Valuation and Long-Term Growth Expectations

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Abstract

Long-term growth expectations are central to investment analysis and corporate valuation. Despite a dominant effect on firm value, the academic literature and practitioner conventions provide little guidance on how this long-term growth rate should be determined. This paper takes a step in addressing this gap: we estimate the relation between long-term growth and an extensive selection of firm, industry, and market characteristics. Market prices do not seem to fully capture long-term growth information. Cross-sectional tests yield substantial positive abnormal returns for firms with high expected long-term growth.

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I. Introduction

The standard discounted cash flow (DCF) corporate valuation consists of three steps: 1) estimate cash flows over a short-term "projection period", 2) estimate an appropriate discount rate for these cash flows, and 3) estimate a terminal value for the years beyond the projection period, where the terminal value is typically found either by assuming some future growth process or by applying some valuation multiple.[1] But while there is voluminous practical guidance and large research literatures for the first two steps, there is very little guidance, both in research and in practice, for the third step. Thus, the same finance textbooks that devote multiple chapters to short-term pro-forma projections and discount rate estimation often have only a few paragraphs discussing how one might predict a long-term corporate growth rate. Similarly, there are huge research literatures on the pricing of risk, and on short-run pro forma projections of earnings and cash flows, yet the literature on estimating and predicting long-term corporate growth rates is very scarce.

This inattention to long-term corporate growth rates is all the more striking given the sensitivity of corporate valuation to this variable. In many valuations, this is the most important input, i.e., results are more sensitive to changes in long-term growth than any other parameter in the valuation. For example, the market value of many start-ups and other rapidly growing firms will often derive primarily or exclusively from long-term cash flows, which in turn will be entirely dependent on the long-term operating growth of these companies. Small changes in the magnitude or duration of high growth can have a dramatic effect on the valuation. The reason for this inattention to long-term growth rates may be informational: we

[1] The EV/EBITDA multiple is perhaps the most common valuation ratio in practice (see e.g., Eaton, Guo, Liu, and Officer (2021)), and is often preferred over multiples based on sales or net income because EBITDA is less subject to accounting distortions (see e.g., Demiroglu and James (2010) and Purnanandam and Swaminathan (2004)). Projections about future long-term growth play a fundamental role in determining cross-sectional variation in EV/EBITDA.

know very little about how long-term growth rates evolve, and estimating long-term growth well for a given company is difficult. Instead, a common practice in industry is to assume an ad-hoc long-term growth rate (often taken to be the overall growth rate of the economy) and then to perform sensitivity analysis on this rate. This, however, seems to be more an acknowledgment of the absence of a good estimate, than a sensible strategy to estimate a long-term growth rate.

A primary goal of this paper is to address this inattention and advance what is known about predicting long-term corporate growth rates. This paper presents an exploratory analysis of how firms' long-term growth is related to various firm and industry characteristics. Here we are searching for correlations – what firm, industry, and market characteristics predict long-term growth rates – without attempting to demonstrate causation. While we at times provide potential interpretations for the correlations we find, it should be understood that these interpretations are speculative, and that our results are predictive and not causal. While we expect our predictive ability of long-term growth rates to be fairly modest – i.e., such growth is hard to predict and we will only explain a relatively small fraction of the variation, we argue that such estimation is of sufficient importance in valuation, and so little is known on the question, that even a relatively small advance can be of first order importance to the theory and practice of corporate valuations.

To be clear, when we speak of a long-term growth rate, we mean something different than the infinite-horizon growth rate that this term is sometimes taken to represent. Instead, we have in mind the intermediate to long-term growth rate, beyond the cash flow projection period. While we agree with the general notion that in the *very* long run one would expect corporate growth to match economic growth, there is little reason to think this provides for a meaningful estimate for a company's growth rate 10, 20 or even 30 years into the future. And it is growth over this range, rather than at infinity, which will typically be most relevant for valuation. Indeed this study is motivated by this distinction. Our starting point is the notion that one should be able to do better estimating growth over this range than the common practice of defaulting to an economy-wide growth rate, and that this distinction will have a large impact on valuation. Hence, when we speak of long-run growth throughout this paper, it is to be understood that we have in mind the intermediate to long-term range that is relevant for valuation, and not the growth rate at an infinite horizon.[2]

We find a number of industry and firm variables that predict a firm's long-term growth. Overall, our empirical models explain up to 22 percent of the variation of long-term growth rates. This contrasts with existing literature, which generally concludes that there is very little predictability of long-term growth rates.[3] While we view our primary contribution here as predictive, there are some interesting qualitative insights from predictors of long-run growth, including the following:

First, we find a positive relation between barriers to entry, a variable representing firms' competitive positioning, and subsequent long-term growth rates. We also find that the propensity of firms exiting an industry is correlated with lower future long-term growth rates of remaining firms in that industry.[4]

[2]To illustrate this point numerically, consider a highly stylized example of a firm whose cash flows grow at an 8% rate for years 1-5, at a 5% rate from years 6-30, and at a 2% rate in perpetuity after that, with a discount rate of 12%. Then, about 90% of the overall firm value comes from cash flows from the first 30 years, and if one were to incorrectly use a perpetual growth rate of 5% beyond year 5, one would misestimate value by only 4.7%. In contrast, if one were to use the infinite horizon 2% growth rate in perpetuity beyond year 5, one would misestimate value by 24.7%. We would like to note that if we apply a lower discount rate in this example we arrive at an even higher misestimation.

[3]Chan, Karceski, and Lakonishok (2003), for example, conclude that only about three percent of the variation in five-year growth rates is explained by their model. Variables that proxy for the expectations of the market do not perform better either. In Table IA1 in the Internet Appendix we show that a market implied long-term growth rate derived from a constant growth dividend discount model explains only up to three percent of the variation in corporate long-term growth rates.

[4]These findings relate our study to a body of literature that examines the impact of competition, persistence of profitability, and accounting rates of return (see e.g., Fama and French (2000), Penman (1991), Fama and French (2006)). While the focus of that literature is primarily on profitability and accounting rates of return, we are inter-

Second, we find that companies with more leverage are associated with lower long-term growth. One potential explanation is that increased usage of debt financing is indicative of higher bankruptcy likelihood and costs, which lead to lower future growth.

Third, we document negative firm size and age effects, indicating that as firms grow larger and older they grow at lower rates.

Fourth, we document that a prominent measure of market expectations, equity analysts' long-term earnings forecasts, is positively related to long-term growth. We also find a positive relation between the number of analysts following a company and subsequent growth rates, evidence consistent with securities analysts providing oversight and disciplining management through their role in providing information to the capital markets.

Finally, we find a positive relation between variables representing current investment opportunities, such as capital expenditures, and subsequent long-term growth rates.

While many of these relations are not surprising, our analysis provides a quantitative prediction of firms' long-run growth rates that appears to be an improvement over current practice. We provide specific support for this in the second part of the paper, where we test whether the long-term growth estimates are a better predictor of expected growth than those estimates that are implicit when investors calculate prices. If this is indeed that case, then we would expect to find a positive association between long-term growth expectations and future stock returns. Alternatively, if the expected long-term growth rates are already fully reflected in prices, then we would not expect to find an association between long-term growth expectations and future returns.

As a natural test of our hypothesis, we estimate cross-sectional Fama and MacBeth (1973) regressions with future returns as a dependent variable and expected long-term growth

ested in predicting growth for the purpose of valuation. We contribute to this literature by incorporating predictors that capture competition and profitability and provide evidence that competitive forces do shape corporate long-term growth.

as the main explanatory variable. We find positive and significant association between expectations for long-term growth and subsequent stock returns. The association persists even after controlling for major known return predictors. Since the long-term growth expectations are of main interest here, we perform an analysis of the out-of-sample performance for several different predictive frameworks. We find that the Least Absolute Shrinkage and Selection Operator (LASSO) provides the best out-of-sample predictions of long-term growth.

