.1)**
					DUR^{GON} equity duration						
$\text{EBITDA}_{t,t+5}$	6.69	6.93	7.37	7.61	8.43	8.53	9.33	10.2	11.8	13.5	**6.80**
	(16.6)	(17.7)	(18.4)	(18.9)	(22.8)	(22.5)	(25.0)	(25.1)	(25.6)	(31.3)	**(25.9)**
$\text{EBITDA}_{t,t+10}$	6.71	6.50	6.80	6.98	7.45	7.63	7.86	8.50	9.22	10.5	**3.81**
	(27.7)	(30.0)	(32.1)	(32.9)	(38.8)	(48.1)	(38.1)	(37.7)	(28.8)	(39.1)	**(22.0)**
					$DUR^{GON-UDR}$ equity duration						
$\text{EBITDA}_{t,t+5}$	6.72	6.71	7.52	7.64	7.79	9.08	9.69	10.5	11.7	13.3	**6.62**
	(15.3)	(18.2)	(21.1)	(20.3)	(20.3)	(26.5)	(25.9)	(26.9)	(26.9)	(28.0)	**(24.8)**
$\text{EBITDA}_{t,t+10}$	6.62	6.42	6.71	7.01	7.42	7.98	7.98	8.76	9.37	10.1	**3.52**
	(26.8)	(28.0)	(30.9)	(39.9)	(42.5)	(48.3)	(39.1)	(33.9)	(30.1)	(36.7)	**(19.2)**
Panel B: **Earnings growth: Equity duration measures excl. discount rate information**											
					$DUR^{DSS-FIP}$ equity duration						
$\text{EBITDA}_{t,t+5}$	8.00	7.70	7.56	6.95	7.71	7.90	8.40	9.82	12.8	16.2	**8.16**
	(24.3)	(23.8)	(24.8)	(22.0)	(23.4)	(25.3)	(23.6)	(25.3)	(31.2)	(37.8)	**(26.9)**
$\text{EBITDA}_{t,t+10}$	7.60	7.63	7.23	7.33	7.64	7.62	8.08	8.72	10.5	12.3	**4.67**
	(26.5)	(32.2)	(31.2)	(37.0)	(38.1)	(38.2)	(37.5)	(37.7)	(39.5)	(40.3)	**(21.0)**
					$DUR^{DSS-TZZ}$ equity duration						
$\text{EBITDA}_{t,t+5}$	6.03	6.51	6.43	6.64	7.03	7.68	8.12	9.87	12.3	15.0	**9.00**
	(16.6)	(17.9)	(17.3)	(18.8)	(19.9)	(21.7)	(21.1)	(24.8)	(29.1)	(25.3)	**(22.3)**
$\text{EBITDA}_{t,t+10}$	6.01	6.37	6.41	6.58	6.77	7.21	7.77	8.34	9.94	11.6	**5.55**
	(25.6)	(26.3)	(34.8)	(34.4)	(35.7)	(32.9)	(37.2)	(43.3)	(34.4)	(25.9)	**(15.0)**
					$DUR^{GON-NMI}$ equity duration						
$\text{EBITDA}_{t,t+5}$	7.79	7.50	7.75	8.40	8.28	8.39	9.49	9.42	10.2	12.2	**4.38**
	(16.3)	(19.2)	(20.4)	(23.3)	(22.0)	(23.8)	(21.9)	(27.0)	(25.3)	(25.6)	**(10.3)**
$\text{EBITDA}_{t,t+10}$	7.18	6.69	6.87	7.36	7.20	7.54	8.11	8.21	8.70	9.85	**2.67**
	(26.3)	(32.3)	(33.8)	(47.1)	(39.1)	(38.0)	(37.1)	(31.7)	(32.3)	(29.7)	**(9.71)**

Continued on next page

Table 2 continued: Realized cash-flows of duration-sorted portfolios (in %).

	D1	D2	D3	D4	D5	D6	D7	D8	D9	D10	**D10-D1**
Panel *C*: **Cash flows to equity growth: Equity duration measures incl. discount rate information**											
					DUR^{DSS} equity duration						
$\text{CFEG}_{t,t+5}$	13.7	14.1	13.8	14.7	14.6	13.7	15.2	16.0	18.0	16.7	**3.02**
	(18.5)	(19.3)	(16.7)	(19.3)	(19.9)	(17.9)	(20.7)	(22.0)	(19.4)	(16.9)	**(3.56)**
$\text{CFEG}_{t,t+10}$	9.42	10.3	9.83	9.42	10.5	9.72	10.7	11.7	12.3	11.2	**1.77**
	(22.4)	(23.4)	(22.4)	(21.0)	(26.3)	(24.7)	(27.4)	(24.1)	(24.9)	(21.2)	**(4.10)**
					DUR^{GON} equity duration						
$\text{CFEG}_{t,t+5}$	15.4	16.3	15.3	15.8	15.7	16.9	15.2	16.9	17.8	19.2	**3.83**
	(18.3)	(23.5)	(22.1)	(20.8)	(18.4)	(23.0)	(17.8)	(18.5)	(18.2)	(18.3)	**(3.74)**
$\text{CFEG}_{t,t+10}$	10.7	10.5	10.8	11.3	11.6	11.5	11.3	11.1	12.3	11.7	**1.07**
	(21.4)	(25.2)	(23.6)	(25.2)	(27.0)	(24.3)	(25.6)	(22.1)	(23.1)	(19.9)	**(1.83)**
					$DUR^{GON-UDR}$ equity duration						
$\text{CFEG}_{t,t+5}$	13.6	15.4	15.3	17.2	16.9	17.9	19.2	19.2	18.5	15.8	**2.22**
	(16.4)	(19.5)	(21.9)	(20.9)	(20.3)	(19.3)	(21.6)	(22.5)	(18.4)	(13.8)	**(2.05)**
$\text{CFEG}_{t,t+10}$	9.52	10.7	10.9	11.4	12.5	12.2	12.9	12.8	11.7	10.2	**0.70**
	(19.5)	(21.7)	(26.0)	(26.1)	(31.0)	(28.4)	(29.0)	(24.4)	(19.4)	(15.3)	**(1.11)**
Panel *D*: **Cash flows to equity growth: Equity duration measures excl. discount rate information**											
					$DUR^{DSS-FIP}$ equity duration						
$\text{CFEG}_{t,t+5}$	15.2	15.0	14.0	13.7	16.0	14.7	14.4	14.8	16.3	18.5	**3.24**
	(17.9)	(17.3)	(17.4)	(19.5)	(19.5)	(21.6)	(18.9)	(19.2)	(20.7)	(19.6)	**(5.00)**
$\text{CFEG}_{t,t+10}$	10.7	11.3	10.6	10.1	10.4	10.4	10.2	10.5	10.9	11.5	**0.87**
	(25.2)	(26.0)	(25.4)	(22.8)	(27.3)	(22.6)	(22.1)	(22.9)	(24.0)	(23.1)	**(2.70)**
					$DUR^{DSS-TZZ}$ equity duration						
$\text{CFEG}_{t,t+5}$	13.5	15.3	14.6	15.3	15.7	17.1	17.4	16.3	18.1	21.4	**7.82**
	(13.4)	(15.6)	(17.4)	(18.3)	(17.8)	(18.5)	(22.9)	(18.6)	(21.4)	(21.3)	**(9.87)**
$\text{CFEG}_{t,t+10}$	10.0	11.3	11.8	11.2	10.8	11.3	10.6	10.4	12.5	12.8	**2.79**
	(18.8)	(22.3)	(27.5)	(20.9)	(24.4)	(24.5)	(22.8)	(21.2)	(20.7)	(23.8)	**(6.09)**
					$DUR^{GON-NMI}$ equity duration						
$\text{CFEG}_{t,t+5}$	10.5	14.5	16.4	17.8	19.1	19.7	18.1	18.5	17.8	13.9	**3.38**
	(12.2)	(19.4)	(23.2)	(19.3)	(22.6)	(22.7)	(21.9)	(22.9)	(18.6)	(13.8)	**(3.95)**
$\text{CFEG}_{t,t+10}$	8.69	9.80	11.1	12.2	12.2	13.1	13.2	12.3	12.3	8.73	**0.04**
	(18.1)	(23.2)	(28.3)	(28.5)	(30.2)	(26.2)	(25.1)	(22.8)	(20.4)	(13.1)	**(0.08)**

Table 3: Unconditional returns on duration-sorted portfolios (in %).

We report monthly average returns in excess of the risk-free rate and mean pricing errors (α^{FF5}) relative to the Fama and French (2015) five-factor model for portfolios sorted on equity duration measures. Mean excess returns are calculated from January 1964 - December 2020 (depending on data availability), are value weighted and reported in percent per month. Numbers in brackets are Newey and West (1987) t-statistics with 6 lags. Moreover, we report annualized volatilities $\sigma_{ann} = \sigma_{monthly} \cdot \sqrt{12}$ and annualized Sharpe ratios $SR_{ann} = (r^e \cdot 12)/(\sigma_{monthly} \cdot \sqrt{12})$.

	D1	D2	D3	D4	D5	D6	D7	D8	D9	D10	**D10-D1**
Panel A: **Original equity duration measures including discount rate information**											
					DUR^{DSS} equity duration						
r^e	0.85	0.78	0.81	0.78	0.58	0.61	0.65	0.65	0.66	0.41	**-0.45**
	(4.04)	(4.02)	(4.24)	(4.37)	(3.39)	(3.32)	(3.88)	(3.59)	(3.18)	(1.47)	**(-2.18)**
α^{FF5}	0.03	0.01	0.04	0.07	-0.08	-0.12	-0.01	0.04	0.12	-0.07	**-0.10**
	(0.38)	(0.10)	(0.53)	(0.81)	(-1.06)	(-1.74)	(-0.10)	(0.72)	(1.87)	(-0.55)	**(-0.67)**
σ_{ann}	19.20	17.80	16.90	16.40	15.90	16.00	15.80	16.20	18.00	22.70	**16.70**
SR_{ann}	0.53	0.53	0.58	0.57	0.44	0.46	0.49	0.48	0.44	0.21	**-0.32**
					DUR^{GON} equity duration						
r^e	1.06	0.91	0.99	0.86	0.97	0.76	0.74	0.81	0.69	0.36	**-0.70**
	(4.71)	(4.46)	(4.93)	(3.99)	(4.46)	(4.17)	(3.87)	(4.45)	(3.19)	(1.42)	**(-3.41)**
α^{FF5}	0.09	0.05	0.15	-0.03	0.15	-0.00	-0.04	0.10	-0.07	-0.28	**-0.37**
	(0.79)	(0.51)	(1.63)	(-0.41)	(1.61)	(-0.04)	(-0.60)	(1.36)	(-1.06)	(-3.58)	**(-2.61)**
σ_{ann}	19.40	17.00	17.40	17.60	17.60	16.80	16.10	16.10	17.40	19.60	**15.20**
SR_{ann}	0.65	0.64	0.68	0.59	0.66	0.55	0.55	0.61	0.47	0.22	**-0.55**
					$DUR^{GON-UDR}$ equity duration						
r^e	1.04	0.79	0.95	0.73	0.84	0.76	0.73	0.72	0.54	0.61	**-0.43**
	(5.24)	(3.85)	(5.22)	(3.85)	(4.75)	(3.87)	(3.88)	(3.48)	(2.08)	(2.12)	**(-2.18)**
α^{FF5}	0.23	-0.06	0.11	-0.06	0.08	-0.00	-0.10	-0.05	-0.23	-0.11	**-0.34**
	(2.40)	(-0.60)	(1.38)	(-0.65)	(1.02)	(-0.01)	(-1.46)	(-0.82)	(-2.48)	(-0.99)	**(-2.43)**
σ_{ann}	17.20	16.40	15.90	16.10	15.90	15.80	16.30	17.50	20.00	22.60	**15.00**
SR_{ann}	0.73	0.58	0.72	0.54	0.64	0.57	0.54	0.49	0.32	0.32	**-0.34**
Panel B: **Equity duration measures excluding discount rate information**											
					$DUR^{DSS-FIP}$ equity duration						
r^e	0.62	0.64	0.59	0.58	0.59	0.64	0.61	0.55	0.65	0.76	**0.14**
	(3.17)	(3.58)	(3.33)	(3.14)	(3.34)	(3.37)	(3.45)	(2.83)	(2.96)	(2.69)	**(0.73)**
α^{FF5}	0.05	0.13	0.01	-0.02	-0.05	0.02	-0.07	-0.05	-0.07	0.05	**-0.01**
	(0.92)	(2.47)	(0.09)	(-0.25)	(-0.74)	(0.24)	(-0.92)	(-0.67)	(-0.79)	(0.40)	**(-0.06)**
σ_{ann}	16.90	15.50	16.30	16.30	16.50	17.40	16.60	16.80	19.70	23.40	**15.10**
SR_{ann}	0.44	0.49	0.44	0.43	0.43	0.44	0.44	0.39	0.40	0.39	**0.11**

Continued on next page

Table 3 continued: Unconditional returns on duration-sorted portfolios (in %).

					$DUR^{DSS-TZZ}$ equity duration					
r^e	0.76	0.66	0.77	0.70	0.73	0.75	0.84	0.67	0.82	0.62	**-0.14**
	(3.56)	(3.32)	(3.86)	(3.31)	(3.72)	(3.22)	(3.72)	(2.86)	(3.36)	(1.91)	**(-0.68)**
α^{FF5}	0.14	0.06	0.08	-0.06	0.08	-0.01	0.18	-0.04	0.10	-0.08	**-0.22**
	(2.11)	(0.84)	(0.85)	(-0.80)	(0.80)	(-0.14)	(2.03)	(-0.35)	(0.88)	(-0.60)	**(-1.48)**
σ_{ann}	17.00	16.50	16.70	17.60	18.00	18.80	18.70	19.70	20.40	24.50	**15.70**
SR_{ann}	0.54	0.48	0.55	0.48	0.49	0.48	0.54	0.41	0.48	0.30	**-0.11**
					$DUR^{GON-NMI}$ equity duration					
r^e	0.73	0.67	0.67	0.71	0.89	0.72	0.64	0.72	0.89	0.55	**-0.18**
	(3.79)	(3.75)	(3.09)	(3.71)	(4.33)	(3.47)	(3.10)	(3.08)	(3.62)	(1.85)	**(-1.03)**
α^{FF5}	-0.13	-0.06	0.01	0.05	0.24	0.06	-0.05	-0.02	0.09	-0.34	**-0.20**
	(-1.52)	(-0.78)	(0.15)	(0.76)	(2.63)	(0.76)	(-0.64)	(-0.16)	(0.92)	(-3.30)	**(-1.48)**
σ_{ann}	15.40	15.40	16.80	15.90	18.10	17.90	18.20	18.60	20.30	23.70	**15.50**
SR_{ann}	0.57	0.52	0.48	0.53	0.59	0.48	0.43	0.46	0.53	0.28	**-0.14**

Figure 2: Mean Return Spread of DUR^{DSS} for different forecasting horizons T.

This figure depicts the mean return spread (in % per month) of the equity duration measure DUR^{DSS} following Dechow et al. (2004) and Weber (2018) for different lengths of the forecasting horizon T in Equation (11). 90 % confidence intervals correspond to Newey and West (1987) corrected standard errors and are depicted in grey.

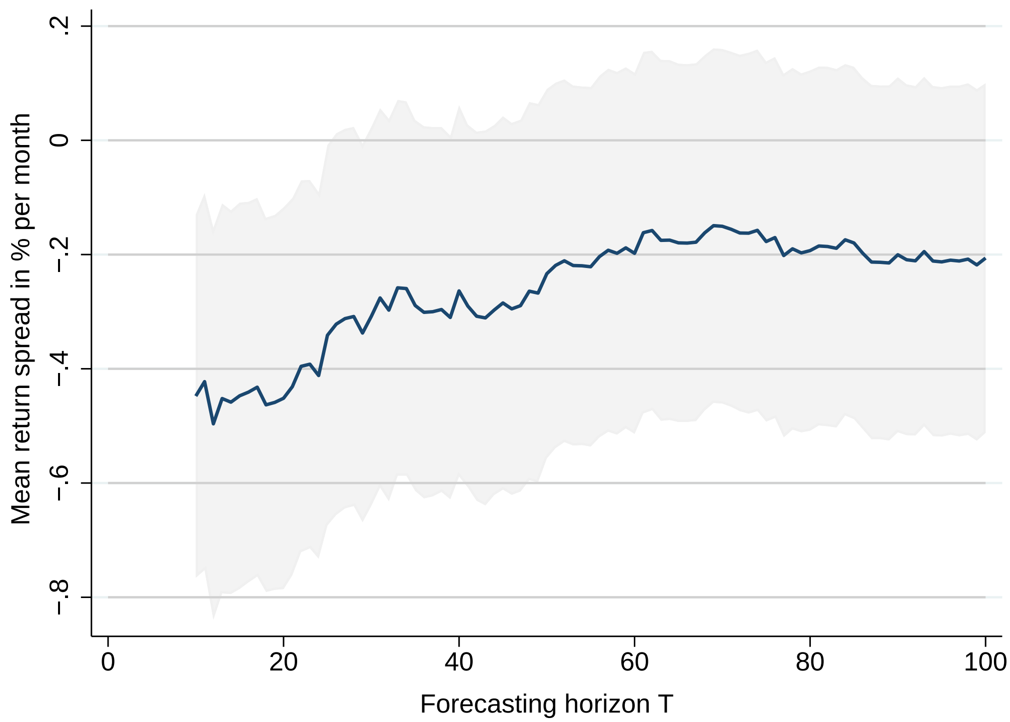

Table 4: Conditional returns for duration-sorted portfolios based on the Chicago Fed National Activity Index (CFNAI).

We document monthly excess returns for portfolios sorted on equity duration measures conditional on the Chicago Fed National Activity Index (CFNAI) from January 1964 to December 2020. r^{high} (r^{low}) are monthly excess returns if the CFNAI is higher (lower) compared to the 75th (25th) quantile. Returns are value weighted and in percent per month. Δ documents the difference in the high minus low duration portfolio (D10-D1) between the conditional returns documented in each panel and the returns in all other months.