As noted above, the literature that deals directly with estimating long-term corporate growth rates for valuation purposes is rather limited. Most closely related to our contribution is the paper by Chan, Karceski, and Lakonishok (2003).[5] In particular, they analyze sales and earnings growth and conclude that traditional valuation ratios, e.g., earnings yield, book-to-market, and sales-to-price have little explanatory power and IBES long-term growth estimates also add little value to predicting long-term growth. However, their focus is on firm growth rather than on valuation, they primarily consider growth of only up to five years, and they look at a much narrower range of explanatory variables than we do. Kryzanowski and Mohsni (2013) and Kryzanowski and Mohsni (2014) document that some firm and industry level variables have predictive power for subsequent five year growth rates in earnings. In particular, they show that industry-level variables have predictive power for five year growth in aggregated industry-level earnings, and market expectations variables have predictive power for five year firm-level earnings growth.[6]

[5]We note that researchers have adopted different conventions for calculating growth rates. In our paper, we are analyzing long-term growth for the purposes of valuation from the perspective of the individual investor, who buys and holds stock over some horizon and reinvests dividends (see e.g., Chan et al. (2003)). In contrast, other papers take the perspective of the overall firm and track overall firm growth. For example, Lakonishok, Shleifer, and Vishny (1994) argue that investors tend to favor companies with strong overall past growth performance, with strong management, and in a glamorous line of business.

[6]Our study is also related to papers that examine how analysts form their growth expectations. For example, Jylha and Ungeheuer (2021) provide evidence that there is an association between beta and growth overestimation and suggest that analysts adjust growth expectations to offset the valuation effects resulting from time-varying beta estimates. Gao and Wu (2014) focus on creating an earnings growth model that performs better than analysts' long-term growth estimates from IBES.

We differ from these papers in several important manners. First, we consider longer term growth and extend the definition of 'long-term' to periods beyond five years. Second, we predict growth using a much wider set of potential long-term growth predictors, looking at more than 30 different predictors and spanning more than 50 years of data. Third, we develop a predictive framework, test its out-of-sample performance, and relate the resulting growth predictions to market valuations. We demonstrate that simple cross-sectional asset pricing tests based on long-term growth expectations yield significant abnormal returns.

There is also a related literature analyzing expected dividends implied by market prices. Some contributions to this literature focus on dividend derivatives to back out the present value of expected future dividends at various time horizons.[7] More recent papers, such as Giglio, Kelly, and Kozak (2021), exploit equilibrium relations between stock price dynamics and the implied dynamics of dividend yields, without relying on dividend futures.[8] All these papers take market prices as given and derive the implied dividend expectations. We essentially take the opposite approach: we estimate cash-flow growth to derive the resulting fair valuations. Thus, our approach does not rely on market prices that correctly reflect cash-flow growth and consequently, we can provide firm valuations, ask questions about misvaluation, and value private firms.

The remainder of this paper is organized as follows. Section II describes variable construction, the underlying data, and the predictive model specification. An analysis of the corresponding results is presented in Section III. Section IV outlines our model selection procedures for the construction of long-term growth expectations and evaluates the

[7] See, for example, Van Binsbergen, Brandt, and Koijen (2012), Van Binsbergen, Hueskes, Koijen, and Vrugt (2013), and Van Binsbergen and Koijen (2017).

[8] Other important contributions to this strand of literature include Bansal, Miller, Song, and Yaron (2021) and Gormsen, Koijen, and Martin (2020).

corresponding results. Section V relates the long-term growth expectations to the cross-section of firm values. Additional robustness is presented in Section VI. Section VII concludes.

II. Empirical approach

A. Measuring long-term growth

As discussed in the introduction, a company's long-term growth rate is a crucial input for valuation and investment decisions. To make progress in our understanding of the determinants of long-term growth rates, one first needs to define an appropriate measure for corporate growth. From a theoretical valuation perspective, free cash flows to the firm (FCFF) or free cash flows to equity (FCFE) are the most appropriate measures since they are immediate inputs when calculating net present values. While this direct link to valuation is crucial, a major drawback of these measures is that, on average about 53% of the FCFF observations and about 48% of the FCFE observations in our sample are negative or missing so that growth rates cannot be calculated in a consistent way. This, in turn, can introduce a substantial sample selection bias. Alternative definitions of corporate growth can be derived from the company's income statement. EBITDA is a widely used historical cash flow measure and an important input for valuation multiples such as the EV/EBITDA or EBITDA/Price (see e.g., Liu, Nissim, and Thomas (2002)). Further, EBIT or Net Income are important components of free cash flows and are natural candidates for alternative growth measures. Compared to free cash flows, data availability on all these items is improved and fewer observations are negative. For example, on average only 14% of observations are missing or negative for EBITDA, 19% for EBIT, and 24% for Net Income. Alternatively, one can move further up the income statement and focus on Sales. Sales are less closely related to cash flows than, say, EBITDA, but data availability is virtually 100% and there is no problem with negative observations. Based on these tradeoffs, we choose long-term growth in EBITDA as our primary measure in the analyses below.[9] In addition, we also consider long-term growth in Sales as a second measure in the first part of the paper.[10]

Finally, to make these definitions of long-term growth operational, we need to decide how to define long-term. The feasible definition of long-term growth is constrained by sample length. For example, in Compustat comprehensive data only exist since 1962. Thus, the trade-off is to define growth over a sufficiently long term such that a significant portion of the overall firm value is captured versus ensuring a sufficiently large sample of long-term growth observations. In our analyses we therefore use two alternative definitions of long-term: five years and ten years.

[9]Using the discounted cash flow (DCF) approach Kaplan and Ruback (1995) study the valuation properties of highly leveraged transactions. While they determine that DCF valuations approximate transacted values reasonably well, they conclude that simple EBITDA multiples result in similar valuation accuracy. Indeed EBITDA is a metric that investors and company management closely monitor. For example, equity analysts often assume that in the last period, when free cash flow is modelled, fixed capital investments are equal to depreciation and amortization (i.e., maintenance CapEx) and net working capital investments are equal to zero, which makes long-term free cash flow measures very similar to EBITDA. Sometimes, exit multiples, such as EV/EBITDA are applied. Therefore, EBITDA growth is more relevant for firm valuation, than, say, Sales or Net Income, as it is directly related to free cash flows. To asses if EBITDA growth rates are a suitable proxy for FCF growth rates, in additional tests (untabulated) we regressed realized FCF growth rates on realized EBITDA growth rates and examined the slope coefficients. We hypothesise that if EBITDA growth rates are a good proxy for FCF growth rates we would expect that the slope coefficient be significantly different from zero and insignificantly different from one. While this is not the case for five-year growth rates, we find that, for our sample, the coefficient estimates from the regression estimations of the ten-year FCF growth rates on ten-year EBITDA growth rates are significantly different from zero and also insignificantly different from one for the more recent period, 1981-2018. We interpret these results as evidence that the bias in our data is not too large and that ten-year EBITDA growth rates are a suitable proxy for ten-year FCF growth rates.

[10]As explained in the text we focus on EBITDA and Sales because annual earnings, and annual free cash flows are remarkably volatile and frequently negative for a typical company. This, in turn, prevents the reliable estimation of long-term growth rates for a big proportion of the firm-year observations. Although Sales are less closely related to free cash flows than EBITDA, Sales are also a key input in DCF corporate valuation. For example, the components of FCF are often modelled as ratios of Sales (e.g., CoGS divided by Sales, SGA divided by Sales, Depreciation and Amortization divided by Sales, Capex divided by Sales, etc.). To arrive at a terminal FCF figure these components are then combined with a terminal Sales figure. A long-term Sales growth is then applied as a proxy for the growth rate in perpetuity (see e.g., Allee, Erickson, Esplin, and Yohn (2020), who provide evidence that valuation specialists often use future growth estimates based on a historical sales growth rate).

B. Predicting long-term growth: variables

Many different factors contribute to the long-term growth of a firm. Our econometric specifications are guided by different strands of the finance and economics literature, as well as conventional practitioner beliefs, that imply correlations between different market and firm characteristics and future firm performance. In particular, the finance literature has linked future growth of corporations to market expectations implicit in dividend to price ratios or book to market ratios, to their ownership and capital structure, dividend policy, corporate governance, and managerial characteristics. In addition, the IO literature has identified industry characteristics such as barriers to entry as a determinant of future corporate growth. In the following we discuss empirical proxies for these long-term growth drivers.

Market expectations

The most obvious starting point for identifying predictors of long-term growth is information contained in market valuations. Prices can be expressed by Free Cash Flow, EBITDA, or Dividends, divided by the difference between the discount rate and the growth rate. Thus, in a traditional Gordon growth valuation framework (see Gordon (1959)), dividend price ratios, earnings-to-price ratios, or book-to-market ratios can be expressed as linear functions of future growth rates. We therefore rely on these measures as predictors of long-term growth rates. Specifically, we use dividend yield (*Dividend Yield*), earnings to price ratio (*E/P*), and book-to-market ratio (*B/M*) as predictive variables in the analysis below.