	D1	D2	D3	D4	D5	D6	D7	D8	D9	D10	**D10-D1**	Δ
Panel *A*: **Equity duration measures including discount rate information**												
						DUR^{DSS} equity duration						
r^{low}	0.16	0.51	0.53	0.37	0.15	0.31	0.62	0.42	0.39	-0.46	**-0.62**	**0.21**
	(0.30)	(1.06)	(1.14)	(0.82)	(0.35)	(0.72)	(1.54)	(0.99)	(0.82)	(-0.71)	**(-1.46)**	**(0.48)**
r^{high}	1.05	0.82	0.66	0.71	0.49	0.49	0.31	0.47	0.40	0.32	**-0.73**	**0.36**
	(2.41)	(1.89)	(1.68)	(1.88)	(1.28)	(1.24)	(0.80)	(1.19)	(0.97)	(0.69)	**(-1.97)**	**(0.80)**
						DUR^{GON} equity duration						
r^{low}	0.79	0.62	0.65	0.55	0.67	0.51	0.69	0.68	0.60	-0.13	**-0.91**	**0.30**
	(1.41)	(1.32)	(1.35)	(1.06)	(1.34)	(1.18)	(1.57)	(1.59)	(1.23)	(-0.22)	**(-2.19)**	**(0.71)**
r^{high}	1.01	0.69	0.86	0.80	1.18	0.62	0.45	0.44	0.17	-0.03	**-1.04**	**0.44**
	(1.91)	(1.46)	(1.83)	(1.75)	(2.57)	(1.26)	(1.01)	(0.95)	(0.36)	(-0.05)	**(-2.50)**	**(0.97)**
						$DUR^{GON-UDR}$ equity duration						
r^{low}	0.78	0.65	0.66	0.69	0.60	0.62	0.76	0.58	0.16	-0.19	**-0.97**	**0.74**
	(1.59)	(1.40)	(1.48)	(1.55)	(1.40)	(1.41)	(1.81)	(1.17)	(0.28)	(-0.29)	**(-2.37)**	**(1.82)**
r^{high}	0.71	0.81	0.82	0.58	0.78	0.38	0.32	0.32	0.20	0.35	**-0.36**	**-0.09**
	(1.57)	(1.88)	(1.79)	(1.27)	(1.76)	(0.90)	(0.68)	(0.66)	(0.37)	(0.58)	**(-0.91)**	**(-0.21)**
Panel *B*: **Equity duration measures excluding discount rate information**												
						$DUR^{DSS-FIP}$ equity duration						
r^{low}	0.35	0.26	0.26	0.02	0.16	0.06	0.17	-0.01	-0.10	0.09	**-0.26**	**0.51**
	(0.75)	(0.59)	(0.58)	(0.04)	(0.35)	(0.13)	(0.38)	(-0.01)	(-0.19)	(0.14)	**(-0.73)**	**(1.29)**
r^{high}	0.45	0.47	0.64	0.48	0.68	0.52	0.50	0.36	0.63	0.86	**0.42**	**-0.41**
	(1.13)	(1.35)	(1.63)	(1.33)	(1.72)	(1.37)	(1.32)	(0.97)	(1.32)	(1.51)	**(1.20)**	**(-1.00)**
						$DUR^{DSS-TZZ}$ equity duration						
r^{low}	0.71	0.63	0.63	0.46	0.32	0.32	0.30	0.02	0.33	-0.26	**-0.97**	**1.14**
	(1.48)	(1.34)	(1.31)	(0.91)	(0.62)	(0.59)	(0.58)	(0.04)	(0.56)	(-0.39)	**(-2.50)**	**(2.68)**
r^{high}	0.38	0.30	0.27	0.51	0.50	0.55	0.64	0.68	0.67	0.86	**0.49**	**-0.80**
	(0.81)	(0.70)	(0.62)	(1.07)	(1.02)	(1.13)	(1.23)	(1.19)	(1.24)	(1.30)	**(1.22)**	**(-1.73)**
						$DUR^{GON-NMI}$ equity duration						
r^{low}	0.69	0.45	0.37	0.37	0.62	0.39	0.53	0.37	0.46	-0.29	**-0.98**	**1.11**
	(1.63)	(1.09)	(0.80)	(0.84)	(1.27)	(0.75)	(1.03)	(0.69)	(0.78)	(-0.41)	**(-2.17)**	**(2.64)**
r^{high}	0.53	0.46	0.64	0.56	0.54	0.53	0.28	0.35	0.65	0.41	**-0.12**	**-0.07**
	(1.22)	(1.05)	(1.42)	(1.28)	(1.14)	(1.13)	(0.57)	(0.72)	(1.27)	(0.66)	**(-0.35)**	**(-0.16)**

Table 5: Interest-rate sensitivity.

We show estimated coefficients b_1 and b_2 from the regression: $r_{i,t} = a + b_1 \cdot \Delta R_{f,1m,t} + b_2 \cdot \Delta R_{f,10y,t}$, where $r_{i,t}$ is the studentized return of the portfolio in month t, $\Delta R_{f,1m,t}$ is the contemporaneous change in the one-month treasury yield and $\Delta R_{f,10y,t}$ is the contemporaneous change in the 10-year treasury yields as provided by the St. Louis Fed FRED database. Numbers in brackets are robust t-statistics. MB denotes a sort with respect to the market-to-book ratio.

Measure	IR	D1	D2	D3	D4	D5	D6	D7	D8	D9	D10
DSS	$\Delta R_{f,1m,t}$	-240.3***	-221.7***	-229.2***	-230.0***	-245.1***	-223.8***	-234.9***	-220.5***	-219.4***	-226.0***
		(-3.44)	(-3.25)	(-3.17)	(-3.16)	(-3.36)	(-3.03)	(-3.13)	(-2.85)	(-2.80)	(-3.23)
	$\Delta R_{f,10y,t}$	0.17	0.10	0.10	0.05	0.02	0.00	0.00	-0.02	0.03	0.22*
		(1.26)	(0.71)	(0.72)	(0.41)	(0.18)	(0.03)	(-0.02)	(-0.17)	(0.22)	(1.69)
GON	$\Delta R_{f,1m,t}$	-250.4***	-230.6***	-227.3***	-239.4***	-230.8***	-204.0***	-234.1***	-249.5***	-229.9***	-232.7***
		(-3.51)	(-3.15)	(-3.17)	(-3.28)	(-3.22)	(-2.75)	(-3.06)	(-3.20)	(-2.81)	(-2.93)
	$\Delta R_{f,10y,t}$	0.35**	0.24*	0.24*	0.22	0.19	0.18	0.17	0.17	0.12	0.17
		(2.54)	(1.70)	(1.66)	(1.58)	(1.34)	(1.29)	(1.21)	(1.18)	(0.82)	(1.26)
GON-UDR	$\Delta R_{f,1m,t}$	-256.7***	-249.5***	-225.1***	-242.2***	-251.1***	-228.8***	-216.6***	-219.8***	-235.1***	-227.5***
		(-3.47)	(-3.33)	(-3.01)	(-3.36)	(-3.42)	(-3.06)	(-2.84)	(-2.93)	(-3.06)	(-3.01)
	$\Delta R_{f,10y,t}$	0.32**	0.27*	0.20	0.17	0.17	0.15	0.15	0.19	0.21	0.25*
		(2.26)	(1.85)	(1.43)	(1.18)	(1.22)	(1.05)	(1.10)	(1.35)	(1.56)	(1.77)
DSS-FIP	$\Delta R_{f,1m,t}$	-238.9***	-221.4***	-216.9***	-239.1***	-231.7***	-218.8***	-249.6***	-222.2***	-226.9***	-230.4***
		(-2.97)	(-2.89)	(-2.84)	(-3.27)	(-3.16)	(-3.11)	(-3.45)	(-3.07)	(-3.19)	(-3.29)
	$\Delta R_{f,10y,t}$	-0.03	-0.06	-0.05	-0.01	0.00	0.04	0.08	0.08	0.21	0.27**
		(-0.20)	(-0.48)	(-0.37)	(-0.10)	(0.00)	(0.32)	(0.56)	(0.61)	(1.58)	(2.16)
DSS-TZZ	$\Delta R_{f,1m,t}$	-241.3***	-245.0***	-227.2***	-226.5***	-218.3***	-244.3***	-244.4***	-237.9***	-227.5***	-230.1***
		(-2.87)	(-3.14)	(-2.97)	(-3.07)	(-2.84)	(-3.25)	(-3.21)	(-3.24)	(-3.00)	(-3.18)
	$\Delta R_{f,10y,t}$	-0.03	0.01	0.05	0.08	0.12	0.16	0.17	0.26*	0.28**	0.34**
		(-0.22)	(0.04)	(0.35)	(0.56)	(0.80)	(1.10)	(1.20)	(1.83)	(1.98)	(2.53)
GON-NMI	$\Delta R_{f,1m,t}$	-271.2***	-262.2***	-257.4***	-244.7***	-231.1***	-226.6***	-243.3***	-215.7***	-226.9***	-209.6***
		(-3.33)	(-3.31)	(-3.31)	(-3.23)	(-3.13)	(-3.02)	(-3.29)	(-2.97)	(-3.14)	(-2.98)
	$\Delta R_{f,10y,t}$	0.27*	0.19	0.17	0.18	0.18	0.19	0.22	0.24*	0.24*	0.25*
		(1.89)	(1.29)	(1.12)	(1.27)	(1.25)	(1.41)	(1.59)	(1.73)	(1.70)	(1.80)
MB	$\Delta R_{f,1m,t}$	-246.0***	-237.1***	-210.4***	-227.2***	-231.3***	-211.1***	-225.0***	-242.7***	-229.2***	-216.9***
		(-3.59)	(-3.51)	(-3.02)	(-3.31)	(-3.35)	(-2.94)	(-3.15)	(-3.20)	(-2.99)	(-2.64)
	$\Delta R_{f,10y,t}$	0.30**	0.20	0.16	0.14	0.09	0.07	0.04	0.01	0.00	0.04
		(2.45)	(1.49)	(1.20)	(1.00)	(0.70)	(0.48)	(0.28)	(0.08)	(0.00)	(0.27)

Table 6: Correlations between duration measures.

Panel A documents the time-series average of rank correlations between the respective equity duration measures and the book-to-market ratio (BM). Panel B shows return correlations between high-minus-low portfolios based on the respective equity duration measure and the book-to-market ratio. The time period corresponds due to data availability to January 1964 - December 2020 for DUR^{DSS}, $DUR^{DSS-FIP}$, and BM, to January 1974 - December 2020 for $DUR^{DSS-TZZ}$, DUR^{GON}, $DUR^{GON-UDR}$ and $DUR^{GON-NMI}$. Note that we drop the label DUR for all measures due to notational convenience.

	DSS	DSS-FIP	DSS-TZZ	GON	GON-UDR	GON-NMI
Panel A: **Rank correlations**						
DSS-FIP	0.30					
DSS-TZZ	0.35	0.77				
GON	0.48	-0.20	-0.09			
GON-UDR	0.41	-0.05	0.02	0.85		
GON-NMI	0.09	0.14	0.17	0.40	0.67	
BM	-0.49	0.53	0.35	-0.67	-0.46	0.02
Panel B: **Return Correlations**						
DSS-FIP	0.10					
DSS-TZZ	0.33	0.67				
GON	0.52	-0.29	-0.05			
GON-UDR	0.50	-0.01	0.17	0.75		
GON-NMI	0.42	0.36	0.45	0.25	0.54	
BM	-0.45	0.54	0.24	-0.64	-0.37	0.04

A Additional tables for versions of the Dechow et al. (2004) and Gonçalves (2021) equity duration measure

Table A.1: Characteristics of Dechow et al. (2004) duration-sorted portfolios.

Characteristics of portfolios sorted on the Dechow et al. (2004) equity duration measure. All characteristics are value weighted, while Newey and West (1987) t-statistics with 6 lags are printed in brackets. In every year we winsorize each characteristic in the cross-section at the 1% and 99% quantile. The precise definitions of all characteristics are documented in Appendix F. The observation period is from January 1964 to December 2020.

	D1	D2	D3	D4	D5	D6	D7	D8	D9	D10	**D10-D1**
Duration	10.72	14.39	15.89	16.93	17.80	18.59	19.38	20.32	21.57	26.73	**16.01**
											(24.93)
	Panel *A*: **Payout characteristics**										
Dividend ratio	0.28	0.34	0.37	0.39	0.40	0.41	0.41	0.44	0.37	0.22	**-0.06**
											(-3.08)
Repurchase ratio	0.17	0.19	0.20	0.23	0.23	0.26	0.28	0.32	0.31	0.13	**-0.04**
											(-1.68)
Issuance ratio	0.02	0.01	0.01	0.01	0.01	0.02	0.02	0.02	0.04	0.09	**0.08**
											(11.36)
Total payout ratio	0.04	0.05	0.05	0.06	0.07	0.07	0.09	0.11	0.09	-0.02	**-0.06**
											(-5.51)
	Panel *B*: **General characteristics**										
Market beta	1.08	1.00	0.98	0.98	0.96	0.97	0.99	1.01	1.14	1.33	**0.25**
											(6.58)
Size	21.74	22.09	22.38	22.46	22.61	22.77	22.88	22.87	22.89	22.04	**0.30**
											(1.68)
Book-to-market	1.27	0.99	0.83	0.72	0.62	0.53	0.44	0.35	0.29	0.43	**-0.84**
											(-16.57)
Asset growth	0.15	0.14	0.12	0.11	0.12	0.12	0.13	0.13	0.18	0.28	**0.13**
											(5.38)
Profits-to-assets	0.27	0.29	0.31	0.33	0.35	0.36	0.41	0.45	0.47	0.37	**0.10**
											(5.58)
Operating Profitability	0.33	0.30	0.30	0.31	0.33	0.34	0.36	0.40	0.39	0.17	**-0.15**
											(-5.24)
Book leverage	3.00	2.46	2.33	2.31	2.32	2.40	2.18	2.44	2.69	3.20	**0.21**
											(1.55)
Return on equity	0.18	0.15	0.15	0.15	0.16	0.17	0.18	0.20	0.18	-0.09	**-0.27**
											(-9.53)
Book equity growth	0.28	0.18	0.14	0.12	0.12	0.12	0.12	0.11	0.14	0.28	**0.00**
											(-0.02)

Table A.2: Characteristics of of Gonçalves (2021) duration-sorted portfolios.

Characteristics of portfolios sorted on the Gonçalves (2021) equity duration measure. All characteristics are value-weighted, while Newey and West (1987) t-statistics with 6 lags are printed in brackets. In every year we winsorize each characteristic in the cross-section at the 1% and 99% quantile. The precise definitions of all characteristics are documented in Appendix F. The observation period is from January 1964 to December 2020.

	D1	D2	D3	D4	D5	D6	D7	D8	D9	D10	**D10-D1**
Duration	13.06	19.99	25.09	29.64	33.81	37.94	42.66	48.18	56.02	76.05	**62.99**
											(32.84)
	Panel *A*: **Payout characteristics**										
Dividend ratio	0.30	0.30	0.30	0.34	0.35	0.39	0.40	0.39	0.34	0.31	**0.01**
											(0.51)
Repurchase ratio	0.36	0.30	0.31	0.34	0.31	0.29	0.31	0.34	0.36	0.30	**-0.06**
											(-2.68)
Issuance ratio	0.01	0.01	0.02	0.02	0.02	0.02	0.02	0.02	0.03	0.06	**0.05**
											(14.75)
Total payout ratio	0.06	0.07	0.07	0.09	0.08	0.10	0.11	0.11	0.13	0.08	**0.02**
											(2.36)
	Panel *B*: **General characteristics**										
Market beta	1.03	1.01	1.05	1.04	1.04	0.96	0.98	1.01	1.05	1.18	**0.14**
											(4.87)
Size	21.00	21.76	21.93	22.31	22.55	23.17	23.19	23.21	23.41	23.13	**2.13**
											(12.21)
Book-to-market	1.44	0.95	0.80	0.71	0.66	0.57	0.48	0.42	0.35	0.30	**-1.14**
											(-12.63)
Asset growth	0.05	0.08	0.10	0.10	0.11	0.12	0.12	0.13	0.17	0.27	**0.22**
											(12.86)
Profits-to-assets	0.50	0.48	0.46	0.43	0.41	0.41	0.43	0.41	0.41	0.32	**-0.18**
											(-6.03)
Operating Profitability	0.25	0.29	0.31	0.33	0.33	0.36	0.37	0.38	0.40	0.35	**0.10**
											(8.84)
Book leverage	2.02	2.10	2.14	2.22	2.29	2.24	2.36	2.39	2.52	3.30	**1.28**
											(8.08)
Return on equity	0.11	0.13	0.14	0.15	0.15	0.17	0.18	0.20	0.21	0.16	**0.06**
											(8.50)
Book equity growth	0.07	0.09	0.12	0.10	0.12	0.13	0.12	0.14	0.16	0.26	**0.19**
											(11.82)

Table A.3: Characteristics of of $DUR^{GON-UDR}$-sorted portfolios.

Characteristics of portfolios sorted on a version of the Gonçalves (2021) equity duration measure, $DUR^{GON-UDR}$, that does not use market-implied discount rates. All characteristics are value-weighted, while Newey and West (1987) t-statistics with 6 lags are printed in brackets. In every year we winsorize each characteristic in the cross-section at the 1% and 99% quantile. The precise definitions of all characteristics are documented in Appendix F. The observation period is from January 1964 to December 2020.

	D1	D2	D3	D4	D5	D6	D7	D8	D9	D10	**D10-D1**
Duration	14.47	16.59	17.89	19.04	20.22	21.50	23.13	25.44	29.56	64.42	**49.96**
											(13.95)
	Panel *A*: **Payout characteristics**										
Dividend ratio	0.34	0.35	0.35	0.37	0.39	0.41	0.40	0.35	0.32	0.24	**-0.10**
											(-5.69)
Repurchase ratio	0.39	0.34	0.36	0.36	0.32	0.34	0.32	0.34	0.31	0.22	**-0.16**
											(-6.79)
Issuance ratio	0.01	0.01	0.01	0.02	0.02	0.02	0.02	0.03	0.04	0.07	**0.06**
											(12.13)
Total payout ratio	0.08	0.09	0.12	0.11	0.12	0.12	0.12	0.12	0.07	0.00	**-0.08**
											(-11.64)
	Panel *B*: **General characteristics**										
Market beta	0.98	0.96	0.96	0.94	0.97	0.97	0.99	1.08	1.19	1.31	**0.33**
											(12.53)
Size	21.52	22.25	22.67	22.95	23.19	23.19	23.14	23.16	22.85	22.69	**1.18**
											(6.35)
Book-to-market	1.14	0.80	0.69	0.59	0.53	0.47	0.43	0.39	0.39	0.46	**-0.68**
											(-12.41)
Asset growth	0.04	0.06	0.09	0.08	0.11	0.11	0.13	0.15	0.21	0.33	**0.29**
											(14.58)
Profits-to-assets	0.44	0.45	0.43	0.44	0.44	0.45	0.43	0.42	0.37	0.25	**-0.19**
											(-7.98)
Operating Profitability	0.25	0.31	0.35	0.35	0.37	0.38	0.38	0.39	0.37	0.29	**0.04**
											(3.05)
Book leverage	1.73	1.87	2.01	2.02	2.16	2.23	2.32	2.50	2.87	4.13	**2.39**
											(13.15)
Return on equity	0.12	0.15	0.17	0.17	0.19	0.19	0.20	0.20	0.17	0.10	**-0.02**
											(-1.58)
Book equity growth	0.07	0.08	0.09	0.09	0.11	0.11	0.13	0.15	0.20	0.31	**0.24**
											(13.56)

Table A.4: Characteristics of of $DUR^{DSS-FIP}$ duration-sorted portfolios.

Characteristics of portfolios sorted on $DUR^{DSS-FIP}$, a version of the Dechow et al. (2004) equity duration measure where market prices are replaced by an estimate derived from the employed cash-flow forecasts discounted at a uniform rate and assuming uniform long-run growth. All characteristics are value-weighted, while Newey and West (1987) t-statistics with 6 lags are printed in brackets. In every year we winsorize each characteristic in the cross-section at the 1% and 99% quantile. The precise definitions of all characteristics are documented in Appendix F. The observation period is from January 1964 to December 2020.