We construct these ratios in accordance with the existing literature. The *Dividend Yield* is the ratio of dividends per share divided by current price per share, *E/P* is the ratio of income before extraordinary items available to common equity relative to equity market value, and *B/M* is the ratio of book value of common equity plus deferred taxes divided by the market value of common equity. Since valuation models imply that higher expected long-term growth increases a company's current market value, and thus the denominators of all three ratios, we expect a negative relation between these ratios and future long-term growth rates of a company.

An alternative proxy for growth expectations is security analysts' predictions. We therefore include the mean analyst forecast for long-term growth in earnings (*ALTGF Earnings*) in the predictive regression.

In Section VI B we estimate our predictive regressions and construct our long-term growth expectations for the purpose of corporate valuation by excluding all variables based on market information. The reason we perform these additional estimations is twofold: we want to alleviate concerns about the potential circularity of using market-based information as an ingredient in the valuation exercise, plus we want to provide long-term growth expectations for valuation of private companies.[11]

Firms' investment decisions

Given the criterion of positive net present value for evaluating investment projects, going back to Fisher (Fisher, 1907) or Boehm-Bawerk (Von Böhm-Bawerk, 1899), investments in capital should be related to the trajectory of future cash flows. We therefore consider the capex ratio (*CAPEX*), measured as capital expenditures in the current period divided by property, plant, and equipment in the previous period, and the R&D intensity ratio, defined as the ratio of research and development expenditures to sales (*R&D Intensity*), to capture future growth related to investments in tangible and intangible assets.

[11] For example, stock analysts often adjust their long-term earnings growth forecasts to justify the current stock price. This so-called model calibration may be a reasonable practice, but it does amount to admitting that the analyst is unable to predict long-term growth rates independently and thus relies on the very same stock price s/he is supposed to evaluate.

We also include the amount of external financing a company obtains in any given period, constructed as the change in total assets minus the change in retained earnings all scaled by total assets (*External Financing*). Additionally, we consider the dividend payout ratio, defined as common dividends divided by earnings before extraordinary items (*Payout Ratio*).

Firms' riskiness

Riskier firms are likely to be subject to higher probabilities of distress or even liquidation, due to their inability to meet operating expenses or debt obligations. Even if they are subsequently restructured, this is not costless and generates legal expenses or losses from liquidating assets (as analyzed, for example in Bernanke (1981), Fischer, Heinkel, and Zechner (1989), or Goldstein, Ju, and Leland (2001)). These costs impact firms' long-term growth trajectories. Furthermore, firms' growth options may be related to measures of systematic risk, such as their betas. Since beta at least partly reflects a firm's cash-flow sensitivity to the state of the economy (see e.g., Campbell, Polk, and Vuolteenaho (2010)), high beta-firms may be hit particularly hard by disasters or economic crises, and may therefore exhibit less robust long-term cash-flow growth. We therefore include a company's systematic risk (*Beta*). *Beta* is calculated by estimating a regression over the past 60 months of a stock's excess returns against the market's excess returns with the requirement that at least 24 months of data are available (for the relation between systematic risk and growth options, see also Carlson, Fisher, and Giammarino (2006)).

As discussed, default risk may adversely influence future growth via negative consequences of financial distress or bankruptcy. An increase in the probability of financial distress is related to companies being more prone to, among other things, losing customers, business opportunities, and favorable credit terms, all of which will negatively impact companies' future operating growth. To this end we include the modified *Altman's Z* score as a proxy for a company's probability of bankruptcy (see Graham and Leary (2011)).

There are a number of manners in which firm leverage might be related to long-term growth. The widespread explanations of leverage (taxes, signaling, agency, strategic interactions, etc…) yield multiple potential implications for long-run growth. Thus we include the leverage ratio defined as total debt scaled by book assets (*Leverage*).

Firms' competitive positioning

Industry structure is likely to play a significant role in company growth (see for example Bain (1956), Stigler et al. (1983), and Dixit, Norman et al. (1979)). We therefore include a set of variables related to companies' competitive positioning.

First, we include the industry Herfindahl index based on sales as a standard measure of industry competition (*HHI Sales*).

Second, we also construct two variables that capture the change of the industries' competitive environment. Specifically, we calculate the change in the number of companies in a particular industry based on *Industry Entries* and *Industry Exits*. These variables are constructed as the number of company entries or exits for a particular industry-year pair divided by the total number of companies in the same industry and year. As industry definition we use the Fama-French (FF) 48 industry classification.

In addition, we include a measure that captures the level of barriers to entry. We use the plant, property and equipment to total assets ratio (*Barriers to Entry*). This ratio captures how capital intensive firms are. We construct this ratio at the industry level by computing the mean ratio of property, plant and equipment to total assets for a particular industry-year pair, using the FF 48 industry classification.

We also consider proxies for product differentiation (see e.g., Hotelling (1929) and Salop (1979)). If a firm with a differentiated product earns above-normal operating profits, it may grow faster in the future. We use two variables to proxy for this: the ratio of depreciation, depletion, and amortization expense to net sales (*Capital Intensity*) and the ratio of advertising expense to net sales (*Advertising Intensity*) (see Cheng (2005)). An additional measure for competitive advantage is the number of patents on the company's books. Bloom and Van Reenen (2002) show that patents have economically and statistically positive significant impact on firm-level productivity and market value. Having a large number of patents on the balance sheet implies that a company has heavily invested into intangible assets, which have materialized and lead to above average profit margins. Consequently, we would expect that such a company would achieve higher growth in the future. To this end we include the number of patents a company has, defined as the natural logarithm of total number of patents (*Number of Patents*).

Firms' corporate governance

Firms' corporate governance may also potentially influence its long-term growth in a number of different ways. Governance may impact project choice, efficiency, empire-building tendencies of management, competitive advantages, and cost of capital, thereby affecting long-term growth (see Berle and Means (1932), Jensen and Meckling (1976), Grossman and Hart (1982), and Jensen (1986)). Thus we will consider a number of variables related to governance.

Large outside shareholders may play an important role in corporate governance (see e.g., Shleifer and Vishny (1986), Admati, Pfleiderer, and Zechner (1994), and Gillan et al. (2006)). A large shareholder has the incentive to gather information, monitor the management, and also put pressure on the management through sizeable voting control (see e.g., Harris and Raviv (1988), Grossman and Hart (1988), and Shleifer and Vishny (1997)). To capture the potential monitoring by large shareholders and its effect on the firm's future growth, we construct a measure of institutional ownership concentration (*Inst. Ownership HHI*). In addition, we also use the percentage of total institutional ownership to total equity ownership in the company (*Inst. Ownership*) (see Hartzell and Starks (2003)). Finally, securities analysts may provide oversight as well, through their role in providing information to the market (see Gillan et al. (2006)). Therefore, we include the number of analysts issuing a forecast for a company's long-term growth (*Number Analysts*).

Additional variables

We also include several additional variables, which do not directly relate to the categories discussed above.

First, we include a company's sustainable growth rate as explanatory variable, given by the product of its return on equity and the retention ratio. This is the sustainable growth rate if a company's profitability and payout policy remain constant. We construct the sustainable growth (*G*), where the return on equity is measured as a company's earnings before extraordinary items divided by book equity and the retention ratio is one minus the payout ratio, measured as common dividend divided by earnings before extraordinary items (see Chan et al. (2003)).

Second, we include last year's growth in Sales (*Growth Sales 1Y*) or growth in

EBITDA (*Growth EBITDA 1Y*) in the respective predictive regression specifications to capture information coming from past performance.

Third, a company's size might also be related to future long-term growth rates. Large firms may require organizational and operational structures that make it more difficult to realize growth opportunities, as formalized, e.g., by Arrow (1974), Holmstrom (1989), and Manso (2011). We therefore construct a variable for the size of the company by taking the natural logarithm of total assets (*Size*).

Fourth, we also include a proxy for the age of the company. As discussed by Loderer, Stulz, and Waelchli (2016) corporate aging could reflect an increase of organizational rigidities over time or diffusion of rent seeking behavior in the firm. Consistent with the existing literature we measure the age of the company (*Firm Age*) as the natural log of years since IPO or years of information on Compustat if IPO year is missing.

Finally, we include a set of macroeconomic variables, which have been regarded as factors influencing the overall business environment a company operates in and consequently its long-term growth. The variables that we consider are the change in the logarithm over 10 years of the Real GDP (*GDP Growth 10Y*), the change in the logarithm of the U.S. Consumer Price Index (*Inflation Rate*) and also the 10Y Treasury Rate (*RFR*). Prior literature shows that these variables are related to both expected earnings growth and expected returns (see e.g., Sharpe (2002)). We also include industry dummies (based on FF 48 industries) to capture that companies operating in different industries might differ in the average long-term growth rate.

A detailed description of the construction of each variable is contained in the Appendix. To be eligible for inclusion in the predictive regressions at a given horizon, a company must have a positive base-year value for the corresponding growth variable, i.e., Sales or EBITDA, so as to calculate a growth rate. In addition, the company must not have any missing values for any of the predictors.

C. Data

Our sample is obtained from several data sources. Our primary data source for accounting information is Compustat. Compustat provides comprehensive data starting in 1962 and contains relevant accounting variables as well as data for the operating performance measures. Macroeconomic data, such as data on the U.S. Consumer Price Index (CPI), real GDP and the risk-free rate are obtained from the Federal Reserve Bank of St. Louis (FRED) database. Price data are from CRSP. Data on the Fama-French factors are taken from Kenneth French's data webpage. We obtain firm-level data on patents from Noah Stoffman's website (see Kogan, Papanikolaou, Seru, and Stoffman (2017)). The institutional ownership data is derived from Thomson Reuters Institutional (13f) Holdings. Data on the number of analysts following a company and analysts forecast for long-term growth rates are retrieved from I/B/E/S.

To make use of all available company and time-series information, we take into account that the different datasets provide data availability for different sets of companies and different time periods. We therefore construct two datasets, covering different periods and containing different number of variables. First, we merge the Compustat data file with the Macroeconomic data file and the CRSP data file to cover the largest number of companies and the longest time period. In performing our predictive estimations we utilize independent variables that require accounting information lagged by one year.[12] Therefore, the longest

[12]For example, we construct the predictor variable *CAPEX* defined as capital expenditures in year t divided by property, plant, and equipment in year t-1. Another example is the variable *External Financing* defined as the change in total assets (from year t-1 to year t) minus change in retained earnings (from year t-1 to year t) divided by

period we cover in our estimations is from 1963 to 2018. Second, we complement this dataset with information about patents, institutional ownership, and analysts' forecasts. The resulting dataset covers the period from 1981 to 2018.

We focus on U.S. companies traded on AMEX, NASDAQ, and NYSE. We remove utilities (SIC 4900-4949) and financial companies (SIC 6000-6999). We also remove firms with negative or missing asset and equity values, or gross plant, property and equipment larger than assets. We perform our estimations on a yearly basis, since most of the data that we use are available only on yearly frequency. Firms are selected at the end of each fiscal year. To control for the effect of outliers in the subsequent estimations the variables are winsorized at the 1% level in both tails of the distribution. We winsorize the variables year by year in order to avoid a look-ahead bias. The two final datasets that we use in our tests are as follows: i) the dataset for the period 1963-2018 contains 105,007 firm-year observations for 8,505 unique firms, and ii) the dataset for the period 1981-2018 contains 53,469 firm-year observations for 6,283 unique firms. Due to missing data on a variety of data items, we often employ a smaller sample in the analyses.

[Insert Table 1 here.]

Panels A and B in Table 1 provide summary statistics for the periods 1963-2018 and 1981-2018, respectively. The median firm growth rates in Sales and EBITDA are in line with the growth rates in the sample of Chan et al. (2003). Figure 1 displays the empirical histograms of the 5 and 10 year growth rates in Sales and EBITDA. The histograms show that there is wide dispersion in growth rates and that the dispersion widens as we move from 5 to 10 year growth rates.

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total assets. Both examples show that we lose the first year of the sample period when constructing these variables for the purpose of our predictive regression estimations.

[Insert Figure 1 here.]

It is important to note that the 5 year and 10 year growth rates can only be estimated for firms that survive the 5 and 10 years, respectively. This, in turn, restricts the first stage of our predictive estimations to firms for which 5 and 10 year growth rates are available, which may introduce a survivorship bias.[13] In the Internet Appendix we therefore analyze and compare the behavior of non-surviving firms to that of surviving firms, to provide evidence on potential biases.[14] In addition, in the second stage of our predictive regression framework, we construct long-term growth expectations for all firms with available predictors in a given sample year (and not only the firms with available 5 and 10 year growth estimates). Thus, any survivorship bias in the first stage in the predictive regression framework would work against finding predictive power for the growth estimates in the second stage.[15] Next, we discuss our estimation framework and results.

[13]This corresponds to the measurement convention in the literature (see e.g., Chan et al. (2003)).

[14]To gauge the potential impact of survivorship on our results at every fiscal year-end over the sample period we select two sets of firms: firms that survive the following ten years (survivors), and firms that survive over the following five years but not until year ten (non-survivors). In the Internet Appendix in Table IA2 we show that the mean (median) annualized growth rates are slightly higher for survivors compared to non-survivors. Importantly, in Tables IA3 and IA4 we replicate our predictive regression tests for non-survivors and find very similar results for the long-term growth predictors of non-survivors compared to those of survivors. We conclude that survivorship does not have a pronounced impact on our results.

[15]To shed more light on the robustness of our results, we perform the first stage predictive regressions over different sample periods, different forecasting horizons (5 and 10 years), and different dependent variables (Sales and EBITDA).

D. Model specification

In this section we outline our methodology. For long-term growth, we consider annualized geometric growth rates as the dependent variable. We adjust these growth rates for stock splits and dividends, as well as reinvestment of cash dividends.[16] that is,

$$G_{i,j,t\to t+n} = \left(\frac{V_{i,j,t+n}}{V_{i,j,t}} \times \prod_{m=1}^{n} (1 + Div_{i,j,t+m}) \right)^{\frac{1}{n}} - 1, \quad (1)$$

where $G_{i,j,t\to t+n}$ is the annualized geometric growth rate in Sales or EBITDA from t to $t+n$, and $n = 5$ or $n = 10$. $V_{i,j,t+n}$ is the end of period value of the cash flow measure, $V_{i,j,t}$ is the start of period value of the cash flow measure. These cash flow measures are adjusted for stock splits and dividends. $Div_{i,j,t}$ is the cash dividend in the stock each year, i=1,...,N is a firm index, j=1,...,48 is an industry index based on the FF 48 industry classification, and t=1,...,T is a year index.

We predict the long-term growth rates in the above-mentioned cash flow variables using a two-stage procedure. Specifically, in the first stage we estimate the following model:

$$G_{i,j,t\to t+n} = \alpha_j + \sum_{f=1}^{m} \beta_{f,t+n} X_{i,j,t} + \varepsilon_{i,j,t+n} \quad (2)$$

where: $G_{i,j,t\to t+n}$ is the annualized geometric growth rate per share in Sales or EBITDA with dividends reinvested over the years from t to $t+n$, where $n = 5$ or $n = 10$. m denotes the

[16] Estimating long-term growth as an annualized geometric average growth adjusted for stock splits and dividends, as well as reinvestment of cash dividends is in line with extant literature (see e.g., Chan et al. (2003)). In robustness estimations we also estimate realized long-term growth as the average of one-year growth rates over the long-run (five and ten years). The results are quantitatively and qualitatively very similar (untabulated). This, in turn, alleviates concerns that the geometric growth formula only uses the data points at the start and the end of the growth window.

number of predictors. The independent variables $X_{i,j,t}$ are measured at the beginning of the 5 and 10 year periods, respectively. The model is estimated with industry dummies (α_j). Statistical inference is based on double clustered standard errors. In particular, to account for both cross-sectional and time-series serial correlation we report t-statistics that are based on standard errors clustered by firm and year.[17]

In the second stage we take the point of view of an investor, who uses only the past information available and updates information each year as time passes. Specifically, we perform an expanding window estimation[18] of Model (2) and perform out-of-sample forecasting. In other words, in the second stage the estimated parameters, $\hat{\alpha}_j$ and $\hat{\beta}_{1,t+n}, \hat{\beta}_{2,t+n}, ..., \hat{\beta}_{m,t+n}$, which are re-estimated each year, are combined with the independent variables (X_i) in the same year ($t+n$), to generate predicted growth rates over the next τ = 5 and 10 years ($\hat{G}_{i,j,t+n\to t+n+\tau}$), as outlined below in Model (3). The predicted growth rates are generated for all companies in our sample that have available information for the independent variables (X_i) and not only for the companies with available 5 or 10 year growth information. This, in turn, reduces the potential impact of survivorship bias in the second stage estimation.

$$\hat{G}_{i,j,t+n\to t+n+\tau} = \hat{\alpha}_j + \sum_{f=1}^{m} \hat{\beta}_{f,t+n} X_{i,j,t+n} \quad (3)$$

Figure 2 outlines the timeline of the estimation procedure.