	D1	D2	D3	D4	D5	D6	D7	D8	D9	D10	**D10-D1**
Duration	13.87	16.03	17.02	17.77	18.42	19.08	19.82	20.86	22.76	41.32	**27.45**
											(16.89)
	Panel *A*: **Payout characteristics**										
Dividend ratio	0.33	0.35	0.32	0.35	0.36	0.41	0.49	0.69	0.62	0.23	**-0.10**
											(-4.22)
Repurchase ratio	0.30	0.25	0.26	0.24	0.22	0.23	0.28	0.40	0.34	0.08	**-0.22**
											(-7.55)
Issuance ratio	0.03	0.02	0.02	0.02	0.02	0.02	0.02	0.02	0.03	0.04	**0.01**
											(5.17)
Total payout ratio	0.18	0.09	0.07	0.05	0.04	0.04	0.03	0.02	0.01	0.00	**-0.18**
											(-11.19)
	Panel *B*: **General characteristics**										
Market beta	1.04	1.00	1.02	1.00	1.01	1.02	1.03	1.07	1.19	1.32	**0.28**
											(10.12)
Size	23.21	23.32	23.04	22.74	22.55	22.49	22.45	22.23	21.54	21.15	**-2.07**
											(-25.24)
Book-to-market	0.24	0.34	0.41	0.53	0.61	0.70	0.79	0.88	1.00	1.03	**0.79**
											(13.33)
Asset growth	0.19	0.15	0.14	0.13	0.12	0.12	0.11	0.10	0.15	0.21	**0.02**
											(1.05)
Profits-to-assets	0.57	0.47	0.42	0.37	0.34	0.31	0.29	0.26	0.25	0.24	**-0.33**
											(-32.90)
Operating Profitability	0.61	0.41	0.34	0.30	0.28	0.26	0.23	0.21	0.18	0.13	**-0.48**
											(-33.72)
Book leverage	3.03	2.26	2.27	2.17	2.20	2.11	2.15	2.34	2.37	2.98	**-0.05**
											(-0.37)
Return on equity	0.35	0.22	0.18	0.15	0.13	0.11	0.09	0.06	0.03	-0.08	**-0.43**
											(-31.14)
Book equity growth	0.24	0.14	0.14	0.12	0.12	0.11	0.10	0.09	0.12	0.20	**-0.04**
											(-1.52)

Table A.5: Characteristics of $DUR^{DSS-TZZ}$-sorted portfolios.

Characteristics of portfolios sorted on $DUR^{DSS-TZZ}$, a version of the Dechow et al. (2004) equity duration measure where market prices are replaced by an estimate derived from the employed cash-flow forecasts discounted at a uniform rate but allowing for stock-specific growth rate equaling the predicted 5 year growth in EBITDA similar to Tengulov et al. (2019). All characteristics are value-weighted, while Newey and West (1987) t-statistics with 6 lags are printed in brackets for the difference between the highest and lowest Decile. In every year we winsorize each characteristic in the cross-section at the 1% and 99% quantile. The precise definitions of all characteristics are documented in Appendix F. The observation period is from January 1964 to December 2020.

	D1	D2	D3	D4	D5	D6	D7	D8	D9	D10	**D10-D1**
Duration	9.24	10.78	11.75	12.60	13.43	14.41	15.80	18.13	23.39	1339.71	**1330.47**
											(18.22)
	Panel A: **Payout characteristics**										
Dividend ratio	0.32	0.32	0.33	0.33	0.42	0.32	0.37	0.38	0.29	0.15	**-0.17**
											(-8.84)
Repurchase ratio	0.37	0.33	0.31	0.37	0.39	0.35	0.33	0.37	0.28	0.13	**-0.24**
											(-8.85)
Issuance ratio	0.03	0.02	0.02	0.02	0.02	0.03	0.03	0.03	0.04	0.08	**0.05**
											(10.40)
Total payout ratio	0.19	0.10	0.07	0.06	0.06	0.05	0.03	0.03	0.02	-0.02	**-0.22**
											(-16.03)
	Panel B: **General characteristics**										
Market beta	1.00	1.01	1.02	1.08	1.07	1.16	1.14	1.18	1.24	1.36	**0.36**
											(11.51)
Size	23.71	23.31	23.07	22.47	22.63	22.28	22.22	21.95	21.93	21.47	**-2.24**
											(-16.84)
Book-to-market	0.29	0.37	0.45	0.54	0.56	0.59	0.64	0.70	0.70	0.68	**0.39**
											(19.87)
Asset growth	0.16	0.14	0.14	0.13	0.15	0.15	0.18	0.17	0.22	0.35	**0.19**
											(5.74)
Profits-to-assets	0.53	0.49	0.45	0.42	0.41	0.41	0.37	0.37	0.33	0.27	**-0.26**
											(-23.82)
Operating Profitability	0.55	0.37	0.34	0.31	0.29	0.28	0.26	0.25	0.24	0.12	**-0.43**
											(-24.26)
Book leverage	2.81	2.13	2.12	2.12	2.10	2.17	2.27	2.22	2.42	2.71	**-0.10**
											(-0.86)
Return on equity	0.33	0.21	0.18	0.15	0.14	0.13	0.11	0.09	0.06	-0.06	**-0.39**
											(-22.81)
Book equity growth	0.19	0.14	0.18	0.13	0.15	0.15	0.18	0.18	0.21	0.34	**0.15**
											(3.68)

Table A.6: Characteristics of of $DUR^{GON-NMI}$-sorted portfolios.

Characteristics of portfolios sorted on a version of the Gonçalves (2021) equity duration measure, $DUR^{GON-NMI}$, that uses neither market-implied discount rates nor any market-price related state variables in the VAR. All characteristics are value-weighted, while Newey and West (1987) t-statistics with 6 lags are printed in brackets. In every year we winsorize each characteristic in the cross-section at the 1% and 99% quantile. The precise definitions of all characteristics are documented in Appendix F. The observation period is from January 1964 to December 2020.

	D1	D2	D3	D4	D5	D6	D7	D8	D9	D10	**D10-D1**
Duration	25.34	27.27	28.49	29.51	30.50	31.60	32.93	34.68	37.42	57.71	**32.37**
											(17.22)
	Panel A: **Payout characteristics**										
Dividend ratio	0.41	0.40	0.41	0.38	0.37	0.35	0.35	0.35	0.26	0.22	**-0.20**
											(-11.47)
Repurchase ratio	0.47	0.39	0.35	0.31	0.30	0.31	0.33	0.24	0.19	0.16	**-0.32**
											(-10.79)
Issuance ratio	0.02	0.02	0.02	0.02	0.02	0.02	0.02	0.03	0.04	0.09	**0.07**
											(10.80)
Total payout ratio	0.21	0.14	0.14	0.10	0.09	0.07	0.06	0.04	0.01	-0.04	**-0.25**
											(-14.00)
	Panel B: **General characteristics**										
Market beta	0.90	0.92	0.97	0.99	1.04	1.09	1.09	1.14	1.21	1.32	**0.43**
											(17.98)
Size	23.09	23.39	23.45	23.20	22.99	23.07	22.96	22.54	22.21	22.15	**-0.93**
											(-10.93)
Book-to-market	0.61	0.55	0.50	0.49	0.50	0.50	0.53	0.56	0.59	0.58	**-0.03**
											(-0.54)
Asset growth	0.03	0.07	0.10	0.11	0.12	0.15	0.15	0.19	0.23	0.51	**0.48**
											(14.58)
Profits-to-assets	0.40	0.41	0.43	0.42	0.42	0.41	0.41	0.38	0.36	0.26	**-0.14**
											(-3.97)
Operating Profitability	0.43	0.38	0.39	0.36	0.35	0.33	0.33	0.31	0.30	0.25	**-0.19**
											(-4.83)
Book leverage	2.62	2.19	2.15	2.13	2.20	2.20	2.26	2.47	2.89	4.23	**1.61**
											(7.66)
Return on equity	0.23	0.20	0.20	0.18	0.17	0.17	0.15	0.14	0.11	0.05	**-0.18**
											(-6.89)
Book equity growth	0.03	0.08	0.11	0.11	0.13	0.15	0.15	0.20	0.23	0.51	**0.48**
											(12.50)

Table A.7: Rank correlations of duration measures and characteristics.

We report the time-series average of Spearman rank correlations between the respective equity duration measures and stock characteristics. β is the co-movement with the market, ME the natural logarithm of market equity, BM the book-to-market ratio, AG asset growth, GPA gross profits-to-assets, OPE operating profitability, BL book leverage, ROE return on equity and BEG book equity growth. The precise definitions of all characteristics are documented in Appendix F. The time period corresponds to January 1964 - December 2020 for DSS, $DSS-FIP$, β, ME, BM, AG, GPA, OPE, BL, ROE, BEG and to January 1974 - December 2020 for $DSS-TZZ$, GON, $GON-UDR$ and $GON-NMI$ due to data availability.

	DSS	DSS-FIP	DSS-TZZ	GON	GON-UDR	GON-NMI	β	ME	BM	AG	GPA	OPE	BL	ROE
DSS-FIP	0.29													
DSS-TZZ	0.35	0.77												
GON	0.48	-0.20	-0.09											
GON-UDR	0.41	-0.05	0.02	0.85										
GON-NMI	0.09	0.14	0.17	0.39	0.67									
Beta	0.13	0.05	0.09	0.11	0.14	0.12								
Size	0.07	-0.40	-0.48	0.41	0.26	-0.03	0.04							
BM	-0.49	0.53	0.35	-0.67	-0.46	0.02	-0.08	-0.42						
AG	-0.05	-0.37	-0.20	0.28	0.29	0.27	0.06	0.20	-0.34					
GPA	0.01	-0.35	-0.22	-0.31	-0.30	-0.22	-0.02	-0.02	-0.29	0.07				
OPE	-0.17	-0.80	-0.65	0.20	0.13	-0.06	-0.04	0.40	-0.49	0.30	0.37			
BL	-0.02	-0.03	-0.04	0.15	0.41	0.30	0.04	0.06	0.00	0.04	-0.14	0.22		
ROE	-0.28	-0.99	-0.75	0.22	0.08	-0.10	-0.04	0.40	-0.55	0.43	0.34	0.80	0.02	
BEG	-0.18	-0.54	-0.34	0.23	0.20	0.17	0.09	0.21	-0.38	0.63	0.16	0.43	-0.04	0.62

Table A.8: CAPM alphas for duration sorted portfolios.

We regress the value-weighted excess returns of duration sorted portfolios on the Capital Asset Pricing model from January 1964 to December 2020. The market factor is from Kenneth French's website. In brackets are Newey and West (1987) *t*-statistics with 6 lags and the alpha (α^{CAPM}) is denoted in percent per month.

	D1	D2	D3	D4	D5	D6	D7	D8	D9	D10	**D10-D1**
Panel *A*: **Equity duration measures including discount rate information**											
					DUR^{DSS} equity duration						
MKT	1.05	1.02	0.96	0.94	0.91	0.94	0.93	0.98	1.08	1.28	**0.24**
	(25.29)	(26.26)	(27.68)	(33.96)	(31.60)	(31.92)	(35.49)	(45.41)	(55.51)	(32.05)	**(3.69)**
α^{CAPM}	0.26	0.21	0.28	0.25	0.07	0.08	0.12	0.10	0.05	-0.32	**-0.58**
	(2.22)	(1.89)	(2.44)	(2.47)	(0.83)	(0.99)	(1.55)	(1.54)	(0.57)	(-2.25)	**(-2.78)**
					DUR^{GON} equity duration						
MKT	1.00	0.91	0.97	1.00	1.01	0.94	0.94	0.94	1.03	1.15	**0.15**
	(21.01)	(26.26)	(26.24)	(25.85)	(29.26)	(24.41)	(37.93)	(32.84)	(38.37)	(38.41)	**(2.13)**
α^{CAPM}	0.40	0.31	0.36	0.21	0.30	0.15	0.13	0.20	0.01	-0.39	**-0.79**
	(2.65)	(2.49)	(3.15)	(1.75)	(2.89)	(1.40)	(1.54)	(2.69)	(0.14)	(-3.99)	**(-3.71)**
					$DUR^{GON-UDR}$ equity duration						
MKT	0.90	0.91	0.88	0.92	0.90	0.91	0.93	1.03	1.18	1.31	**0.41**
	(23.87)	(25.38)	(25.24)	(28.97)	(26.82)	(33.95)	(24.23)	(38.04)	(43.70)	(35.76)	**(7.67)**
α^{CAPM}	0.46	0.19	0.37	0.13	0.26	0.16	0.12	0.04	-0.23	-0.25	**-0.70**
	(3.80)	(1.63)	(3.15)	(1.29)	(2.69)	(1.78)	(1.20)	(0.54)	(-2.38)	(-2.17)	**(-3.95)**
Panel *B*: **Equity duration measures excluding discount rate information**											
					$DUR^{DSS-FIP}$ equity duration						
MKT	1.01	0.94	0.99	0.99	0.99	1.03	0.96	0.97	1.16	1.31	**0.30**
	(43.10)	(59.34)	(51.60)	(66.65)	(54.36)	(46.84)	(32.26)	(42.97)	(38.19)	(32.41)	**(5.84)**
α^{CAPM}	0.05	0.11	0.04	0.03	0.03	0.06	0.07	0.00	0.00	0.02	**-0.03**
	(0.62)	(1.76)	(0.59)	(0.44)	(0.44)	(0.78)	(0.82)	(0.03)	(0.04)	(0.13)	**(-0.18)**
					$DUR^{DSS-TZZ}$ equity duration						
MKT	0.99	0.97	0.97	1.02	1.02	1.08	1.08	1.11	1.16	1.35	**0.35**
	(51.98)	(47.90)	(40.29)	(48.08)	(31.98)	(46.28)	(42.74)	(38.73)	(40.34)	(30.06)	**(6.68)**
α^{CAPM}	0.11	0.02	0.14	0.03	0.06	0.05	0.13	-0.05	0.06	-0.26	**-0.38**
	(1.36)	(0.26)	(1.72)	(0.36)	(0.62)	(0.50)	(1.35)	(-0.52)	(0.58)	(-1.69)	**(-1.98)**
					$DUR^{GON-NMI}$ equity duration						
MKT	0.83	0.88	0.97	0.93	1.05	1.05	1.06	1.08	1.18	1.38	**0.55**
	(20.97)	(30.87)	(36.49)	(46.98)	(42.38)	(52.34)	(37.93)	(49.99)	(39.70)	(37.65)	**(9.28)**
α^{CAPM}	0.18	0.09	0.04	0.10	0.20	0.03	-0.05	0.01	0.12	-0.36	**-0.54**
	(1.84)	(1.12)	(0.38)	(1.63)	(2.48)	(0.42)	(-0.62)	(0.13)	(1.10)	(-3.65)	**(-3.81)**

Table A.9: Fama and French (1993) alphas of duration sorted portfolios.

We regress the value-weighted excess returns of duration sorted portfolios on the Fama and French (1993) factor model from January 1964 to December 2020. The factors are from Kenneth French's website. Numbers in brackets correspond to Newey and West (1987) t-statistics with 6 lags and the alpha (α^{FF3}) is denoted in percent per month.

	D1	D2	D3	D4	D5	D6	D7	D8	D9	D10	**D10-D1**
Panel A: **Equity duration measures including discount rate information**											
						DUR^{DSS} equity duration					
MKT	1.07	1.04	0.99	0.98	0.93	0.97	0.95	0.98	1.05	1.18	**0.11**
	(37.57)	(35.60)	(42.54)	(47.44)	(29.30)	(42.32)	(41.47)	(50.21)	(59.37)	(30.42)	**(2.14)**
SMB	0.25	0.17	0.11	0.02	0.02	-0.04	-0.08	-0.08	-0.07	0.26	**0.01**
	(4.16)	(3.38)	(3.03)	(0.51)	(0.35)	(-1.05)	(-2.47)	(-2.29)	(-2.54)	(4.62)	**(0.06)**
HML	0.57	0.40	0.39	0.28	0.16	0.13	-0.01	-0.14	-0.35	-0.37	**-0.94**
	(10.22)	(8.11)	(6.52)	(5.07)	(2.37)	(2.18)	(-0.16)	(-3.26)	(-10.53)	(-5.94)	**(-10.06)**
α^{FF3}	0.05	0.06	0.14	0.16	0.02	0.04	0.13	0.15	0.17	-0.22	**-0.28**
	(0.62)	(0.77)	(1.73)	(1.93)	(0.20)	(0.56)	(1.87)	(2.60)	(2.50)	(-1.76)	**(-1.78)**
						DUR^{GON} equity duration					
MKT	0.97	0.89	0.96	1.02	1.03	0.93	0.95	0.94	1.02	1.11	**0.13**
	(32.37)	(28.62)	(29.61)	(40.61)	(36.27)	(22.94)	(48.47)	(38.94)	(45.98)	(44.85)	**(3.10)**
SMB	0.56	0.35	0.31	0.15	0.08	0.10	-0.05	-0.04	-0.10	-0.07	**-0.63**
	(11.39)	(7.51)	(6.27)	(2.94)	(2.51)	(1.25)	(-1.18)	(-1.72)	(-3.47)	(-1.87)	**(-10.52)**
HML	0.49	0.27	0.28	0.31	0.19	0.04	0.03	-0.05	-0.17	-0.37	**-0.86**
	(9.43)	(4.62)	(5.40)	(4.45)	(3.76)	(0.53)	(0.44)	(-0.94)	(-3.08)	(-8.73)	**(-10.95)**
α^{FF3}	0.19	0.19	0.23	0.09	0.23	0.12	0.13	0.22	0.07	-0.27	**-0.46**
	(1.78)	(1.86)	(2.47)	(1.08)	(2.60)	(1.20)	(1.60)	(3.13)	(1.06)	(-3.62)	**(-3.35)**
						$DUR^{GON-UDR}$ equity duration					
MKT	0.87	0.93	0.90	0.94	0.92	0.92	0.94	1.03	1.13	1.25	**0.38**
	(25.56)	(41.45)	(32.23)	(34.49)	(28.40)	(38.99)	(28.49)	(43.26)	(46.67)	(32.01)	**(7.79)**
SMB	0.43	0.16	0.10	-0.02	-0.05	-0.02	-0.11	-0.08	0.05	0.12	**-0.31**
	(9.28)	(3.37)	(2.15)	(-0.38)	(-1.11)	(-0.79)	(-2.84)	(-3.21)	(0.92)	(1.87)	**(-3.71)**
HML	0.30	0.33	0.26	0.16	0.06	-0.02	-0.07	-0.12	-0.24	-0.29	**-0.58**
	(5.39)	(6.60)	(3.93)	(2.87)	(0.91)	(-0.32)	(-0.81)	(-2.09)	(-5.73)	(-4.14)	**(-6.35)**
α^{FF3}	0.31	0.07	0.28	0.08	0.24	0.16	0.15	0.09	-0.17	-0.17	**-0.49**
	(3.05)	(0.75)	(3.02)	(0.93)	(2.72)	(2.03)	(1.71)	(1.28)	(-1.90)	(-1.71)	**(-3.39)**

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Table A.9 continued: Fama and French (1993) alphas of duration sorted portfolios.

Panel *B*: **Equity duration measures excluding discount rate information**

					$DUR^{DSS-FIP}$ equity duration						
MKT	0.99	0.93	1.00	0.99	1.01	1.04	0.97	0.96	1.12	1.20	**0.20**
	(46.10)	(60.77)	(51.12)	(63.28)	(53.83)	(49.38)	(36.58)	(43.09)	(42.08)	(31.43)	**(4.35)**
SMB	-0.13	-0.06	-0.13	0.02	-0.07	0.02	0.06	0.14	0.32	0.61	**0.74**
	(-3.16)	(-2.64)	(-3.68)	(0.65)	(-2.00)	(0.51)	(1.44)	(3.52)	(8.18)	(13.62)	**(11.83)**
HML	-0.29	-0.20	-0.12	0.05	0.02	0.09	0.15	0.19	0.19	0.09	**0.38**
	(-7.22)	(-9.13)	(-4.02)	(1.74)	(0.48)	(2.47)	(3.25)	(4.70)	(4.62)	(1.37)	**(4.36)**
α^{FF3}	0.16	0.18	0.09	0.01	0.03	0.03	0.01	-0.07	-0.09	-0.07	**-0.23**
	(2.19)	(3.35)	(1.56)	(0.12)	(0.45)	(0.36)	(0.18)	(-0.87)	(-1.01)	(-0.54)	**(-1.39)**
					$DUR^{DSS-TZZ}$ equity duration						
MKT	0.99	0.96	0.97	1.00	1.01	1.06	1.03	1.04	1.09	1.23	**0.24**
	(53.34)	(55.09)	(39.15)	(43.21)	(32.24)	(45.61)	(47.44)	(37.44)	(34.27)	(27.26)	**(4.53)**
SMB	-0.16	-0.10	-0.02	0.12	0.05	0.16	0.17	0.36	0.31	0.47	**0.64**
	(-4.58)	(-2.98)	(-0.39)	(2.67)	(1.17)	(3.51)	(4.09)	(6.86)	(4.81)	(7.14)	**(7.22)**
HML	-0.23	-0.18	-0.05	-0.03	-0.07	0.02	-0.17	-0.08	-0.09	-0.29	**-0.06**
	(-5.83)	(-5.26)	(-1.02)	(-0.81)	(-1.58)	(0.34)	(-4.38)	(-1.37)	(-1.38)	(-5.05)	**(-0.72)**
α^{FF3}	0.20	0.09	0.15	0.02	0.08	0.02	0.16	-0.07	0.05	-0.23	**-0.43**
	(2.82)	(1.29)	(1.90)	(0.32)	(0.78)	(0.24)	(1.89)	(-0.74)	(0.51)	(-1.62)	**(-2.44)**
					$DUR^{GON-NMI}$ equity duration						
MKT	0.88	0.88	0.99	0.94	1.02	1.03	1.03	1.03	1.14	1.32	**0.45**
	(29.99)	(30.51)	(39.35)	(48.90)	(48.18)	(48.52)	(37.23)	(47.08)	(37.87)	(33.78)	**(7.68)**
SMB	-0.12	-0.05	-0.17	-0.11	0.07	-0.00	0.05	0.20	0.22	0.35	**0.47**
	(-2.06)	(-1.66)	(-6.31)	(-3.79)	(1.50)	(-0.06)	(1.33)	(3.90)	(5.69)	(8.25)	**(6.23)**
HML	0.18	-0.04	-0.09	-0.06	-0.14	-0.14	-0.11	-0.10	-0.06	0.01	**-0.17**
	(2.56)	(-1.17)	(-2.26)	(-1.85)	(-2.90)	(-3.44)	(-2.40)	(-2.04)	(-1.25)	(0.20)	**(-1.64)**
α^{FF3}	0.14	0.11	0.08	0.13	0.23	0.08	-0.02	0.02	0.11	-0.40	**-0.54**
	(1.55)	(1.33)	(1.00)	(2.07)	(3.05)	(1.02)	(-0.25)	(0.20)	(1.05)	(-4.09)	**(-4.00)**

Table A.10: Fama and French (2015) alphas of duration sorted portfolios.

We regress the value-weighted excess returns of duration sorted portfolios on the Fama and French (2015) five-factor model from January 1964 to December 2020. The Fama and French (2015) factors are from Kenneth French's website. Numbers in brackets correspond to Newey and West (1987) t-statistics with 6 lags and the alpha (α^{FF5}) is denoted in percent per month.

	D1	D2	D3	D4	D5	D6	D7	D8	D9	D10	**D10-D1**
Panel *A*: **Equity duration measures including discount rate information**											
						DUR^{DSS} equity duration					
MKT	1.06	1.04	1.01	0.99	0.95	1.01	0.99	1.01	1.06	1.15	**0.09**
	(36.09)	(35.40)	(44.43)	(48.86)	(33.59)	(49.20)	(48.67)	(61.33)	(55.84)	(30.84)	**(1.84)**
SMB	0.31	0.24	0.18	0.09	0.09	0.06	-0.02	-0.03	-0.05	0.15	**-0.16**
	(7.46)	(5.66)	(4.72)	(2.64)	(1.91)	(2.06)	(-0.51)	(-0.98)	(-1.76)	(2.62)	**(-2.31)**
HML	0.58	0.39	0.31	0.22	0.09	0.01	-0.16	-0.23	-0.38	-0.37	**-0.95**
	(9.34)	(7.48)	(5.13)	(4.16)	(1.31)	(0.27)	(-4.03)	(-6.27)	(-9.63)	(-5.22)	**(-10.02)**
CMA	-0.14	-0.06	0.12	0.11	0.13	0.26	0.35	0.22	0.09	-0.05	**0.09**
	(-1.70)	(-0.78)	(1.48)	(1.46)	(1.73)	(4.67)	(4.52)	(4.02)	(1.49)	(-0.46)	**(0.61)**
RMW	0.17	0.21	0.22	0.21	0.21	0.32	0.19	0.19	0.06	-0.43	**-0.60**
	(2.31)	(3.54)	(3.70)	(3.32)	(2.91)	(5.25)	(2.42)	(3.21)	(1.28)	(-4.99)	**(-5.93)**
α^{FF5}	0.03	0.01	0.04	0.07	-0.08	-0.12	-0.01	0.04	0.12	-0.07	**-0.10**
	(0.38)	(0.10)	(0.53)	(0.81)	(-1.06)	(-1.74)	(-0.10)	(0.72)	(1.87)	(-0.55)	**(-0.67)**
						DUR^{GON} equity duration					
MKT	1.00	0.92	0.97	1.04	1.04	0.97	0.99	0.96	1.06	1.11	**0.11**
	(32.70)	(29.22)	(32.11)	(36.94)	(35.30)	(27.74)	(68.39)	(49.60)	(53.96)	(44.14)	**(2.73)**
SMB	0.62	0.43	0.37	0.24	0.16	0.15	0.05	0.05	-0.02	-0.07	**-0.68**
	(12.61)	(9.04)	(8.81)	(5.94)	(4.51)	(2.17)	(1.49)	(1.67)	(-0.65)	(-1.99)	**(-10.25)**
HML	0.31	0.10	0.18	0.21	0.13	-0.10	-0.08	-0.11	-0.26	-0.38	**-0.68**
	(5.61)	(1.48)	(3.18)	(4.80)	(3.45)	(-1.24)	(-1.71)	(-3.15)	(-6.13)	(-7.10)	**(-7.90)**
CMA	0.18	0.21	0.09	0.11	0.05	0.29	0.20	0.07	0.20	0.03	**-0.15**
	(1.91)	(2.30)	(1.15)	(1.27)	(0.68)	(2.91)	(3.12)	(0.90)	(2.13)	(0.38)	**(-1.17)**
RMW	0.18	0.24	0.17	0.26	0.20	0.14	0.31	0.27	0.24	0.01	**-0.17**
	(3.53)	(5.11)	(3.12)	(3.27)	(3.35)	(1.45)	(5.13)	(3.50)	(3.91)	(0.24)	**(-1.87)**
α^{FF5}	0.09	0.05	0.15	-0.03	0.15	-0.00	-0.04	0.10	-0.07	-0.28	**-0.37**
	(0.79)	(0.51)	(1.63)	(-0.41)	(1.61)	(-0.04)	(-0.60)	(1.36)	(-1.06)	(-3.58)	**(-2.61)**
						$DUR^{GON-UDR}$ equity duration					
MKT	0.89	0.95	0.95	0.97	0.95	0.96	0.99	1.06	1.14	1.23	**0.34**
	(26.85)	(41.58)	(35.43)	(36.07)	(37.23)	(42.97)	(43.49)	(59.24)	(41.99)	(34.21)	**(7.27)**
SMB	0.44	0.24	0.19	0.07	0.04	0.07	0.05	-0.01	0.09	0.09	**-0.35**
	(8.69)	(5.04)	(4.72)	(1.73)	(0.83)	(1.94)	(1.33)	(-0.24)	(2.46)	(1.56)	**(-4.36)**
HML	0.11	0.22	0.10	0.08	-0.05	-0.14	-0.20	-0.21	-0.27	-0.24	**-0.36**

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Table A.10 continued: Fama and French (2015) alphas of duration sorted portfolios.

	(1.65)	(4.65)	(2.36)	(1.84)	(-0.80)	(-2.97)	(-4.02)	(-4.35)	(-5.98)	(-2.89)	**(-3.53)**
CMA	0.28	0.14	0.28	0.14	0.23	0.25	0.24	0.19	0.03	-0.12	**-0.40**
	(2.71)	(1.71)	(3.17)	(2.26)	(2.34)	(3.39)	(2.76)	(2.01)	(0.33)	(-1.02)	**(-2.72)**
RMW	0.05	0.25	0.27	0.25	0.25	0.27	0.49	0.24	0.14	-0.09	**-0.14**
	(0.90)	(3.67)	(3.80)	(4.05)	(3.33)	(3.76)	(6.14)	(3.11)	(2.03)	(-1.12)	**(-1.37)**
α^{FF5}	0.23	-0.06	0.11	-0.06	0.08	-0.00	-0.10	-0.05	-0.23	-0.11	**-0.34**
	(2.40)	(-0.60)	(1.38)	(-0.65)	(1.02)	(-0.01)	(-1.46)	(-0.82)	(-2.48)	(-0.99)	**(-2.43)**
Panel *B*: **Equity duration measures excluding discount rate information**											
					$DUR^{DSS-FIP}$ equity duration						
MKT	1.00	0.93	1.02	1.00	1.04	1.05	1.01	0.98	1.13	1.19	**0.19**
	(61.78)	(62.26)	(53.89)	(58.79)	(56.62)	(47.16)	(40.81)	(47.70)	(46.65)	(29.13)	**(4.47)**
SMB	-0.03	-0.02	-0.07	0.03	-0.03	0.01	0.05	0.09	0.26	0.50	**0.53**
	(-1.12)	(-1.00)	(-2.71)	(1.06)	(-0.99)	(0.28)	(1.20)	(2.56)	(5.71)	(9.65)	**(9.60)**
HML	-0.24	-0.18	-0.12	0.03	-0.05	0.04	-0.03	0.07	0.04	-0.06	**0.18**
	(-7.80)	(-5.93)	(-3.18)	(0.72)	(-1.45)	(0.76)	(-0.53)	(1.72)	(0.58)	(-0.72)	**(1.99)**
CMA	-0.11	-0.02	0.02	0.04	0.18	0.12	0.42	0.24	0.28	0.18	**0.29**
	(-2.45)	(-0.46)	(0.42)	(0.70)	(3.36)	(1.87)	(3.97)	(3.38)	(4.10)	(1.62)	**(2.55)**
RMW	0.39	0.15	0.23	0.04	0.14	-0.06	-0.02	-0.21	-0.25	-0.45	**-0.84**
	(11.00)	(4.40)	(6.55)	(1.24)	(3.53)	(-1.13)	(-0.26)	(-4.10)	(-3.56)	(-5.88)	**(-9.74)**
α^{FF5}	0.05	0.13	0.01	-0.02	-0.05	0.02	-0.07	-0.05	-0.07	0.05	**-0.01**
	(0.92)	(2.47)	(0.09)	(-0.25)	(-0.74)	(0.24)	(-0.92)	(-0.67)	(-0.79)	(0.40)	**(-0.06)**
					$DUR^{DSS-TZZ}$ equity duration						
MKT	0.99	0.96	0.99	1.02	1.01	1.06	1.03	1.04	1.09	1.21	**0.22**
	(56.22)	(59.78)	(38.42)	(41.80)	(32.29)	(47.94)	(46.58)	(33.00)	(35.59)	(25.26)	**(4.07)**
SMB	-0.08	-0.07	0.02	0.15	0.04	0.19	0.13	0.31	0.25	0.35	**0.43**
	(-2.39)	(-2.03)	(0.48)	(3.94)	(0.94)	(4.13)	(3.43)	(5.78)	(4.34)	(4.57)	**(4.67)**
HML	-0.17	-0.15	-0.10	-0.12	-0.09	-0.05	-0.22	-0.16	-0.17	-0.34	**-0.16**
	(-3.82)	(-4.30)	(-1.65)	(-2.51)	(-1.35)	(-0.95)	(-4.93)	(-2.28)	(-2.04)	(-4.00)	**(-1.44)**
CMA	-0.14	-0.07	0.10	0.14	0.03	0.08	0.09	0.11	0.14	0.06	**0.21**
	(-2.24)	(-1.23)	(1.21)	(1.62)	(0.27)	(0.87)	(1.27)	(1.09)	(1.35)	(0.51)	**(1.41)**
RMW	0.24	0.13	0.14	0.13	-0.02	0.05	-0.09	-0.15	-0.20	-0.43	**-0.67**
	(5.63)	(3.25)	(2.06)	(2.95)	(-0.32)	(0.77)	(-1.74)	(-2.35)	(-3.06)	(-4.28)	**(-6.16)**
α^{FF5}	0.14	0.06	0.08	-0.06	0.08	-0.01	0.18	-0.04	0.10	-0.08	**-0.22**
	(2.11)	(0.84)	(0.85)	(-0.80)	(0.80)	(-0.14)	(2.03)	(-0.35)	(0.88)	(-0.60)	**(-1.48)**
					$DUR^{GON-NMI}$ equity duration						
MKT	0.95	0.93	1.01	0.96	1.02	1.03	1.03	1.03	1.14	1.30	**0.35**
	(35.24)	(36.84)	(36.97)	(51.63)	(51.41)	(40.77)	(45.32)	(45.49)	(35.65)	(32.89)	**(6.16)**
SMB	0.01	-0.00	-0.16	-0.07	0.06	0.02	0.11	0.23	0.24	0.35	**0.34**

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Table A.10 continued: Fama and French (2015) alphas of duration sorted portfolios.

	(0.30)	(-0.07)	(-5.26)	(-2.66)	(1.45)	(0.49)	(2.45)	(4.60)	(6.28)	(9.13)	**(6.53)**
HML	-0.04	-0.21	-0.14	-0.09	-0.16	-0.13	-0.09	-0.14	-0.12	0.02	**0.05**
	(-0.83)	(-4.46)	(-3.03)	(-2.80)	(-3.97)	(-2.80)	(-1.68)	(-2.84)	(-2.13)	(0.27)	**(0.64)**
CMA	0.48	0.39	0.19	0.10	0.03	-0.05	-0.12	0.00	0.03	-0.14	**-0.62**
	(5.45)	(4.27)	(2.13)	(1.66)	(0.27)	(-0.63)	(-1.19)	(0.07)	(0.51)	(-1.57)	**(-4.41)**
RMW	0.39	0.19	0.05	0.14	-0.05	0.08	0.17	0.10	0.03	-0.07	**-0.46**
	(4.96)	(3.72)	(0.73)	(3.61)	(-0.50)	(1.19)	(2.85)	(1.96)	(0.65)	(-0.96)	**(-3.67)**
α^{FF5}	-0.13	-0.06	0.01	0.05	0.24	0.06	-0.05	-0.02	0.09	-0.34	**-0.20**
	(-1.52)	(-0.78)	(0.15)	(0.76)	(2.63)	(0.76)	(-0.64)	(-0.16)	(0.92)	(-3.30)	**(-1.48)**

Table A.11: Returns on duration-sorted portfolios for different holding periods.
We document monthly average holding period returns in percent for portfolios sorted on equity duration measures over different horizons. I.e. $r^e_{t\rightarrow t+2}$ is the average excess return for a holding period over the next 2 years. Note that the initial holding period is 12 months in our analysis. Holding period returns are calculated from January 1964 - December 2020 and are value weighted. Numbers in brackets are Newey and West (1987) t-statistics.

	D1	D2	D3	D4	D5	D6	D7	D8	D9	D10	**D10-D1**
Panel A: **Equity duration measures including discount rate information**											
					DUR^{DSS} equity duration						
$r^e_{t\rightarrow t+2}$	0.84	0.80	0.81	0.80	0.67	0.65	0.64	0.63	0.58	0.50	**-0.35**
	(4.68)	(4.98)	(5.13)	(5.43)	(4.52)	(4.09)	(4.13)	(3.79)	(2.95)	(1.98)	**(-1.69)**
$r^e_{t\rightarrow t+3}$	0.82	0.79	0.79	0.76	0.69	0.64	0.63	0.62	0.58	0.54	**-0.28**
	(5.05)	(5.45)	(5.81)	(5.83)	(4.88)	(4.37)	(4.40)	(3.85)	(3.07)	(2.27)	**(-1.36)**
$r^e_{t\rightarrow t+4}$	0.80	0.82	0.79	0.76	0.69	0.63	0.62	0.62	0.57	0.58	**-0.21**
	(5.25)	(6.21)	(5.89)	(5.90)	(5.11)	(4.52)	(4.28)	(3.93)	(3.05)	(2.43)	**(-0.99)**
$r^e_{t\rightarrow t+5}$	0.79	0.79	0.80	0.75	0.69	0.64	0.60	0.60	0.56	0.59	**-0.20**
	(5.31)	(5.93)	(5.99)	(5.85)	(5.03)	(4.50)	(4.07)	(3.79)	(2.85)	(2.44)	**(-0.90)**
					DUR^{GON} equity duration						
$r^e_{t\rightarrow t+2}$	1.00	0.95	0.98	0.90	0.95	0.77	0.75	0.80	0.71	0.34	**-0.65**
	(5.35)	(6.25)	(6.40)	(5.26)	(5.40)	(4.86)	(5.32)	(4.80)	(3.70)	(1.56)	**(-3.31)**
$r^e_{t\rightarrow t+3}$	0.97	0.90	0.94	0.94	0.94	0.75	0.75	0.79	0.71	0.38	**-0.59**
	(5.87)	(6.36)	(6.63)	(6.11)	(5.93)	(5.24)	(5.91)	(4.94)	(3.93)	(1.81)	**(-3.12)**
$r^e_{t\rightarrow t+4}$	0.95	0.89	0.90	0.93	0.90	0.77	0.77	0.76	0.68	0.43	**-0.52**
	(6.17)	(6.75)	(6.25)	(6.98)	(6.34)	(5.87)	(5.92)	(4.88)	(4.00)	(2.00)	**(-2.59)**
$r^e_{t\rightarrow t+5}$	0.94	0.90	0.89	0.91	0.92	0.75	0.76	0.77	0.67	0.44	**-0.50**
	(6.49)	(7.27)	(6.29)	(7.06)	(6.77)	(5.95)	(5.78)	(5.13)	(3.85)	(2.11)	**(-2.49)**
					$DUR^{GON-UDR}$ equity duration						
$r^e_{t\rightarrow t+2}$	0.99	0.80	0.91	0.78	0.83	0.79	0.77	0.71	0.54	0.61	**-0.38**
	(6.14)	(4.97)	(6.31)	(5.12)	(5.53)	(5.16)	(4.78)	(4.04)	(2.36)	(2.58)	**(-2.26)**
$r^e_{t\rightarrow t+3}$	0.91	0.82	0.88	0.81	0.81	0.74	0.80	0.71	0.59	0.59	**-0.32**
	(5.89)	(6.10)	(6.94)	(5.77)	(5.69)	(5.19)	(5.29)	(4.16)	(2.85)	(2.69)	**(-2.05)**
$r^e_{t\rightarrow t+4}$	0.88	0.78	0.88	0.80	0.82	0.73	0.81	0.70	0.58	0.61	**-0.28**
	(6.13)	(5.93)	(7.47)	(6.45)	(6.00)	(5.12)	(5.33)	(4.10)	(2.90)	(2.94)	**(-1.80)**
$r^e_{t\rightarrow t+5}$	0.87	0.79	0.88	0.79	0.82	0.73	0.80	0.71	0.58	0.59	**-0.29**
	(6.17)	(6.55)	(7.85)	(6.49)	(5.88)	(5.26)	(5.46)	(4.15)	(2.76)	(2.96)	**(-1.94)**
Panel B: **Equity duration measures excluding discount rate information**											
					$DUR^{DSS-FIP}$ equity duration						
$r^e_{t\rightarrow t+2}$	0.64	0.61	0.57	0.57	0.61	0.65	0.62	0.57	0.69	0.79	**0.15**
	(3.26)	(3.44)	(3.53)	(3.70)	(3.96)	(4.01)	(4.01)	(3.38)	(3.75)	(3.25)	**(0.88)**

Continued on next page

Table A.11 continued: Returns on duration-sorted portfolios for different holding periods.