[Insert Figure 2 here.]

[17] To take into account serial correlation we explore a number of standard error correction methodologies with different lag structures. We find that double clustering by firm and year is the most conservative approach. Therefore, we report our results based on this approach. See Petersen (2009) for a study on standard error estimation in panel data sets.

[18] The model is re-estimated each year including the information from the new period and all past available information.

III. Predicting long-term growth: analysis and results

In this section we present and evaluate the results of the predictive regressions of companies' long-term growth rates in Sales and EBITDA. While we view our primary contribution as predictive, there are some interesting qualitative insights from predictors of long-run growth which we discuss below. Tables 2 and 3 summarize the results from regressions with different sample periods (i.e., starting 1963 or 1981), different forecasting horizons (five and ten years), and different dependent variables (Sales and EBITDA growth). In general, the estimated results for a particular predictor have predominately the same coefficient signs, similar magnitudes, and similar statistical significance. However, in some of the estimations, frequently in the shorter periods, statistical significance weakens although the coefficient sign and magnitude remain.[19] We therefore, without loss of generality, concentrate our attention on variables that have statistically significant results and have the same coefficient sign in at least 75% of the estimations for either Sales or EBITDA growth. To infer relative economic importance, we multiply the coefficient estimate of each predictive variable by its standard deviation. We then normalize these products by the sample average for the respective dependent variable. This procedure allows for relative comparison, i.e., by how many percent does the long-term growth measure change if an independent variable changes by one standard deviation. For brevity, we take the average across the different dataset periods

[19]For example, the results for the Industry Exits variable indicate negative and statistically significant association in three out of four estimations for future long-term Sales growth, and in three out of four estimations for future long-term EBITDA growth. In the period 1981-2018, when looking at ten-year Sales and ten-year EBITDA growth, statistical significance disappears, although the coefficient sign remains negative. This is likely due to the decrease in sample size. Still, we proceed by providing economic interpretations for the association between Industry Exits and subsequent long-term growth in Sales and EBITDA because statistically significant association is present in three out of four estimations.

and also long-term growth periods for Sales and EBITDA.

[Insert Table 2 here.]

[Insert Table 3 here.]

Market expectations

We start the discussion of our results with the variables that capture the expectations of the market. The variable *B/M* exhibits a negative and statistically significant relation to future long-term growth in Sales. This finding is in line with the predictions from a simple Gordon growth model and is indicative of future growth being at least partially reflected in current stock prices, i.e., higher expected long-term growth increases a company's current stock price, which, in turn, results in an increase of the denominator of this ratio. On average a one-standard-deviation increase in *B/M* is associated with a 12.5 percent decrease in long-term Sales growth.[20]

The next prominent measure for market expectations is security analysts' long-term growth earnings forecasts *ALTGF Earnings* (see e.g., Dechow and Sloan (1997) and Chan et al. (2003)). We find a positive and statistically significant relation with long-term growth in Sales, which indicates that analysts' long-term forecasts are informative for future realizations of long-term growth. A one-standard-deviation increase in *ALTGF Earnings* is associated with a 11.1 percent increase in long-term Sales growth.

[20]The variable *B/M* exhibits a positive and significant relation to future long-term growth in EBITDA during the period 1963-2018. However, when we include additional growth predictors, such as *ALTGF Earnings* and *Number Analysts*, the coefficient estimate becomes negative and statistically significant. We therefore refrain from providing an interpretation for the association between *B/M* and future long-term growth in EBITDA.

Firms' investment decisions

Tables 2 to 3 reveal that the level of a company's *External Financing*, has a positive and statistically significant coefficient in all long-term growth in Sales estimations. This finding confirms that in a well-functioning capital market, firms with growth potential look for external funds to finance investment opportunities. A one-standard-deviation increase in *External Financing* is associated with a 4.1 percent increase in long-term Sales growth.

Furthermore, we find that *Capex* has positive and statistically significant relation to future long-term growth rates in Sales. Thus, investments in tangible capital are indicative for future growth opportunities, which lead to higher future growth. A one-standard-deviation increase in *Capex* is associated with a 6.3 percent increase in long-term Sales growth.

Firms' riskiness

We document a negative relation between *Altman's Z*, a measure of a firm's riskiness, and subsequent long-term growth rates in EBITDA. Higher values of the variable are associated with lower probability of financial distress in the short-run, so the negative relation indicates that companies with higher short-run probability of financial distress enjoy higher long-term growth in the future. One economic interpretation is that firms might need to undertake riskier ventures in order to achieve higher growth in the future. Thus, "low Altman's Z" companies are more likely to go bankrupt, but those that survive generate substantially higher long-term growth. A one-standard-deviation increase in *Altman's Z* is associated with a 24.3 percent decrease in long-term EBITDA growth.

Furthermore, we find that *Leverage* has negative and statistically significant relation to future long-term growth rates. One potential explanation is that increased usage of debt financing is indicative for higher bankruptcy likelihood and costs, which lead to lower future growth. A one-standard-deviation increase in *Leverage* is associated with a 9.9 percent decrease in long-term Sales growth and 13.3 percent decrease in long-term EBITDA growth.

Firms' competitive positioning

We also find a positive and statistically significant association between the *Barriers to Entry* variable and future long-term growth rates. This finding confirms the intuition that companies in more capital intensive industries enjoy higher barriers to entry and tend to grow at higher future rates. A one-standard-deviation increase in *Barriers to Entry* is associated with a 24.9 percent increase in long-term Sales growth and a 21.3 percent increase in long-term EBITDA growth. Furthermore, *Industry Exits* predicts lower long-term growth rates for those companies that remain in the industry. A one-standard-deviation increase in *Industry Exits* is associated with a 12.6 percent decrease in long-term Sales growth and 17.4 percent decrease in long-term EBITDA growth.

Additional variables

We also find that the coefficient of the sustainable growth rate *G* is positive and statistically significant in the long-term Sales growth regressions. This finding suggests that companies, which sustain high profitability and high profit retention, i.e., have higher *G*, enjoy higher long-term Sales growth rates in the future. A one-standard-deviation increase in *G* is associated with a 16.3 percent increase in long-term Sales growth.

We also document a negative and statistically significant relation between *Firm Age* and subsequent long-term growth in Sales. This evidence supplements earlier findings that as firms grow older, their profitability and capital expenditures decline (see e.g., Loderer et al.

(2016)). A one-standard-deviation increase in *Firm Age* is associated with a 9.7 percent decrease in long-term Sales growth.

Further, we find a positive and statistically significant relation between *Number Analysts* and subsequent long-term growth in Sales. This evidence is in line with securities analysts providing oversight and disciplining management through their role in providing information to the capital markets, which is associated with higher growth rates. A one-standard-deviation increase in *Number Analysts* is associated with a 4.3 percent increase in long-term Sales growth.

Moreover, the coefficient of the *Size* variable is negative and statistically significant across all long-term growth in EBITDA specifications. This is in line with the economic intuition that there exist dis-economies of scale so that bigger firms grow more slowly. A one-standard-deviation increase in *Size* is associated with a 12.2 percent decrease in long-term EBITDA growth.

We finally document that the *Growth Ebitda 1Y* variable is negatively associated with subsequent long-term growth in EBITDA. This is indicative of reversals in the growth rates. A one-standard-deviation increase in *Growth Ebitda 1Y* is associated with a 10.8 percent decrease in long-term EBITDA growth.

IV. Model selection for long-term growth expectations

In this part of the paper we explore whether long-term corporate growth expectations are reflected in the cross-section of stock returns. We hypothesize that if our long-term growth predictions are more informative than the ones used by investors when determining market prices, we would find a positive association between long-term growth expectations and future stock returns. Since long-term growth predictions are of main interest here, we first analyze which predictive model delivers the best out-of-sample results. We then analyze whether the resulting long-term growth expectations are related to the cross-section of firm values. To this end a natural testing framework is the cross-sectional regression à la Fama and MacBeth (1973). We therefore regress monthly returns on predicted long-term growth rates, controlling for other return predictors.