$r^e_{t\to t+3}$	0.64	0.59	0.59	0.58	0.63	0.64	0.62	0.60	0.69	0.76	**0.13**
	(3.30)	(3.57)	(3.85)	(3.98)	(4.57)	(4.44)	(4.51)	(4.06)	(4.17)	(3.54)	**(0.82)**
$r^e_{t\to t+4}$	0.65	0.58	0.59	0.60	0.65	0.62	0.60	0.61	0.71	0.75	**0.10**
	(3.41)	(3.56)	(3.98)	(4.51)	(5.03)	(4.56)	(4.50)	(4.35)	(4.46)	(3.74)	**(0.73)**
$r^e_{t\to t+5}$	0.65	0.56	0.61	0.60	0.63	0.62	0.62	0.62	0.72	0.75	**0.11**
	(3.32)	(3.38)	(4.07)	(4.37)	(4.80)	(4.45)	(4.80)	(4.42)	(4.40)	(3.76)	**(0.82)**
$DUR^{DSS-TZZ}$ equity duration											
$r^e_{t\to t+2}$	0.78	0.63	0.69	0.77	0.71	0.76	0.84	0.73	0.76	0.67	**-0.11**
	(3.78)	(3.42)	(4.06)	(4.67)	(3.93)	(4.04)	(4.44)	(3.90)	(3.63)	(2.35)	**(-0.60)**
$r^e_{t\to t+3}$	0.77	0.66	0.67	0.77	0.71	0.77	0.78	0.79	0.74	0.74	**-0.04**
	(3.73)	(3.76)	(3.85)	(4.95)	(3.97)	(4.35)	(4.52)	(5.08)	(3.76)	(2.96)	**(-0.20)**
$r^e_{t\to t+4}$	0.77	0.65	0.71	0.80	0.72	0.72	0.76	0.80	0.78	0.76	**-0.01**
	(3.76)	(3.82)	(4.11)	(5.07)	(4.33)	(4.42)	(4.64)	(5.35)	(4.36)	(3.30)	**(-0.08)**
$r^e_{t\to t+5}$	0.74	0.67	0.70	0.80	0.75	0.73	0.77	0.81	0.79	0.81	**0.07**
	(3.56)	(3.95)	(4.03)	(5.26)	(4.73)	(4.52)	(5.02)	(5.33)	(4.33)	(3.83)	**(0.43)**
$DUR^{GON-NMI}$ equity duration											
$r^e_{t\to t+2}$	0.70	0.61	0.72	0.71	0.91	0.67	0.74	0.66	0.81	0.65	**-0.06**
	(4.49)	(3.92)	(3.61)	(4.37)	(5.06)	(3.74)	(3.82)	(3.57)	(4.52)	(2.50)	**(-0.35)**
$r^e_{t\to t+3}$	0.67	0.65	0.69	0.73	0.88	0.68	0.77	0.69	0.78	0.69	**0.01**
	(4.86)	(4.36)	(3.69)	(4.78)	(5.12)	(4.16)	(4.32)	(3.82)	(4.73)	(2.83)	**(0.10)**
$r^e_{t\to t+4}$	0.65	0.65	0.72	0.73	0.82	0.69	0.78	0.71	0.77	0.71	**0.06**
	(4.88)	(4.66)	(4.05)	(4.62)	(5.17)	(4.35)	(4.53)	(4.05)	(4.94)	(3.10)	**(0.44)**
$r^e_{t\to t+5}$	0.65	0.67	0.70	0.71	0.79	0.70	0.78	0.72	0.77	0.73	**0.08**
	(4.99)	(4.81)	(4.10)	(4.41)	(5.02)	(4.33)	(4.72)	(4.37)	(5.06)	(3.30)	**(0.60)**

Figure A.1: Chicago Fed National Activity Index.

This figure depicts the 3-month rolling average of the Chicago Fed National Activity Index (CFNAI) alongside with NBER recession months and the lowest quartile of the CFNAI Index.

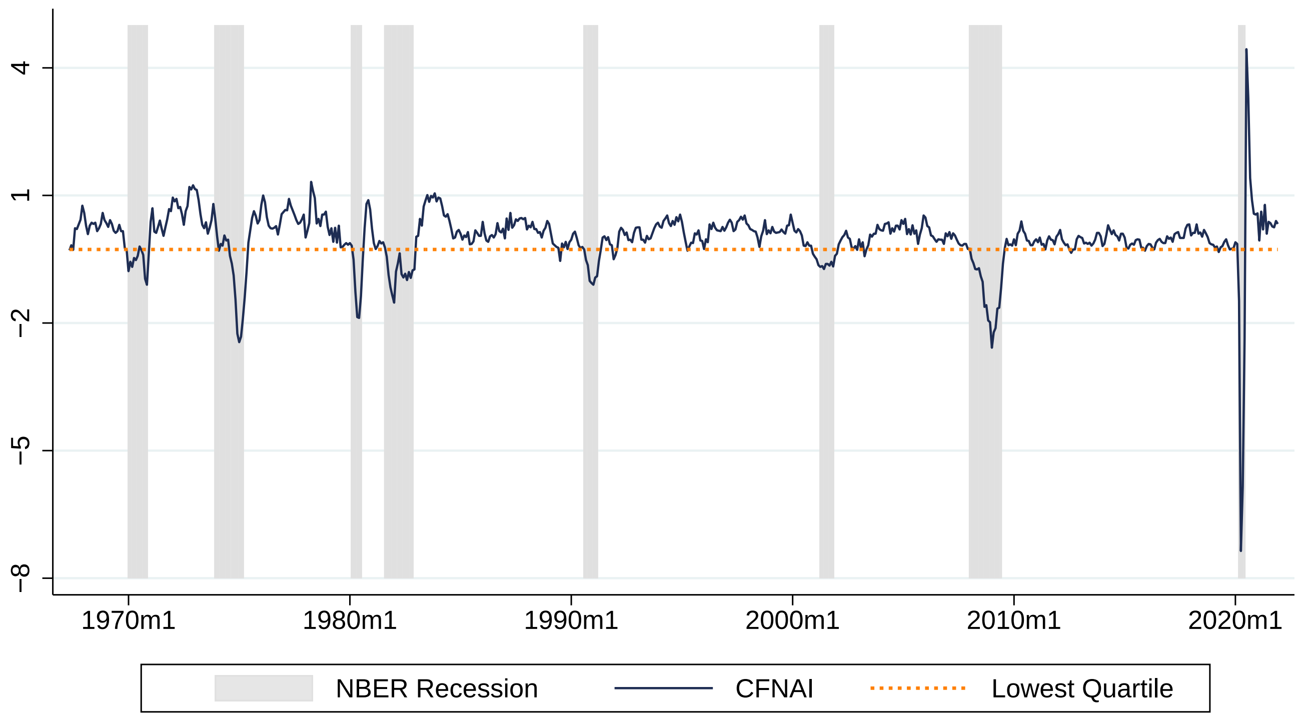


Table A.12: Returns for duration-sorted portfolios during NBER recessions.

We document monthly excess returns for portfolios sorted on equity duration measures conditional on NBER recession periods (r_1^{nber}). Moreover, we document monthly excess returns conditional on NBER recession periods excluding the first recession quarter (r_2^{nber}). The observation period spans from 01.1964 - 12.2020 and returns are value weighted and in percent per month. Δ is the difference in the high-minus-low duration portfolio (D10-D1) between the conditional returns documented in each panel and the returns in all other months.

	D1	D2	D3	D4	D5	D6	D7	D8	D9	D10	**D10-D1**	Δ
Panel *A*: **Original equity duration measures including discount rate information**												
						DUR^{DSS} equity duration						
r_1^{nber}	-0.68	-0.26	-0.44	-0.19	-0.39	-0.58	-0.14	-0.27	-0.19	-1.18	**-0.50**	**0.06**
	(-0.73)	(-0.31)	(-0.54)	(-0.23)	(-0.55)	(-0.78)	(-0.21)	(-0.38)	(-0.24)	(-1.17)	**(-0.81)**	**(0.11)**
r_2^{nber}	-0.21	0.20	0.28	-0.02	0.04	-0.11	0.34	0.42	0.33	-0.31	**-0.10**	**-0.38**
	(-0.19)	(0.21)	(0.30)	(-0.02)	(0.05)	(-0.13)	(0.43)	(0.49)	(0.36)	(-0.26)	**(-0.14)**	**(-0.59)**
						DUR^{GON} equity duration						
r_1^{nber}	0.08	0.02	0.17	-0.51	-0.38	-0.51	-0.23	-0.09	-0.36	-1.10	**-1.18**	**0.56**
	(0.08)	(0.02)	(0.19)	(-0.54)	(-0.42)	(-0.65)	(-0.29)	(-0.12)	(-0.41)	(-1.10)	**(-1.70)**	**(1.01)**
r_2^{nber}	1.09	0.83	1.21	0.27	0.31	0.10	0.23	0.55	0.28	-0.50	**-1.59**	**0.99**
	(0.93)	(0.80)	(1.23)	(0.25)	(0.30)	(0.13)	(0.24)	(0.62)	(0.27)	(-0.42)	**(-1.97)**	**(1.57)**
						$DUR^{GON-UDR}$ equity duration						
r_1^{nber}	-0.03	-0.23	-0.15	0.14	-0.25	-0.61	-0.19	-0.35	-0.80	-1.20	**-1.17**	**0.84**
	(-0.04)	(-0.27)	(-0.20)	(0.18)	(-0.33)	(-0.75)	(-0.25)	(-0.39)	(-0.80)	(-1.02)	**(-1.71)**	**(1.56)**
r_2^{nber}	0.88	0.56	0.30	0.96	0.28	-0.18	0.48	0.23	0.12	-0.66	**-1.55**	**1.23**
	(0.84)	(0.56)	(0.34)	(1.05)	(0.33)	(-0.19)	(0.56)	(0.22)	(0.10)	(-0.48)	**(-1.93)**	**(2.00)**
Panel *B*: **Equity duration measures excluding discount rate information**												
						$DUR^{DSS-FIP}$ equity duration						
r_1^{nber}	-0.50	-0.37	-0.42	-0.57	-0.42	-0.59	-0.39	-0.43	-0.74	-0.56	**-0.06**	**0.23**
	(-0.64)	(-0.51)	(-0.56)	(-0.72)	(-0.57)	(-0.71)	(-0.51)	(-0.57)	(-0.82)	(-0.55)	**(-0.10)**	**(0.45)**
r_2^{nber}	0.20	0.21	0.24	-0.06	0.23	-0.22	-0.11	-0.17	-0.18	0.30	**0.10**	**0.04**
	(0.21)	(0.25)	(0.27)	(-0.06)	(0.27)	(-0.23)	(-0.13)	(-0.19)	(-0.18)	(0.25)	**(0.15)**	**(0.07)**
						$DUR^{DSS-TZZ}$ equity duration						
r_1^{nber}	-0.17	0.03	0.23	-0.17	-0.14	-0.45	-0.10	-1.04	-0.47	-1.24	**-1.07**	**1.07**
	(-0.20)	(0.04)	(0.28)	(-0.19)	(-0.17)	(-0.47)	(-0.11)	(-1.03)	(-0.45)	(-1.05)	**(-1.75)**	**(1.89)**
r_2^{nber}	0.55	0.59	0.76	0.81	0.48	0.30	0.70	-0.33	0.27	-0.57	**-1.12**	**1.08**
	(0.54)	(0.61)	(0.78)	(0.76)	(0.49)	(0.27)	(0.71)	(-0.28)	(0.22)	(-0.41)	**(-1.64)**	**(1.67)**
						$DUR^{GON-NMI}$ equity duration						
r_1^{nber}	-0.36	-0.34	-0.56	-0.22	-0.09	-0.47	-0.47	-0.46	-0.45	-1.48	**-1.12**	**1.08**
	(-0.47)	(-0.50)	(-0.70)	(-0.29)	(-0.10)	(-0.51)	(-0.52)	(-0.50)	(-0.42)	(-1.17)	**(-1.64)**	**(1.94)**
r_2^{nber}	0.61	0.07	0.03	0.60	0.58	0.11	0.28	-0.05	0.37	-0.82	**-1.43**	**1.38**
	(0.72)	(0.09)	(0.03)	(0.64)	(0.54)	(0.11)	(0.26)	(-0.04)	(0.29)	(-0.56)	**(-1.86)**	**(2.17)**

Table A.13: Returns on duration-sorted portfolios in recessions.

We document monthly excess returns for portfolios sorted on equity duration measures conditional on recession periods. The excess returns r_1^{rec} correspond to quarters with lower GDP growth relative to the last 8 quarters, whereas r_2^{rec} is calculated for quarters with the lowest 10 % GDP growth. The observation period spans from 01.1964 - 12.2020 and returns are value weighted and in percent per month. Δ documents the difference in the high-minus-low duration portfolio (D10-D1) between the conditional returns documented in each panel and the returns in all other months.

	D1	D2	D3	D4	D5	D6	D7	D8	D9	D10	**D10-D1**	Δ
Panel *A*: **Equity duration measures including discount rate information**												
						DUR^{DSS} equity duration						
r_1^{rec}	-0.82	-0.02	-0.01	-0.07	-0.54	-0.03	-0.02	-0.17	-0.43	-1.54	**-0.72**	**0.32**
	(-1.08)	(-0.03)	(-0.02)	(-0.11)	(-0.93)	(-0.06)	(-0.03)	(-0.29)	(-0.70)	(-1.78)	**(-1.14)**	**(0.59)**
r_2^{rec}	-1.15	-0.40	-0.28	-0.74	-0.60	-0.63	0.04	-0.19	0.00	-1.14	**0.01**	**-0.50**
	(-1.03)	(-0.38)	(-0.29)	(-0.77)	(-0.75)	(-0.73)	(0.05)	(-0.23)	(0.00)	(-0.94)	**(0.01)**	**(-0.77)**
						DUR^{GON} equity duration						
r_1^{rec}	-0.10	-0.28	-0.25	-0.87	-0.42	-0.17	-0.40	-0.41	-0.71	-1.71	**-1.61**	**1.06**
	(-0.12)	(-0.40)	(-0.33)	(-1.12)	(-0.56)	(-0.25)	(-0.59)	(-0.67)	(-1.07)	(-2.15)	**(-2.48)**	**(1.99)**
r_2^{rec}	-0.27	-0.38	-0.26	-1.22	-0.93	-1.13	-0.44	-0.52	-0.81	-1.48	**-1.21**	**0.56**
	(-0.22)	(-0.38)	(-0.25)	(-1.11)	(-0.88)	(-1.19)	(-0.45)	(-0.57)	(-0.77)	(-1.23)	**(-1.35)**	**(0.87)**
						$DUR^{GON-UDR}$ equity duration						
r_1^{rec}	-0.21	-0.24	-0.16	-0.32	-0.02	-0.48	-0.37	-0.84	-1.29	-1.85	**-1.64**	**1.40**
	(-0.30)	(-0.33)	(-0.24)	(-0.48)	(-0.03)	(-0.76)	(-0.58)	(-1.27)	(-1.62)	(-2.04)	**(-2.59)**	**(2.66)**
r_2^{rec}	-0.49	-0.97	-0.82	-0.65	-0.26	-1.00	-0.17	-0.74	-1.09	-1.83	**-1.33**	**0.99**
	(-0.49)	(-0.95)	(-0.89)	(-0.67)	(-0.29)	(-1.07)	(-0.18)	(-0.67)	(-0.94)	(-1.35)	**(-1.58)**	**(1.56)**
Panel *B*: **Equity duration measures excluding discount rate information**												
						$DUR^{DSS-FIP}$ equity duration						
r_1^{rec}	-0.40	-0.36	-0.55	-0.39	-0.59	-0.78	-0.20	-0.71	-0.57	-0.71	**-0.31**	**0.52**
	(-0.66)	(-0.62)	(-0.89)	(-0.60)	(-1.06)	(-1.18)	(-0.36)	(-1.14)	(-0.84)	(-0.85)	**(-0.54)**	**(1.06)**
r_2^{rec}	-0.38	-0.45	-0.37	-0.67	-0.56	-1.17	-0.81	-0.68	-0.74	-0.27	**0.10**	**0.04**
	(-0.41)	(-0.54)	(-0.43)	(-0.72)	(-0.67)	(-1.27)	(-0.96)	(-0.79)	(-0.74)	(-0.23)	**(0.14)**	**(0.07)**
						$DUR^{DSS-TZZ}$ equity duration						
r_1^{rec}	-0.77	-0.64	-0.16	-0.88	-0.57	-0.70	-0.44	-1.17	-1.51	-2.05	**-1.28**	**1.32**
	(-1.11)	(-0.87)	(-0.22)	(-1.17)	(-0.78)	(-0.89)	(-0.58)	(-1.45)	(-1.76)	(-2.13)	**(-2.22)**	**(2.40)**
r_2^{rec}	-0.75	-0.24	-0.04	-0.86	-0.75	-0.73	-0.30	-1.19	-1.26	-1.65	**-0.89**	**0.82**
	(-0.76)	(-0.24)	(-0.04)	(-0.83)	(-0.76)	(-0.64)	(-0.31)	(-1.00)	(-1.02)	(-1.14)	**(-1.17)**	**(1.24)**
						$DUR^{GON-NMI}$ equity duration						
r_1^{rec}	-0.69	-0.46	-0.89	-0.63	-0.77	-0.79	-1.09	-0.88	-0.94	-1.38	**-0.68**	**0.58**
	(-1.13)	(-0.73)	(-1.27)	(-0.96)	(-1.07)	(-1.04)	(-1.49)	(-1.19)	(-1.08)	(-1.39)	**(-1.03)**	**(1.07)**
r_2^{rec}	-0.55	-0.62	-0.88	-0.52	-1.01	-1.03	-1.07	-1.05	-1.16	-1.59	**-1.03**	**0.94**
	(-0.66)	(-0.77)	(-0.95)	(-0.56)	(-0.98)	(-0.96)	(-0.96)	(-0.96)	(-0.88)	(-1.03)	**(-1.18)**	**(1.43)**

Table A.14: Returns on duration-sorted portfolios in expansions.