A. Model selection

In this part of the paper we take the viewpoint of an investor who is interested in obtaining an investment signal rather than having a causal explanation of the effects of a particular explanatory variable on long-term growth. Cox and Snell (1974) argue that it is more important to apply predictions from a model that result in smaller mean square error than obtaining unbiased estimates when the main emphasis lies on prediction and not on the economic explanation of the effects of the right hand side variables on the left hand side variable. We therefore apply in addition to the full model specification presented in the previous section two additional dynamic procedures for variables selection: 1.) backward elimination and 2.) the least absolute shrinkage and selection operator (LASSO) of Tibshirani (1996). Our goal here is to select the model that delivers the best out-of-sample performance. We do this by determining which model produces predictions with the smallest error. We apply two popular measures for prediction evaluation: the root mean squared error (RMSE) and the mean absolute error (MAE).[21]

[21] We do not use the mean absolute percentage error (MAPE) criterion since the MAPE is likely to be quite unstable and less reliable due to very small or negative values in the denominator.

B. Backward elimination

The backward elimination procedure starts with the full model, i.e., with the model containing all explanatory variables. In a second step, the variable with the least significant coefficient is removed from the model. We apply a threshold of a p-value greater than 0.10, which is a widely applied drop-out rule in empirical research. The model is then re-fitted and step two is repeated until no further explanatory variables can be dropped.[22]

C. Least absolute shrinkage and selection operator (LASSO)

Standard subset selection procedures, such as backward elimination may produce highly sample-dependent results due to their discrete selection process (see Tibshirani (1996) and Friedman, Hastie, and Tibshirani (2010)). Shrinkage procedures may be preferred in this case since they produce models which are more stable. Therefore, we apply also the least absolute shrinkage and selection operator (LASSO).

D. Results

Table 4 reports the results from the out-of-sample tests. In general, the RMSE and the MAE deliver similar results. In particular, compared to both the full model and the backward elimination model, the LASSO model has the lowest RMSE and MAE during all periods.[23] For the following analyses, we therefore use the expectations estimated according to the

[22]Mantel (1970) shows that the backward elimination procedure has an advantage over other related model selection procedures (e.g., forward selection) when the dependent variable is highly correlated with some linear combination of a group of explanatory variables, but only shows a low correlation with single explanatory variables. The backward elimination procedure tends to leave such groups in the model, while they will usually not enter the model when using forward selection. We therefore apply the backward elimination procedure.

[23]In Table IA5 in the Internet Appendix, as a robustness check, we also compare the out-of-sample performance of the LASSO model to a naïve forecast using the most recently realized growth rate and an alternative forecast using the analysts' long-term growth estimates. We find that the LASSO model has the lowest RMSE and MAE during all periods.

LASSO model. We also examine how much of the cross-sectional variation in realized growth rates is captured by the expected (out-of-sample) growth rates from our LASSO model. We find that the average R^2 in all estimations is positive, and that the expected growth rates explain between 1.5% (5-year EBITDA, 1981-2018) and 12.5% (10-year Sales, 1981-2018) of the variation in realized growth rates out-of-sample.[24] As discussed in Section II compared to EBITDA, Sales are less closely related to shareholders' free cash flows. Therefore, we concentrate on long-term growth in EBITDA in the remainder of the paper. Further, we are interested in utilizing a growth proxy that better captures the true long-term growth rate. We therefore perform our cross-sectional firm-value tests using 10-year EBITDA expectations (*Exp LTGR10 EBITDA LASSO*).[25]

[Insert Table 4 here.]

LASSO minimizes the sum of squared residuals subject to the constraint that the sum of absolute coefficient values is equal or less than a given constant λ. We utilize the extended Bayesian information criterion (EBIC) to determine λ every period (see, Schwarz (1978) and Chen and Chen (2008)).[26] Specifically, every year in our sample LASSO estimates the model

[24]In particular, in additional estimations reported in Table IA6 in the Internet Appendix we regress the realized growth rates on the out-of-sample growth rate forecasts every year and examine the average R^2 from these estimations across all years. In the spirit of Campbell and Thompson (2008) and Clark and West (2006) if the realized growth rate series is truly unpredictable, then in a finite sample the predictive regression will on average have a higher mean squared prediction error. Therefore, the expected R^2 under the null of unpredictability is negative, and a zero or positive R^2 can be interpreted as evidence of predictability. We interpret our results as evidence that long-term growth expectations from our LASSO model have predictive power for actual long-term growth realizations out-of-sample (see also Engelberg, McLean, Pontiff, and Ringgenberg (2023) for a helpful discussion about in-sample and out-of-sample predictability).

[25]In the Internet Appendix we provide evidence using 5-year EBITDA expectations. The results are qualitatively and quantitatively very similar.

[26]As mentioned LASSO relies on λ, a tuning parameter that controls the degree and type of penalization. We examined the out-of-sample performance of several different approaches for selecting λ in arriving at our choice (see Ahrens, Hansen, and Schaffer (2020)). In general, for the construction of the *Exp LTGR EBITDA LASSO*, EBIC performs best out-of-sample during the 1963-2018 period (untabulated). We note that it is standard practice for predictors to be ”standardized” and we incorporate this standardization into the penalty loadings when

for a range of different λ parameters and computes the corresponding EBIC information criteria. Next, the model with λ corresponding to the minimum EBIC information criterion is selected (this corresponds to "Stage 1: regression" in Figure 2). The first cross-section of ten year EBITDA expectations (*Exp LTGR10 EBITDA LASSO*) is obtained ten years later, i.e., starting 1973 and 1991 for the datasets beginning in 1963 and 1981, respectively. This corresponds to $t+n$ in "Stage 2: prediction" in Figure 2. Figure 3 graphically shows, over the periods 1973-2018 and 1991-2018, which characteristics from the universe of all characteristics are selected by the LASSO procedure to generate predictions.[27]

[Insert Figure 3 here.]

Figure 4 plots the time-series evolution of the annual average realized and expected 10Y EBITDA LTGRs. We observe some time-series variation and that the two time-series move closely together. Table 5 presents the corresponding summary statistics. We observe that the empirical distributions of the two variables are comparable and that *Exp LTGR10 EBITDA LASSO* has a slightly higher mean and median values.[28] Overall, we conclude that the LASSO procedure performs well out-of-sample, producing economically sensible growth rate expectations. We proceed with testing whether *Exp LTGR10 EBITDA LASSO* are reflected in the cross-section of future equity values.

[Insert Figure 4 here.]

performing the LASSO estimations. We thank Christian Hansen and an anonymous referee for feedback on this point.

[27] In the Internet Appendix in Figure IA1 we present the corresponding plots for *Exp LTGR5 EBITDA LASSO*.

[28] In the Internet Appendix in Figure IA2 and Table IA7 we present the corresponding figure and summary statistics for *Exp LTGR5 EBITDA LASSO*. In general, we observe more time-series variation in both the realized and expected LTGR5 EBITDA. We also observe that the empirical distributions of the two variables are very similar.

[Insert Table 5 here.]

V. Long-term growth expectations and stock returns

A. Fama-MacBeth regressions: methodology

To explore the relation between long-term growth expectations and firm value realizations we conduct cross-sectional tests based on individual stocks. The use of tests based on individual stocks is motivated by recent literature that argues that using individual stocks permits more efficient tests of whether firm characteristics predict returns (see e.g., Ang, Liu, and Schwarz (2020)).[29] We therefore perform Fama and MacBeth (1973) tests where we predict firm-level returns. In particular, each month we estimate a cross-sectional OLS regression as follows:

$$R_{i,t+1} = \alpha + \beta_t \hat{G}_{i,t} + \gamma_t X_{i,t} + \varepsilon_{i,t+1} \quad (4)$$

where $R_{i,t+1}$ is the stock return (in decimal) for company i in month $t+1$, $\hat{G}_{i,t}$ is the long-term growth expectation for EBITDA. As discussed in section IV D, we obtain these expectations from the LASSO model. X_i contains a set of firm characteristics documented to explain the cross-section of expected stock returns.[30] We estimate multiple specifications which differ in

[29] In robustness estimations we confirm that our results hold when using a portfolio sorting approach. Although, portfolio sorting has become the standard to explore cross-sectional variation in expected returns this approach has some limitations, as pointed out, for example, by Ang et al. (2020). In particular, Ang et al. (2020) argue that using portfolios creates the potential for data-mining biases. They also argue that portfolios destroy information by shrinking the dispersion of betas, leading to larger standard errors. Still, we confirm that our findings are robust to applying this approach and report the results for ease of comparability to other existing papers.