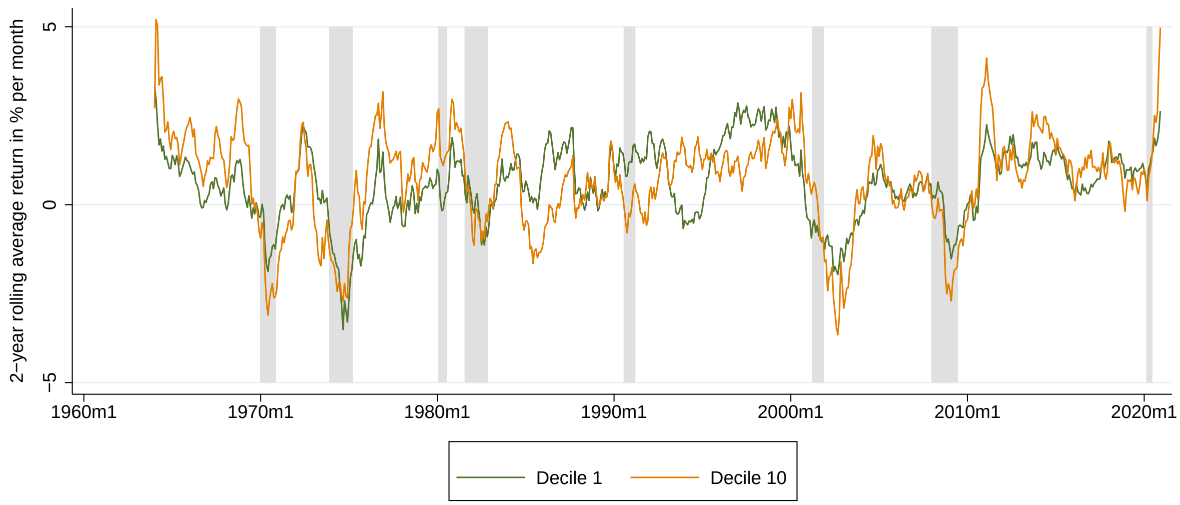
We document monthly excess returns for portfolios sorted on equity duration measures conditional on expansion periods. The excess returns r_1^{exp} correspond to quarters with higher GDP growth compared to the last 8 quarters, whereas r_2^{exp} are calculated for quarters with the highest 10 % GDP growth. The observation period spans from 01.1964 - 12.2020 and returns are value weighted and in percent per month. Δ documents the difference in the high-minus-low duration portfolio (D10-D1) between the conditional returns documented in each panel and the returns in all other months.

	D1	D2	D3	D4	D5	D6	D7	D8	D9	D10	**D10-D1**	Δ
Panel *A*: **Equity duration measures including discount rate information**												
						DUR^{DSS} equity duration						
r_1^{exp}	1.92	1.69	1.46	1.14	1.04	1.15	1.00	1.12	1.45	1.85	**-0.07**	**-0.43**
	(2.96)	(2.62)	(2.35)	(1.82)	(1.75)	(1.83)	(1.73)	(1.84)	(2.09)	(2.09)	**(-0.11)**	**(-0.71)**
r_2^{exp}	1.76	1.44	1.41	0.77	0.99	0.85	0.59	0.25	0.33	0.96	**-0.81**	**0.39**
	(2.84)	(2.44)	(2.68)	(1.44)	(1.72)	(1.43)	(1.17)	(0.41)	(0.49)	(1.52)	**(-1.32)**	**(0.55)**
						DUR^{GON} equity duration						
r_1^{exp}	2.33	1.93	1.89	1.76	1.64	1.54	0.93	1.37	1.44	1.41	**-0.93**	**0.26**
	(2.75)	(2.63)	(2.45)	(2.54)	(2.34)	(1.82)	(1.39)	(1.99)	(1.92)	(1.74)	**(-1.45)**	**(0.44)**
r_2^{exp}	3.90	2.51	2.48	2.07	1.35	0.82	0.93	1.39	1.25	0.40	**-3.50**	**2.93**
	(3.20)	(2.51)	(2.19)	(1.95)	(1.43)	(0.73)	(0.88)	(1.56)	(0.97)	(0.33)	**(-2.64)**	**(3.22)**
						$DUR^{GON-UDR}$ equity duration						
r_1^{exp}	2.42	1.47	1.28	1.18	1.32	1.33	1.18	1.63	1.40	1.79	**-0.64**	**0.23**
	(3.47)	(2.24)	(1.79)	(1.54)	(1.94)	(2.05)	(1.63)	(2.25)	(1.65)	(1.86)	**(-1.01)**	**(0.40)**
r_2^{exp}	3.33	2.26	1.41	1.17	1.31	1.35	1.05	1.38	0.64	1.14	**-2.19**	**1.84**
	(3.58)	(2.64)	(1.36)	(1.08)	(1.22)	(1.52)	(0.95)	(1.21)	(0.50)	(0.85)	**(-1.91)**	**(2.04)**
Panel *B*: **Equity duration measures excluding discount rate information**												
						$DUR^{DSS-FIP}$ equity duration						
r_1^{exp}	1.39	1.27	1.34	1.12	1.08	1.18	1.39	1.55	1.94	3.23	**1.85**	**-1.91**
	(2.16)	(2.19)	(2.05)	(1.80)	(1.66)	(1.76)	(2.16)	(2.55)	(2.48)	(3.39)	**(3.12)**	**(-3.53)**
r_2^{exp}	1.00	0.95	0.74	0.86	0.70	0.54	0.48	1.13	1.48	3.04	**2.05**	**-2.06**
	(1.54)	(1.88)	(1.21)	(1.67)	(1.35)	(1.00)	(0.96)	(1.97)	(2.31)	(3.06)	**(3.18)**	**(-3.26)**
						$DUR^{DSS-TZZ}$ equity duration						
r_1^{exp}	1.35	1.25	1.36	1.59	1.30	1.64	1.88	1.38	1.64	2.34	**0.99**	**-1.28**
	(1.94)	(1.88)	(1.97)	(2.16)	(1.67)	(2.18)	(2.30)	(1.52)	(1.88)	(2.13)	**(1.48)**	**(-2.12)**
r_2^{exp}	0.98	1.19	1.36	1.89	1.49	1.78	1.51	1.77	2.09	1.85	**0.88**	**-1.07**
	(0.83)	(1.21)	(1.60)	(1.74)	(1.42)	(1.56)	(1.38)	(1.92)	(2.09)	(1.16)	**(0.82)**	**(-1.13)**
						$DUR^{GON-NMI}$ equity duration						
r_1^{exp}	1.39	0.87	1.60	1.42	1.79	1.40	1.23	1.49	2.00	1.97	**0.58**	**-0.86**
	(2.15)	(1.26)	(2.18)	(2.13)	(2.30)	(1.93)	(1.53)	(1.93)	(2.44)	(1.95)	**(0.81)**	**(-1.43)**
r_2^{exp}	1.99	1.04	2.04	1.32	1.36	1.02	0.92	1.35	1.39	1.70	**-0.29**	**0.11**
	(2.23)	(1.19)	(1.74)	(1.25)	(1.36)	(1.10)	(0.95)	(1.42)	(1.31)	(1.13)	**(-0.30)**	**(0.12)**

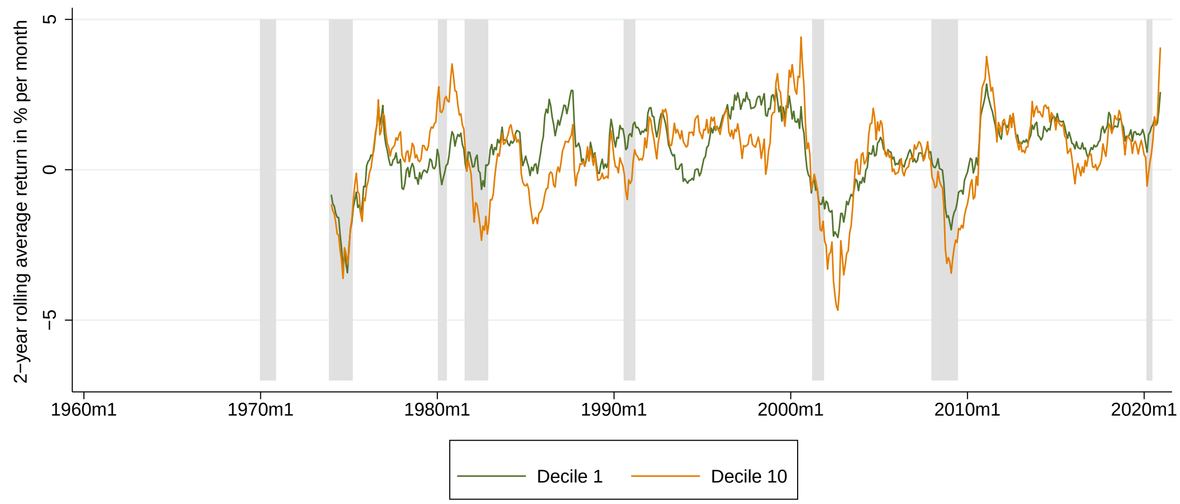
Figure A.2: Returns of the highest and lowest decile over time.

Depicted are 2-year rolling averages of the returns for the lowest (D1) and the highest (D10) decile based on our four alternative equity duration measures: $DUR^{DSS-FIP}$ in Panel A, $DUR^{DSS-TZZ}$ in Panel B, $DUR^{GON-UDR}$ in Panel C and $DUR^{GON-NMI}$ in Panel D. The rolling averages are in percent per month.

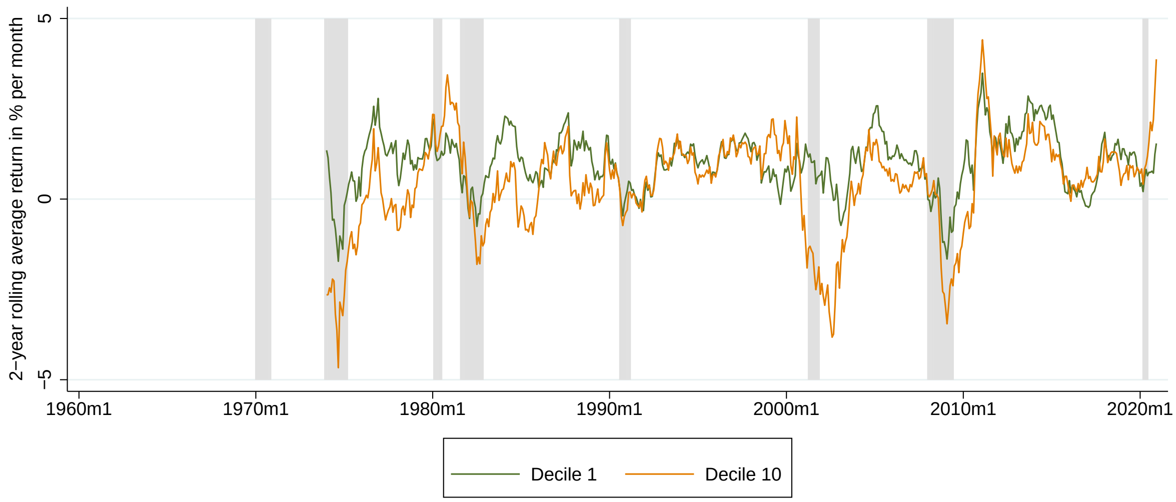
(a) $DUR^{DSS-FIP}$ *equity duration measure*



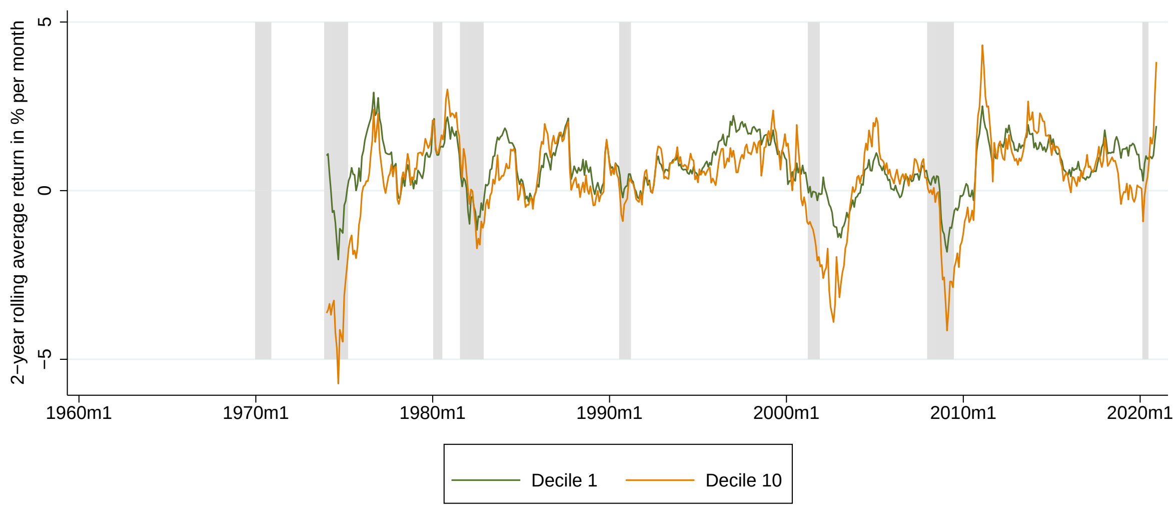
(b) $DUR^{DSS-TZZ}$ *equity duration measure*



(c) $DUR^{GON-UDR}$ *equity duration measure*



(d) $DUR^{GON-NMI}$ *equity duration measure*



B Tables for versions of the Gonçalves (2021) equity duration measure with firm fixed effects in the VAR

We report additional results for versions of the Gonçalves (2021) equity duration measure (GON^{*}, $GON-NDR^{*}$, $GON-NMI^{*}$) which include firm fixed effects in the VAR similar to Chen et al. (2013). Note that these versions are exactly identical to our baseline versions of the Gonçalves (2021) equity duration measure (GON, $GON-NDR$, $GON-NMI$). The only difference is that we demean all state variables in the VAR for each firm.

Table B.1: Realized cash-flows on Gonçalves (2021) duration-sorted portfolios with firm fixed effects in the VAR (in %).

We document measures of realized cash flows in percent for portfolios sorted on variations of the Gonçalves (2021) equity duration measures. We demean all state variable in the VAR for each firm similar to Chen et al. (2013). Realized EBITDA growth in Panel A corresponds to the average EBITDA growth of duration portfolios in the five $(t, t+5)$ and ten years $(t, t+10)$ after formation. Panel B documents realized cash flow to equity growth (CFEG) for duration portfolios. All growth rates are annualized and in percent per year. Newey and West (1987) corrected t-statistics with 6 lags are printed in brackets. The observation period is from January 1974 to December 2020.

	D1	D2	D3	D4	D5	D6	D7	D8	D9	D10	**D10-D1**
Panel A: **Earnings growth: Equity duration measures incl. discount rate information**											
					DUR^{GON*} equity duration						
$\text{EBITDA}_{t,t+5}$	6.72	6.60	7.21	7.38	7.99	8.60	9.03	10.1	11.1	13.6	**6.92**
	(15.6)	(16.0)	(17.7)	(19.1)	(21.2)	(22.5)	(26.5)	(25.5)	(28.0)	(30.7)	**(21.9)**
$\text{EBITDA}_{t,t+10}$	6.77	6.13	6.74	6.52	7.14	7.34	7.72	8.47	9.19	10.7	**3.91**
	(24.9)	(26.0)	(37.3)	(37.7)	(34.0)	(35.9)	(38.8)	(40.9)	(38.2)	(34.0)	**(18.8)**
					$DUR^{GON-UDR*}$ equity duration						
$\text{EBITDA}_{t,t+5}$	8.55	7.70	7.51	7.80	7.67	8.34	8.85	9.63	10.7	13.0	**4.48**
	(19.4)	(18.9)	(20.8)	(22.3)	(22.4)	(24.4)	(23.7)	(24.9)	(25.1)	(26.1)	**(14.7)**
$\text{EBITDA}_{t,t+10}$	7.75	6.94	6.61	7.05	6.99	7.20	7.42	7.87	8.99	10.4	**2.67**
	(28.5)	(32.9)	(31.0)	(40.3)	(36.3)	(33.2)	(37.6)	(34.8)	(33.2)	(27.0)	**(9.81)**
Panel B: **Earnings growth: Equity duration measures excl. discount rate information**											
					$DUR^{GON-NMI*}$ equity duration						
$\text{EBITDA}_{t,t+5}$	9.96	8.52	8.13	7.74	7.76	7.92	8.20	9.17	9.62	11.5	**1.54**
	(21.4)	(20.5)	(20.9)	(21.0)	(20.9)	(23.2)	(23.2)	(20.0)	(25.7)	(26.4)	**(3.98)**
$\text{EBITDA}_{t,t+10}$	8.66	7.58	6.81	6.86	6.85	6.89	6.95	7.94	8.49	10.0	**1.36**
	(33.8)	(35.3)	(39.1)	(33.5)	(32.7)	(36.4)	(38.3)	(31.0)	(34.1)	(34.0)	**(6.72)**

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Table B.1 continued: Realized cash-flows on Gonçalves (2021) duration-sorted portfolios with firm fixed effects in the VAR (in %).

	D1	D2	D3	D4	D5	D6	D7	D8	D9	D10	**D10-D1**
Panel C: **Cash flows to equity growth: Equity duration measures incl. discount rate information**											
					DUR^{GON*} equity duration						
$\text{CFEG}_{t,t+5}$	15.9	15.8	16.1	15.4	15.2	14.3	17.0	16.5	18.4	18.9	**3.01**
	(19.4)	(18.3)	(21.5)	(22.0)	(19.8)	(19.0)	(20.5)	(20.2)	(18.9)	(19.7)	**(3.55)**
$\text{CFEG}_{t,t+10}$	10.8	10.0	11.0	10.6	11.0	11.2	11.0	11.8	12.5	12.2	**1.45**
	(20.3)	(19.1)	(25.7)	(22.1)	(23.7)	(25.5)	(26.3)	(25.9)	(25.1)	(21.4)	**(2.67)**
					$DUR^{GON-UDR*}$ equity duration						
$\text{CFEG}_{t,t+5}$	16.0	14.9	14.9	16.0	16.7	16.9	17.1	16.9	18.5	17.9	**1.83**
	(19.4)	(17.7)	(18.9)	(23.7)	(20.4)	(21.8)	(19.0)	(19.3)	(19.0)	(20.5)	**(2.30)**
$\text{CFEG}_{t,t+10}$	10.2	10.8	10.1	11.6	11.5	11.7	11.8	11.8	12.1	11.1	**0.96**
	(19.5)	(26.1)	(21.2)	(26.9)	(28.0)	(27.9)	(24.7)	(23.8)	(27.2)	(17.9)	**(1.85)**
Panel D: **Cash flows to equity growth: Equity duration measures excl. discount rate information**											
					$DUR^{GON-NMI*}$ equity duration						
$\text{CFEG}_{t,t+5}$	14.9	15.5	16.2	15.8	16.8	17.1	18.9	19.5	18.0	13.6	**-1.39**
	(15.9)	(19.4)	(19.9)	(19.9)	(18.7)	(20.8)	(21.2)	(23.5)	(19.8)	(14.8)	**(-1.86)**
$\text{CFEG}_{t,t+10}$	10.1	10.4	10.1	11.3	11.8	11.8	12.1	13.6	13.0	8.99	**-1.08**
	(19.8)	(21.9)	(21.7)	(25.2)	(24.5)	(27.7)	(29.5)	(24.3)	(24.5)	(14.3)	**(-1.93)**

Table B.2: Unconditional returns on Gonçalves (2021) duration-sorted portfolios with firm fixed effects in the VAR (in %).