[30] The following papers, among others, also apply a similar estimation: Novy-Marx (2013), Ball, Gerakos, Linnainmaa, and Nikolaev (2015), Ball, Gerakos, Linnainmaa, and Nikolaev (2016), Wang (2019).

the control variables they include (see e.g., Wang (2019) and Wahal (2019)). All independent variables are winsorized month by month at the 1% level in both tails.

B. Fama-MacBeth regressions: results

Table 6 presents the results for the periods starting 1973 and 1991 in panels A and B, respectively. In column (1) of each panel we only include *Exp LTGR10 EBITDA LASSO*. In column (2) we include *Beta*, *Size*, and the *Book to Market*. *Beta* is computed from a rolling-window regression of the excess return of a company on the excess return of the market over the past five years of monthly data, with the requirement that at least 24 months of data are available. *Size* is computed as the log of market capitalization, and *Book to Market* is computed as the log of book-to-market. In column (3) we add *Profitability*, computed as $(sales_{t-1} - cogs_{t-1})/assets_{t-1}$, and *Investment*, computed $(assets_{t-1} - assets_{t-2})/assets_{t-2}$. In column (4) we add *Momentum*, computed as the cumulative return from month $t-12$ to month $t-2$, and *Reversal*, computed as the return from month $t-1$ to month t. In column (5) we add *External Financing* and *Altman's Z*, as previously defined in Section II B.[31] In column (6) we add *Operating Leverage*, computed as $(cogs_t + xsga_t)/assets_t$, and Standardized Unexpected Earnings (*SUE*) computed as $(ibcom_t - ibcom_{t-1})/sd(ibcom)$, where $sd(ibcom)$ is the standard deviation of *ibcom* over the prior six years (two years minimum). In column (7) we add *Asset Turnover* computed as $revt_t/assets_t$, and *Accruals* computed as $((act_t - act_{t-1}) - (che_t - che_{t-1}) - ((lct_t - lct_{t-1}) - (dlc_t - dlc_{t-1}) - (txp_t - txp_{t-1})) - dp_t)/assets_t$.

[31] We include *Altman's Z* to take into account the potential effect of financial distress on future returns of surviving firms. Specifically, one might be skeptical that survivorship bias will induce a bias in the estimate for any variable that captures the probability of financial distress. In particular, firms that have high distress probabilities at the beginning of the prediction period but still survived in the end may exhibit special growth patterns that may be correlated with return patterns. In line with prior literature we find that firms with lower probability of financial distress have higher expected returns (see e.g., Campbell, Hilscher, and Szilagyi (2008)). Importantly, the results show that controlling for *Altman's Z* and the additional return predictors has very little effect on the positive association between *Exp LTGR10 EBITDA LASSO* and future stock returns.

The results in both panels indicate that *Exp LTGR10 EBITDA LASSO* has positive and significant association with subsequent stock returns. *Exp LTGR10 EBITDA LASSO* retains significant predictive power even after we include additional known return predictors.[32] The coefficient estimates are 0.1128 and 0.1198 for the most restrictive estimations for the periods starting 1973 and 1991, respectively. The coefficients on the control variables are similar to those documented in the literature.

[Insert Table 6 here.]

Overall, the evidence confirms that *Exp LTGR10 EBITDA LASSO* expectations constructed from our predictive LASSO model are useful in explaining cross-sectional differences in firm value. The evidence supports the hypothesis that the long-term growth estimates are a better predictor of expected growth compared to the estimates investors are actually using when determining prices. The association with stock returns is not explained by firm characteristics known to be associated with stock returns. Next, we proceed with a battery of robustness tests.

VI. Robustness

A. Firm size and the effect of Exp LTGR EBITDA LASSO

In this subsection we investigate whether the predictive power of long-term growth EBITDA expectations derived from our LASSO model is different for different firm size sub-samples. Specifically, we split our samples into microcaps and all-but-microcaps

[32]The results are somewhat stronger after we control for the additional known return predictors. This is consistent with the literature (see e.g., Wang (2019)).

sub-samples. Applying NYSE breakpoints, we assign stocks smaller than the 20th percentile of the market equity into the microcaps sub-sample and all remaining stocks into the all-but-microcaps sub-sample.

For brevity, we report the results in the Internet Appendix. Specifically, tables IA8 and IA9 summarize the results for the datasets with *Exp LTGR10 EBITDA LASSO* starting in 1973 and 1991, respectively. The results in both tables indicate that *Exp LTGR10 EBITDA LASSO* has a positive and significant association with subsequent stock returns, even after controlling for known predictors of returns such as variables that capture external financing or investments. We also find that the predictive power of *Exp LTGR10 EBITDA LASSO* is concentrated in the microcaps sub-sample. These results indicate that the return performance is concentrated in smaller companies with high growth potential.[33] We report further robustness results using 5-year EBITDA expectations in the Internet Appendix in Table IA10 and Table IA11. We find a positive and significant association between *Exp LTGR5 EBITDA LASSO* and stock returns in the microcaps sub-sample 1968-2018. During the shorter period, 1986-2018, we find that the positive and significant association between *Exp LTGR5 EBITDA LASSO* and stock returns is concentrated in the all-but-microcaps sub-sample, indicating that *Exp LTGR5 EBITDA LASSO* constructed based on a wider set of predictors has explanatory power for the valuation of large firms. Further, in Table IA12 in the Internet Appendix we report pairwise correlation coefficients between the long-term growth EBITDA expectations derived from our LASSO model and the known predictors of returns. In general, the correlation coefficients between the *Exp LTGR10 EBITDA LASSO*, *Exp LTGR5 EBITDA LASSO*, and the established return predictors are very low, indicating that the long-term

[33]The *t*-statistics in the estimations where we control for the largest number of additional known predictors of returns exceed three, as advocated by Harvey, Liu, and Zhu (2016).

growth expectations derived from the LASSO model contain firm value information that is somewhat orthogonal to these well-known predictors.[34]

While these results suggest that utilizing *Exp LTGR EBITDA LASSO* expectations in a trading strategy within a sample of microcaps might have a limited scope due to the limited investment capacity and high transaction costs of microcaps we note that microcaps are nevertheless important to study because they constitute a sizable proportion of the population of firms and play an important role in the real economy. In particular, in our longest sample microcaps account for about 50% of the number of companies. This is in line with Fama and French (2008), who report that microcaps account for about 60% of the total number of stocks. Moreover, microcaps have contributed more than large caps to aggregate employment growth (Birch (1987), Moscarini and Postel-Vinay (2012)) and account for a large proportion of aggregate employment (Luttmer (2010)) and total economic growth more generally (Evans (1987), Hou, Xue, and Zhang (2020)).

The stronger results for small companies can be readily interpreted with our notion of imprecise growth estimates. Arguably, simple rules of thumb that practitioners use for growth rates are better estimates for large firms than small firms, as large mature companies may have more reliable and consistent growth. Similarly, behavioral explanations such as rational inattention could give rise to stronger results for small firms.[35] However, in the spirit of

[34]In Table IA13 in the Internet Appendix we also assess if there is an interaction effect between analysts' growth forecasts and *Exp LTGR10 EBITDA LASSO*. We find that controlling for analysts' long-term growth forecasts has little impact on the positive association between *Exp LTGR10 EBITDA LASSO* and stock returns in the microcaps sub-sample. For the all-but-microcaps sub-sample we find a positive and statistically significant interaction effect between analyst long-term growth forecasts and *Exp LTGR10 EBITDA LASSO*. While research has shown that analysts overreact to certain stocks and stocks that receive optimistic analyst long-term growth forecasts exhibit poor subsequent stock market performance (see e.g., Bordalo, Gennaioli, La Porta, and Shleifer (2019)), the results indicate that among these stocks growth predictions from our LASSO model are able to differentiate between stocks that indeed underperform and stocks that perform well going forward.