We report monthly average returns and mean pricing error (α^{FF5}) relative to the Fama and French (2015) five-factor model for portfolios sorted on variations of the Gonçalves (2021) equity duration measures. We demean all state variable in the VAR for each firm similar to Chen et al. (2013). Mean excess returns are calculated from January 1974 - December 2020, are value weighted and reported in percent per month. Numbers in brackets are Newey and West (1987) t-statistics with 6 lags. Moreover, we report annualized volatilities $\sigma_{ann} = \sigma_{monthly} \cdot \sqrt{12}$ in % and annualized Sharpe ratios $SR_{ann} = (r^e \cdot 12)/(\sigma_{monthly} \cdot \sqrt{12})$.

	D1	D2	D3	D4	D5	D6	D7	D8	D9	D10	**D10-D1**
Panel *A*: **Original equity duration measures including discount rate information**											
					DUR^{GON*} equity duration						
r^e	0.95	1.05	0.87	0.80	0.75	0.78	0.74	0.79	0.69	0.54	**-0.41**
	(3.59)	(4.79)	(4.00)	(3.78)	(3.60)	(3.85)	(3.87)	(4.04)	(3.51)	(2.33)	**(-1.87)**
α^{FF5}	-0.08	0.12	0.03	-0.12	-0.17	-0.02	-0.12	-0.00	-0.04	-0.04	**0.03**
	(-0.67)	(1.15)	(0.31)	(-1.22)	(-1.76)	(-0.25)	(-1.69)	(-0.02)	(-0.70)	(-0.65)	**(0.26)**
σ_{ann}	21.20	18.80	17.60	17.40	17.10	17.20	16.90	16.70	16.40	18.20	**16.20**
SR_{ann}	0.54	0.67	0.59	0.55	0.53	0.54	0.53	0.57	0.51	0.36	**-0.30**
					$DUR^{GON-UDR*}$ equity duration						
r^e	0.75	0.91	0.72	0.82	0.76	0.82	0.69	0.69	0.63	0.65	**-0.10**
	(3.60)	(4.29)	(3.60)	(4.26)	(3.68)	(4.14)	(3.58)	(3.19)	(2.57)	(2.18)	**(-0.48)**
α^{FF5}	0.06	0.21	0.12	0.03	-0.03	0.06	-0.05	-0.07	-0.04	-0.18	**-0.24**
	(0.58)	(2.22)	(1.12)	(0.37)	(-0.30)	(0.77)	(-0.58)	(-0.81)	(-0.44)	(-1.80)	**(-1.65)**
σ_{ann}	17.50	17.50	17.80	16.20	17.10	16.10	16.10	17.50	19.20	22.40	**14.80**
SR_{ann}	0.52	0.62	0.49	0.61	0.53	0.61	0.51	0.47	0.39	0.35	**-0.08**
Panel *B*: **Equity duration measures excluding discount rate information**											
					$DUR^{GON-NMI*}$ equity duration						
r^e	0.82	0.68	0.73	0.81	0.73	0.77	0.64	0.77	0.64	0.55	**-0.27**
	(3.74)	(3.43)	(3.67)	(4.20)	(3.67)	(4.16)	(2.82)	(3.29)	(2.78)	(1.80)	**(-1.52)**
α^{FF5}	0.09	-0.02	-0.01	0.11	-0.05	0.02	-0.02	0.07	-0.20	-0.16	**-0.25**
	(0.92)	(-0.23)	(-0.12)	(1.42)	(-0.56)	(0.27)	(-0.29)	(0.53)	(-2.11)	(-1.32)	**(-1.61)**
σ_{ann}	17.50	16.30	16.50	16.80	17.00	16.80	17.50	18.50	18.90	23.60	**14.30**
SR_{ann}	0.56	0.50	0.53	0.58	0.52	0.55	0.44	0.50	0.41	0.28	**-0.23**

Table B.3: Rank correlations of duration measures and characteristics.

We report the time-series average of rank correlations between the respective equity duration measures and stock characteristics. β is the co-movement with the market, ME the natural logarithm of market equity, BM the book-to-market ratio, AG asset growth, GPA gross profits-to-assets, OPE operating profitability, BL book leverage, ROE return on equity and BEG book equity growth. The precise definitions of all characteristics are documented in Appendix F. The time period corresponds to January 1964 - December 2020 for DSS, $DSS-FIP$, β, ME, BM, AG, GPA, OPE, BL, ROE, BEG and to January 1974 - December 2020 for $DSS-TZZ$, $GON*$, $GON-UDR*$ and $GON-NMI*$ due to data availability. Note that all Gonçalves (2021) measures include firm fixed effects in the VAR.

	DSS	DSS-FIP	DSS-TZZ	GON*	GON-UDR*	GON-NMI*	β	ME	BM	AG	GPA	OPE	BL	ROE
DSS-FIP	0.29													
DSS-TZZ	0.37	0.77												
GON*	0.57	-0.28	-0.16											
GON-UDR*	0.28	-0.18	-0.12	0.47										
GON-NMI*	0.09	0.03	0.06	0.13	0.59									
Beta	0.13	0.05	0.09	0.09	0.04	0.03								
Size	0.07	-0.40	-0.48	0.43	0.17	-0.04	0.04							
BM	-0.49	0.53	0.34	-0.86	-0.44	-0.05	-0.08	-0.42						
AG	-0.05	-0.37	-0.20	0.31	0.26	0.30	0.06	0.20	-0.34					
GPA	0.01	-0.35	-0.24	0.02	0.15	0.31	-0.02	-0.02	-0.29	0.07				
OPE	-0.17	-0.80	-0.66	0.28	0.36	0.15	-0.04	0.40	-0.49	0.30	0.37			
BL	-0.02	-0.03	-0.04	-0.01	0.51	0.25	0.04	0.06	0.00	0.04	-0.14	0.22		
ROE	-0.28	-0.99	-0.75	0.30	0.19	0.00	-0.04	0.40	-0.55	0.43	0.34	0.80	0.02	
BEG	-0.18	-0.54	-0.34	0.26	0.18	0.19	0.09	0.21	-0.38	0.63	0.16	0.43	-0.04	0.62

C Tables for versions of the Chen and Li (2018) the Chen (2011) equity duration measure

In this section we report additional results for versions of the Chen and Li (2018) equity duration measure (DUR^{CL}, DUR^{CL-FIP}, DUR^{CL-TZZ}) and for versions of the Chen (2011) equity duration measure (DUR^{CH}, DUR^{CH-FIP}, DUR^{CH-TZZ}).

Table C.1: Unconditional returns for portfolios sorted on other equity duration measures (in %).

We document monthly average returns and mean pricing error (α^{FF5}) relative to the Fama and French (2015) five-factor model for portfolios sorted on other equity duration measures from 2.2.5. DUR^{CL} corresponds to the Chen and Li (2018) equity duration measure, whereas DUR^{CH} is the Chen (2011) equity duration measure. DUR^{CL-FIP} and DUR^{CH-FIP} represent the respective equity duration measure with forecast implied prices using a constant growth rate. Moreover, DUR^{CL-TZZ} and DUR^{CH-TZZ} represent the respective equity duration measure with forecast implied prices using a stock specific growth rate. Value weighted mean excess returns are calculated from January 1964 - December 2020 for the Chen and Li (2018) equity duration measure and from January 1981 - December 2020 for the Chen (2011) equity duration measure. Numbers in brackets are Newey and West (1987) corrected t-statistics with 6 lags. Moreover, we report annualized volatilities $\sigma_{ann} = \sigma_{monthly} \cdot \sqrt{12}$ in % and annualized Sharpe ratios $SR_{ann} = (r^e \cdot 12)/(\sigma_{monthly} \cdot \sqrt{12})$.

	D1	D2	D3	D4	D5	D6	D7	D8	D9	D10	**D10-D1**
Panel A: **Equity duration measures including discount rate information**											
						DUR^{CL} equity duration					
r^e	1.02	1.01	0.96	0.81	0.71	0.64	0.56	0.55	0.63	0.26	**-0.76**
	(3.94)	(4.82)	(4.96)	(4.49)	(4.38)	(4.00)	(3.09)	(3.05)	(2.74)	(0.92)	**(-3.35)**
α^{FF5}	0.02	0.20	0.18	0.09	0.06	-0.01	-0.07	-0.04	0.18	-0.27	**-0.29**
	(0.11)	(1.70)	(1.90)	(0.96)	(0.73)	(-0.07)	(-0.98)	(-0.55)	(2.27)	(-2.23)	**(-1.70)**
σ_{ann}	23.7	19.5	17.8	16.7	15.8	16.2	15.8	16.1	19.1	23.6	**18.3**
SR_{ann}	0.52	0.62	0.64	0.58	0.54	0.47	0.42	0.41	0.40	0.13	**-0.50**
						DUR^{CH} equity duration					
r^e	0.98	0.86	0.85	0.71	0.88	0.69	0.79	0.65	0.62	0.89	**-0.09**
	(3.54)	(3.30)	(3.56)	(3.27)	(4.14)	(2.96)	(3.86)	(3.12)	(2.62)	(3.95)	**(-0.41)**
α^{FF5}	0.15	-0.07	-0.05	-0.12	0.04	-0.14	-0.01	-0.09	-0.12	0.22	**0.07**
	(1.14)	(-0.50)	(-0.55)	(-1.20)	(0.38)	(-1.25)	(-0.16)	(-0.99)	(-1.25)	(2.19)	**(0.38)**
σ_{ann}	19.6	18.7	17.6	17.5	17.3	17.4	15.8	16.4	17.2	16.7	**14.3**
SR_{ann}	0.60	0.55	0.58	0.49	0.61	0.48	0.60	0.48	0.44	0.64	**-0.08**

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Table C.1 continued: Unconditional returns for portfolios sorted on alternative equity duration measures (in %).

Panel *B*: **Equity duration measures excluding discount rate information**

					DUR^{CL-FIP} equity duration						
r^e	0.68	0.68	0.59	0.61	0.56	0.72	0.70	0.48	0.57	0.65	**-0.02**
	(3.66)	(4.02)	(3.34)	(3.30)	(3.08)	(3.83)	(3.63)	(2.44)	(2.74)	(2.34)	**(-0.13)**
α^{FF5}	0.14	0.14	-0.03	0.08	-0.03	0.13	0.05	-0.11	-0.05	-0.04	**-0.18**
	(2.30)	(2.20)	(-0.45)	(1.16)	(-0.46)	(1.72)	(0.57)	(-1.11)	(-0.59)	(-0.40)	**(-1.45)**
σ_{ann}	15.7	15.8	16.1	16.7	16.6	17.3	17.9	17.7	19.0	23.2	**14.9**
SR_{ann}	0.52	0.52	0.44	0.44	0.41	0.49	0.47	0.33	0.36	0.34	**-0.02**
					DUR^{CH-FIP} equity duration						
r^e	0.66	0.86	0.93	0.74	0.89	0.74	0.71	0.66	0.72	0.74	**0.07**
	(2.63)	(3.56)	(4.21)	(3.28)	(4.22)	(3.68)	(3.01)	(2.96)	(3.39)	(2.63)	**(0.39)**
α^{FF5}	-0.15	0.02	0.09	0.00	0.08	-0.03	-0.01	-0.06	-0.06	0.06	**0.21**
	(-1.23)	(0.13)	(0.90)	(0.01)	(0.90)	(-0.44)	(-0.11)	(-0.73)	(-0.82)	(0.72)	**(1.36)**
σ_{ann}	18.1	17.1	16.3	17.3	15.9	15.7	17.3	17.1	16.9	19.9	**13.1**
SR_{ann}	0.44	0.60	0.69	0.51	0.68	0.57	0.49	0.47	0.51	0.44	**0.07**
					DUR^{CL-TZZ} equity duration						
r^e	0.63	0.67	0.71	0.63	0.72	0.75	0.71	0.67	0.73	0.48	**-0.16**
	(3.12)	(3.58)	(3.60)	(2.99)	(3.40)	(3.72)	(3.46)	(3.21)	(3.10)	(1.73)	**(-0.82)**
α^{FF5}	-0.10	0.10	0.16	0.05	0.03	0.09	0.09	-0.00	0.06	-0.05	**0.05**
	(-1.29)	(1.15)	(1.61)	(0.58)	(0.29)	(1.09)	(1.07)	(-0.04)	(0.63)	(-0.34)	**(0.31)**
σ_{ann}	16.2	16.3	17.1	17.6	17.7	17.7	17.7	18.2	19.4	22.6	**16.0**
SR_{ann}	0.47	0.49	0.50	0.43	0.49	0.51	0.48	0.44	0.45	0.25	**-0.12**
					DUR^{CH-TZZ} equity duration						
r^e	0.84	0.73	0.90	0.84	0.90	0.73	0.76	0.81	0.81	0.70	**-0.15**
	(3.52)	(3.21)	(4.03)	(3.99)	(4.05)	(3.17)	(2.99)	(3.30)	(3.32)	(2.35)	**(-0.71)**
α^{FF5}	-0.08	-0.18	0.19	0.03	0.19	0.11	0.07	-0.01	0.09	0.12	**0.21**
	(-0.68)	(-1.54)	(1.54)	(0.22)	(1.37)	(1.19)	(0.73)	(-0.06)	(0.88)	(1.16)	**(1.20)**
σ_{ann}	16.5	16.5	17.8	16.3	17.1	17.5	18.4	18.6	18.8	21.4	**15.5**
SR_{ann}	0.61	0.53	0.61	0.62	0.63	0.50	0.49	0.52	0.52	0.39	**-0.11**

D Details on the LASSO procedure

To predict long term growth rates for each stock $i = 1, ..., N$ we follow Tengulov et al. (2019) and firstly regress the annualized growth rate of EBITDA from year t to $t+5$ ($G_{t \to t+5}$) on predictors ($X_{i,j,t}$) from year t:

$$G_{i,t \to t+5} = \alpha_j + \sum_{f=1}^{m} \beta_{f,t+5} \cdot X_{i,j,t} + \epsilon_{i,j,t+5} \tag{D.1}$$

Note that $j = 1, ..., 48$ corresponds to an index capturing the 48 Fama and French Industries and $t = 1, ..., T$ indicates the point in time. Moreover, we estimate this model with industry fixed effects α_j and apply shrinkage by using the Lasso technique. Since Zou (2006) finds that the Lasso technique can be inconsistent if specific conditions for the shrinkage parameter are not met, we estimate the model by adaptive shrinkage proposed by Zou (2006). By using a prediction-optimal tuning parameter, Zou (2006) shows that the adaptive lasso consistently selects idependent variables without requiring specific conditions (oracle property).

In the second step we generate out-of-sample forecasts at time $t+5$ using the estimated parameters $\hat{\beta}_{1,t+5}, \hat{\beta}_{2,t+5}, ..., \hat{\beta}_{m,t+5}$ from the model above. Thus we obtain the long run growth forecasts $\hat{G}_{i,j,t+5 \to t+10}$:

$$\hat{G}_{i,j,t+5 \to t+10} = \hat{\alpha_j} + \sum_{f=1}^{m} \hat{\beta}_{f,t+5} \cdot X_{i,j,t+5} \tag{D.2}$$

We repeat this procedure in every fiscal year and implement and expanding window estimation. Moreover, we calculate the predicted growth rates for all companies which have information on predictors ($X_{i,j,t+5}$) at $t+5$ and not only those which have 5 year EBITDA growth information. Consequently, this might dampen the particular selection of surviving firms in the first step.

Table D.1: Descriptions for predictive variables used in the LASSO procedure

This table documents the construction of all variables used in the LASSO procedure to predict long term growth rates in EBITDA. All constructions follow Tengulov et al. (2019) and abbreviations in capital letters correspond the to items available at COMPUSTAT.

Variable	Description
Advertising intensity	Advertising expenses scaled by sales ($\frac{XAD_t}{SALE_t}$)
Altmans' Z-score	Z = 3.3*(operating income/assets)+1.4*(retained earnings/assets) +(sales/assets)+1.2*((current assets-current liabilities)/assets) $Z_t = ((3.3 \cdot \frac{OIADP_t}{AT_t} + 1.4 \cdot \frac{RE_t}{AT_t} + \frac{SALE_t}{AT_t} + 1.2 \cdot \frac{ACT_t - LCT_t}{AT_T}$ $\frac{CEQ_t + TXDB_t}{PRCCF_t \cdot CSHO_t}$
Entry barriers	The mean value of property, plant and equipment for each of the 48 Fama and French Industries scaled by the mean value of total assets $\frac{PPEGT_t}{AT_t}$
Capital expenditures	Capital expenditures scaled by property, plant and equipment in year t-1 $\frac{CAPX_t}{PPEGT_{t-1}}$
Capital intensity	Depreciation, depletion and amortization expenses scaled by sales $\frac{DP_t}{SALE_t}$
External financing	Difference between the change in total assets and the change in retained earnings. The difference is then scaled by total assets. $\frac{AT_t - AT_{t-1}}{AT_t} - \frac{RE_t - RE_{t-1}}{AT_t}$
Firm age	The number of years since the IPO or the number of years with COMPUSTAT listing if the IPO date is missing
Sustainable growth	Product of return on equity and the plowback ratio $\frac{IBCOM_t}{CEQ_t} \cdot \frac{1 - DVC_t}{IBCOM_t}$
GDP Growth$_{t \to t+10}$	Annualized percentage change in GDP over the last 10 years $\left(\frac{GDP_t}{GDP_{t-10}}\right)^{0.1} - 1$
EBITDA Growth$_{t \to t+1}$	$\left(\frac{EBITDA_t}{EBITDA_{t-1}}\right) - 1$
EBITDA Growth$_{t \to t+5}$	$\left(\frac{EBITDA_t}{EBITDA_{t-5}}\right)^{0.2} - 1$
Sales Growth$_{t \to t+1}$	$\left(\frac{SALE_t}{SALE_{t-1}}\right) - 1$
Herfindahl index	Herfindahl index based on the sales of firm i relative to the sum of sales in the corresponding Fama and French Industry (48).
Industry dummies	Based on the 48 Fama and French Industry definition

Industry entries	Number of companies entering one of the 48 Fama and French Industries scaled by the total number of firms in the respective Industry
Industry exits	Number of companies exiting one of the 48 Fama and French Industries scaled by the total number of firms in the respective Industry
Inflation rate	One year change in the U.S. Consumer Price Index (CPI)
Leverage	Total debt scaled by total assets $\frac{DLC_t+DLTT_t}{AT_t}$
Payout ratio	Common dividends scaled by income before extraordinary items $\frac{DVC_t}{IBCOM_t}$
R&D expenses	Research and development expenses divided by sales $\frac{XRD_t}{SALE_t}$
10-year treasury rate	10 year treasury rate
Size	Natural logarithm of total assets: $ln(AT_t)$

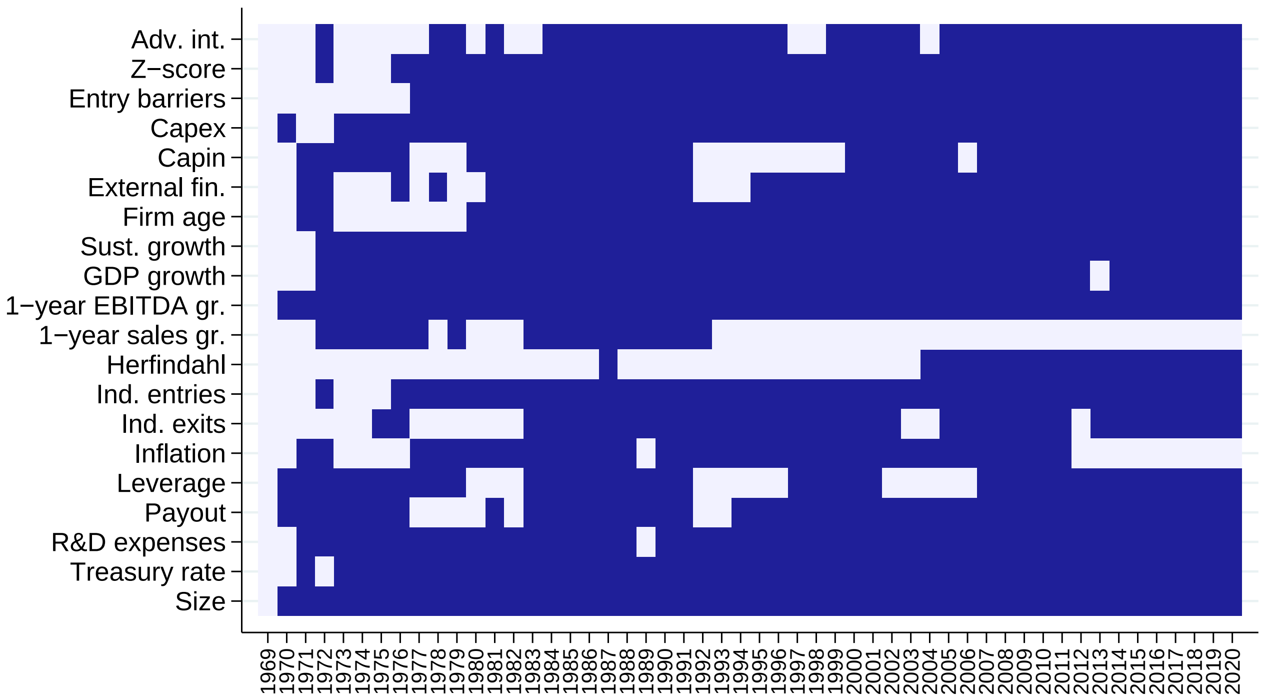
Table D.2: Descriptive statistics for predictive variables.

This table shows the summary statistics for all variables which we use as predictors for the 5-year growth rate in EBITDA. The sample period is from 1962 to 2020 and the choice of predicting variables follows Tengulov et al. (2019). All variables are windorised at the 1 % tails of each distribution to mitigate the effect of outliers. Note that we annualize the 10-year GDP growth rate as well as the 5-year EBITDA growth rate.

	Obs.	Mean	Std. dev.	$Q_{0.01}$	$Q_{0.25}$	$Q_{0.50}$	$Q_{0.75}$	$Q_{0.99}$
Advertising intensity	165380	.01	.04	0	0	0	.01	.18
Altmans' Z-score	161517	1.32	3.4	-13.03	.85	2.04	2.92	5.54
Entry barriers	168202	.42	.14	.13	.31	.42	.51	.74
Capital expenditures	149339	.21	.31	.01	.07	.12	.23	1.7
Capital intensity	165045	.07	.21	0	.02	.03	.06	.97
External financing	148858	.11	.26	-.45	-.02	.05	.17	1.11
Firm age	162374	1.99	1.04	0	1.39	2.08	2.77	3.91
Sustainable growth	165505	-.07	.82	-3.77	-.06	.07	.13	1.99
10-year GDP growth	168202	.03	.01	.01	.03	.03	.03	.05
1-year EBITDA growth	151413	.04	1.84	-7.15	-.22	.09	.35	6.92
5-year EBITDA growth	90800	.11	.18	-.26	0	.09	.2	.6
1-year sales growth	149690	.21	.68	-.7	-.01	.1	.25	3.5
Herfindahl index	168202	.1	.09	.02	.05	.07	.13	.42
Industry entries	168202	.09	.07	0	.04	.08	.13	.34
Industry exits	168202	.04	.06	0	.01	.02	.04	.32
Inflation rate	168202	.04	.03	0	.02	.03	.04	.14
Leverage	166701	.22	.2	0	.04	.19	.35	.82
Payout ratio	167840	.13	.33	-.36	0	0	.19	1.56
R&D expenses	165380	.37	3.39	0	0	0	.05	8.11
10-year treasury rate	168202	.06	.03	.01	.04	.06	.08	.14
Size	168199	4.72	2.11	.6	3.19	4.54	6.11	10.03

Figure D.1: Selected variables by Lasso.

This figure shows which variables were selected in each year by the Least Absolute Shrinkage and Selection Operator (LASSO) in order to predict 5-year EBITDA growth. Dark blue indicates the variable was selected in a given year, whereas light blue indicates the variable was not selected in a particular year.



E Details on the VAR from Gonçalves (2021)

Table E.1: Details on the Vector Autoregressive Process (VAR).

Panel A shows the Γ matrix from Equation (16) over the full sample period from 1973 to 2020. Panel B shows the variance-covariance matrix Σ of firm-demeaned residuals over the full sample period and Panel C shows the steady state means of the full sample period (time-series averages of cross-sectional medians).

	Cons	BM	POY	SY	EG	AG	SG	CSPROF	ROE	GPA	MLEV	BLEV	CASH
Panel A: **Coefficients of Γ**													
CONS	0.18	0.76	0.11	0.01	0.04	0.05	-0.02	0.02	-0.02	-0.15	0.07	-0.06	-0.15
		(30.43)	(1.99)	(2.39)	(1.92)	(3.70)	(-1.42)	(0.45)	(-0.52)	(-8.61)	(1.81)	(-1.91)	(-8.82)
BM	0.01	0.02	0.24	0.00	0.01	-0.02	-0.03	-0.01	0.02	0.01	-0.07	0.02	0.00
		(7.64)	(11.43)	(5.91)	(0.91)	(-5.52)	(-9.71)	(-1.11)	(2.96)	(1.49)	(-7.73)	(1.82)	(-0.63)
POY	0.14	-0.11	0.32	0.93	0.02	0.35	-0.07	-0.06	-0.02	-0.15	0.03	-0.07	-0.29
		(-8.17)	(4.51)	(135.33)	(0.61)	(15.29)	(-3.21)	(-1.88)	(-1.13)	(-5.33)	(-0.10)	(-1.04)	(-10.61)
SY	0.06	-0.12	-0.14	0.01	0.11	0.04	0.13	-0.07	0.12	0.06	-0.07	0.18	0.05
		(-9.95)	(-2.21)	(2.44)	(6.53)	(2.84)	(10.56)	(-2.85)	(3.40)	(3.50)	(-2.08)	(5.56)	(3.22)
BEG	0.07	-0.05	-0.16	-0.01	0.10	0.05	0.11	-0.04	0.04	0.04	-0.13	0.05	-0.01
		(-6.52)	(-4.17)	(-5.86)	(7.23)	(4.99)	(9.76)	(-3.06)	(2.76)	(3.10)	(-7.84)	(3.59)	(-1.22)
AG	0.09	-0.04	-0.16	-0.04	0.00	0.29	0.06	-0.06	-0.03	-0.03	0.05	-0.04	-0.03
		(-5.63)	(-4.16)	(-12.61)	(0.35)	(29.06)	(4.66)	(-2.76)	(-2.23)	(-1.89)	(2.43)	(-1.27)	(-1.74)
SG	0.03	-0.08	-0.04	0.02	-0.07	0.02	0.01	0.13	0.34	0.19	-0.16	0.19	-0.01
		(-4.94)	(-0.50)	(4.13)	(-2.79)	(0.50)	(0.22)	(4.51)	(8.73)	(5.88)	(-3.58)	(4.92)	(-0.10)
CSPROF	0.06	-0.06	0.08	0.02	-0.03	0.00	-0.02	0.05	0.44	0.16	-0.09	0.03	-0.09
		(-5.99)	(1.70)	(5.95)	(-1.54)	(-0.34)	(-0.95)	(2.02)	(15.11)	(6.94)	(-2.26)	(0.84)	(-4.56)
ROE	0.04	-0.01	-0.01	0.00	-0.01	-0.05	0.00	-0.02	-0.04	0.94	-0.01	0.00	0.00
		(-8.11)	(-1.29)	(1.49)	(-1.73)	(-12.70)	(-0.16)	(-2.54)	(-7.42)	(201.67)	(-0.61)	(-0.27)	(0.97)
GPA	0.04	0.00	0.01	0.00	0.01	0.03	-0.01	0.00	0.01	-0.05	0.82	0.06	-0.06
		(0.45)	(0.60)	(1.91)	(0.96)	(4.44)	(-2.04)	(0.35)	(1.41)	(-10.90)	(65.49)	(5.97)	(-8.14)
MLEV	0.04	0.00	0.00	-0.01	0.01	0.01	0.00	0.00	0.00	-0.02	0.06	0.83	-0.05
		(-2.24)	(-0.30)	(-5.41)	(1.03)	(2.79)	(-1.24)	(-0.26)	(0.06)	(-6.63)	(7.06)	(100.88)	(-10.06)
BLEV	0.02	-0.01	-0.02	-0.01	-0.02	-0.04	0.01	0.01	-0.01	0.01	0.03	-0.06	0.82
		(-3.94)	(-2.98)	(-7.67)	(-3.76)	(-10.89)	(5.00)	(3.65)	(-2.52)	(4.41)	(4.97)	(-8.11)	(121.63)
Panel B: **Variance-covariance matrix (Σ)**													
BM	.	0.081	0.001	0.071	0.000	-0.002	-0.003	0.001	0.000	-0.002	0.013	0.001	-0.002
POY	.	0.001	0.004	0.004	-0.006	-0.003	-0.002	0.003	0.001	0.000	0.001	0.001	0.000
SY	.	0.071	0.004	0.148	-0.024	-0.008	0.013	-0.009	-0.006	0.001	0.019	0.005	-0.005
BEG	.	0.000	-0.006	-0.024	0.054	0.026	0.015	0.032	0.021	0.001	-0.004	-0.005	0.002
AG	.	-0.002	-0.003	-0.008	0.026	0.032	0.017	0.013	0.006	0.000	0.003	0.003	0.000
SG	.	-0.003	-0.002	0.013	0.015	0.017	0.033	0.010	0.006	0.005	0.000	0.000	-0.001
CSPROF	.	0.001	0.003	-0.009	0.032	0.013	0.010	0.072	0.034	0.002	-0.002	-0.002	0.000
ROE	.	0.000	0.001	-0.006	0.021	0.006	0.006	0.034	0.061	0.003	-0.002	-0.002	0.000
GPA	.	-0.002	0.000	0.001	0.001	0.000	0.005	0.002	0.003	0.003	-0.001	-0.001	0.000
MLEV	.	0.013	0.001	0.019	-0.004	0.003	0.000	-0.002	-0.002	-0.001	0.007	0.004	-0.001
BLEV	.	0.001	0.001	0.005	-0.005	0.003	0.000	-0.002	-0.002	-0.001	0.004	0.004	-0.001
CASH	.	-0.002	0.000	-0.005	0.002	0.000	-0.001	0.000	0.000	0.000	-0.001	-0.001	0.004
Panel C: **Time-series medians of cross-sectional averages**													
Steady states	.	0.56	0.02	0.08	0.06	0.05	0.06	0.10	0.12	0.31	0.18	0.21	0.08

F Construction of additional variables

Asset growth. We estimate the asset growth of each stock from July in year t until June of year $t+1$ from Compustat data as the change in total assets (AT) from the fiscal year ending in $t-1$ to the fiscal year ending in $t-2$:

$$\text{Asset growth} = \frac{AT_{t-1} - AT_{t-2}}{AT_{t-2}}$$

Book equity. We follow Davis et al. (2000) and define book equity (BE) as shareholders' equity plus deferred taxes and investment tax credit (COMPUSTAT item TXDITC) minus book value of preferred stocks. Missing TXDITC observations are set to zero. Particularly, shareholders' equity is shareholders' equity (SEQ) or common equity (CEQ) plus the carrying value of preferred stocks (PSTK). If the aforementioned data is not available shareholders' equity is computed as total assets (AT) minus total liabilities (LT). The book value of preferred stocks reflects either the redemption value (PSTKRV), the liquidating value (PSTKL) or the carrying value of preferred stocks (PSTK). Following this precise order, we replace the book value of preferred stocks in case one of the aforementioned data items is not available. Lastly, we follow Davis et al. (2000) and add hand collected book equity data from Moody's manual.

Book equity growth. We estimate the book equity growth of each stock from July in year t until June in year $t+1$ by the percentage growth rate in book equity from the fiscal year ending in $t-2$ until the fiscal year ending in $t-1$.

Book leverage. We follow Fama and French (1992) and construct the book leverage of each stock from July in year t until June in year $t+1$ by the ratio of total assets (AT) and book equity from the fiscal year ending in $t-1$.

Book-to-market ratio. We follow Fama and French (1992) and obtain the book-to-market ratio for each stock from July in year t until June in year $t+1$ by scaling the book equity from the fiscal year ending in year $t-1$ with the market equity from CRSP, which we measure at the end of December in year $t-1$. The market-to-book ratio is then the inverse of this ratio.

Dividend ratio. We calculate the dividend ratio of each stock from July in year t until June in year $t+1$ by the ratio of common dividends (DVC) to income before extraordinary items (IB). Both accounting variables are from the fiscal year ending in $t-1$.

Issuance ratio. We estimate the issuance ratio of each stock from July in year t until June in year $t+1$ as:

$$\text{Issuance ratio} = \frac{SSTK_{t-1} - \mathbb{1}_{\Delta PSTKRV>0}(PSTKRV_{t-1} - PSTKRV_{t-2})}{BE_{t-1}}$$

SSTK corresponds to the sale of common and preferred stock, PSTKRV is the value of preferred stocks outstanding, $\mathbb{1}_{\Delta PSTKRV>0}$ is an indicator being one if the change in PSTKRV is positive and zero otherwise. The time subscripts correspond to the fiscal year ending in the denoted year.

Market beta. In each month t we estimate the market beta for stock j as the slope coefficient from the following regression:

$$r_{j,t} - r_{f,t} = \alpha + \beta \cdot (r_{m,t} - r_{f,t}) + u_t$$

where r_j is the return of stock j, r_f the risk free rate and r_m the market return. We run this regression in each month t using the observations from the previous 60 months. Moreover, we require a minimum of 24 monthly observations for each regression.

Net payouts. We follow Boudoukh et al. (2007) and define net payouts (PO) as dividends on common stock (DVC) plus repurchases minus equity issuance. Repurchases are computed as the purchase of common and preferred stock (PRSTKC) plus any reduction in the value of the net number of preferred stocks outstanding (PSTKRV). Equity issuance reflects the sale of common and preferred stock (SSTK) minus any increase in the value of the net number of preferred stocks outstanding (PSTKRV). The book value of preferred stocks reflects either the redemption value (PSTKRV), the liquidating value (PSTKL) or the carrying value of preferred stocks (PSTK). Following this precise order, we replace the book value of preferred stocks in case one of the aforementioned data items is not available. Since COMPUSTAT data for equity issuances and repurchases starts around 1971, we follow Boudoukh et al. (2007) and use CRSP information on market equity such that payouts before 1971 are defined as: $PO_{j,t} = DVC_{j,t} - \big((SHROUT_t \cdot CFACSHR_t) - (SHROUT_{t-1} \cdot CFACSHR_{t-1})\big) \cdot \frac{1}{2}\big(\frac{PRC_t}{CFACPR_t} + \frac{PRC_{t-1}}{CFACPR_{t-1}}\big)$. Note that SHROUT is shares outstanding, CFACSHR the cumulative factor to adjust shares outstanding, PRC the price and CFACPR the cumulative factor to adjust the price. Moreover, this market information is only used to estimate the VAR parameters Γ and Σ because cash flow forecasts start in 1973.

Operating profitability. We follow Fama and French (2015) and obtain operating profitability for each stock from July in year t until June in year $t+1$ as:

$$\text{Operating profitability} = \frac{REVT_{t-1} - COGS_{t-1} - XSGA_{t-1} - XINT_{t-1}}{BE_{t-1}}$$

REVT are revenues, COGS costs of goods sold, XSGA selling and administrative expenses, XINT interest expenses, and BE is book equity. All accounting variables are from the fiscal year ending in $t-1$. We replace missing values of COGS, XSGA and XINT with zero as long as at least one of these three accounting variables is available.

Profits-to-assets. We follow Novy-Marx (2013) and estimate gross profits-to-assets for each stock from July in year t to June in year $t+1$ from Compustat data ending in the fiscal year $t-1$:

$$\text{Profits-to-assets} = \frac{REVT_{t-1} - COGS_{t-1}}{AT_{t-1}}$$

REVT are revenues, COGS costs of goods sold and AT total assets.

Repurchase ratio. We estimate the repurchase ratio of each stock from July in year t until June in year $t+1$ as:

$$\text{Repurchase ratio} = \frac{PRSTKC_{t-1} - \mathbb{1}_{\Delta PSTKRV<0}(PSTKRV_{t-1} - PSTKRV_{t-2})}{IB_{t-1}}$$

PRSTKC corresponds to the value of purchased common and preferred stock, PSTKRV is the value of preferred stocks outstanding, $\mathbb{1}_{\Delta PSTKRV<0}$ is an indicator being one if the change in PSTKRV is negative and zero otherwise. The time subscripts correspond to the fiscal year ending in the denoted year.

Return on equity . We calculate the return on equity for each stock from July in year t until June in year $t+1$ by scaling income before extraordinary items (IB) from the fiscal year ending in $t-1$ with book equity from the fiscal year ending in $t-2$.

Size. We calculate the size of each stock as the natural logarithm of the market capitalization denoted in U.S. Dollar from CRSP.

Total payout ratio. We estimate the total payout ratio of each stock from July in year t until June in year $t+1$ by dividing net payouts for the fiscal year ending in $t-1$ with the book equity from the fiscal year ending in $t-1$.