[35]More broadly, our findings are also related to a body of literature that examines psychology-based models of asset prices (see Barberis (2018) for a survey of the topic). A general prediction of the theoretical literature on the topic is that information processing biases, such as extrapolation of past information, can generate return predictability (see e.g., Barberis, Shleifer, and Vishny (1998), Fuster, Laibson, and Mendel (2010), Alti and Tetlock

Kozak, Nagel, and Santosh (2018), we note that it is challenging to differentiate between ”risk-based” and ”behavioral” explanations in our framework.

The overall evidence indicates that capital markets appear to price growth expectations more efficiently for large stocks, whereas long-term growth expectations for small stocks contain valuable information when predicting their future stock returns. A deeper investigation of the driving forces behind the positive association with returns is outside of the scope of this paper and constitutes, we believe, a fruitful avenue for further research.

B. Excluding growth predictors based on market information

In this subsection, we estimate our predictive regressions and construct our long-term growth expectations by excluding all variables based on market information. Specifically, we exclude the variables *E/P*, *B/M*, *Dividend Yield*, and *Beta*. Further, we perform the estimations with data for the period 1963 - 2018, which provides a longer history and does not include information about analyst expectations. The primary motivation to perform these additional robustness estimations is to provide predicted long-term growth rates for private companies, which, in contrast to their publicly traded counterparts, do not have market information readily available.[36] As a result, determining appropriate inputs for the long-term value becomes even more challenging. A secondary motivation for these robustness estimations is to alleviate

(2014), Hirshleifer, Li, and Yu (2015), Choi and Mertens (2019), Bordalo, Gennaioli, Ma, and Shleifer (2020), among others). Empirically, the evidence on the topic is mixed. While Lakonishok, Shleifer, and Vishny (1994) suggest that individual investors might extrapolate past growth, even when such growth is highly unlikely to persist in the future, Daniel and Titman (2006) argue that past growth in a firm’s fundamentals is not related to the subsequent return of the firm’s stock. Bordalo, Gennaioli, La Porta, and Shleifer (2019) show that the returns on stocks with the most optimistic analyst long-term earnings growth forecasts are lower than those on stocks with the most pessimistic forecasts. Huang, Zhang, Zhou, and Zhu (2023) show that a strategy based on extrapolating firms’ fundamental information earns positive and significant returns. We contribute by showing that taking into account a wide range of information sources significantly improves long-term growth predictability and firm value estimates. In particular, the market does not fully incorporate information contained in long-term growth expectations derived from our predictive model.

[36]Private companies are a large, important part of the U.S. economy. They generate a big portion of the U.S. GDP and represent a substantial portion of all firms in the U.S.

concerns about the potential circularity of using market-based variables as ingredients in the valuation exercise.

We start with estimating Model (2) by excluding market-based predictors, i.e., using only information that would be available for private companies. For brevity, we present the results in the Internet Appendix in Table IA14. The results are quantitatively and qualitatively very similar to the ones presented in Section III. Thus, we relegate the discussion of the results to the Internet Appendix.

Next, we concentrate on the model selection for long-term growth expectations without market-based variables. In particular, we follow the methodology outlined in Section IV and apply in addition to the full model specification the backward elimination and the LASSO procedures. The results are presented in Table IA15. The table shows that the LASSO model delivers the lowest RMSE and MAE during all periods, which is consistent with the results presented in Section IV.

Finally, we examine the interaction between long-term growth expectations without market-based variables and stock returns. Specifically, to test the predictive power of *Exp LTGR10 EBITDA LASSO* constructed without predictors based on market information, i.e., information available only for private companies, similarly to Section V, we perform Fama and MacBeth (1973) regression tests.[37] Table IA16 presents the results. The results in the table indicate that *Exp LTGR10 EBITDA LASSO* has a positive association with subsequent stock returns. Similar to before, these results are statistically significant in the microcaps sub-sample. *Exp LTGR10 EBITDA LASSO* retains significant predictive power even after we include the major known predictors of returns.

[37]In the Internet Appendix we present evidence from portfolio sorts in Table IA23. The long-short portfolio produces positive and highly statistically significant abnormal returns. These results are positive and robust throughout the alternative estimations and highly statistically significant in the 5-f and 6-f alpha estimations.

Overall, the results are in line with the main results presented in Section V. Assuming that private firms are similar to public firms in the dimensions examined in the paper our model also provides useful input for the valuation of private firms, for which market-based variables are not available.

C. Additional corporate governance growth predictors

As further robustness we include additional corporate governance predictors related to characteristics about firms' CEOs. In particular, we consider the variables *CEO Stock Ownership*, *CEO Stk.&Opt. Compensation*, *CEO Age*, *CEO Tenure*, and *CEO Duality*. To construct these variables we utilize data from ExecuComp which provides coverage for a much shorter time span, namely from 1992 to 2018, and a smaller number of companies. The variable definitions and summary statistics are provided in the Internet Appendix in Table IA18 and the results are presented in Tables IA19 and IA20. Overall, the results indicate that CEO characteristics do not consistently have statistically significant predictive power for subsequent long-term growth realizations and therefore do not appear to represent fundamental determinants of corporate long-term growth.

D. Portfolio sorts

As another robustness test to the estimations in Section V we conduct portfolio-sort tests as follows. We allocate firms into deciles according to their long-term growth forecasts for EBITDA. We then calculate the returns of these portfolios for a one-year holding period. For the one-year holding period, the portfolios are rebalanced once a year. We ensure that we use information that was publicly available on each rebalancing date in accordance with previous literature (see e.g., Lakonishok et al. (1994) and Dechow and Sloan (1997)).

For brevity, we present a detailed discussion and the corresponding results in the Internet Appendix. Tables IA21 and IA22 report the average monthly excess returns as well as monthly abnormal returns for the stock portfolios.[38] The long-short portfolios produce positive and statistically significant abnormal returns. Given the magnitude of these returns, they are likely to survive even when accounting for transaction costs, etc.[39] In this context it is important to recall that the analyzed trading strategy only requires portfolio rebalancing once per year. Overall, these results accord well with the findings in Section V.

E. Subsamples

As a further robustness test, it is a common practice to perform sample splits for periods characterized by very significant differences in the underlying economic conditions. The financial crisis of 2008-2009 constitutes such a period. In unreported tests we therefore perform our estimations by excluding the period of the 2008-2009 financial crisis. These alternative estimations deliver results generally very similar to the results presented in the paper.

VII. Conclusion

Expectations about long-term growth are crucial in investment analysis and corporate valuation. Despite its often dominating effect on overall firm value, the academic literature provides very little guidance on the determinants of long-term corporate operating growth. In

[38]We concentrate on equally-weighted (1/N) portfolio returns to eliminate any bias towards large-cap, possibly mature and/or overvalued stocks. We have also computed value-weighted portfolio returns and found weaker excess and abnormal return results (untabulated). These results indicate that the stock performance is concentrated in smaller companies with high growth potential.

[39]For a valuable discussion on anomalies, trading costs, and cost mitigation techniques see Novy-Marx and Velikov (2015).

any MBA Corporate Finance textbook, there are multiple chapters detailing cash flow forecasting, translating accounting numbers and forecasts into cash flows, and choosing the right discount factor for the valuation. However, the literature on the long-term growth determinants is scarce and inconclusive.

This paper presents an exploratory analysis of how firms' long-term growth is related to various firm and industry characteristics. We apply an extensive selection of predictors spanning more than 50 years of data. While extant literature only finds low predictability for long-term growth measures (see e.g., Chan et al. (2003)), we find a much greater degree of predictability in a firm's long-term growth. In particular, we are able to explain up to 22 percent of the long-term growth rate variation. We document a negative relation between long-term growth rates and industry exits, leverage, as well as firm size and age. We also find a positive relation between variables representing firms' competitive positioning, such as barriers to entry, analysts' long-term earnings forecasts and the number of analysts following a firm, and variables representing firms' investment decisions, such as capital expenditures and external financing, and subsequent long-term growth rates. Our growth estimates could be used by practitioners to value companies more accurately.

In the second part of the paper, we show the relevance of our estimates by developing trading strategies based on them. To this end, we first determine the empirical model that delivers the best out-of-sample predictions for EBITDA long-term growth. Also, we examine the out-of-sample predictive performance of this LASSO model by regressing realized growth rates on growth forecasts and document a positive R^2. Finally, we test whether long-term growth expectations from this LASSO model are reflected in the cross-section of future stock returns. Using our long-term growth predictions in cross-sectional asset pricing tests, we find significant positive abnormal returns.

Appendix

Variable Definitions

Variable name	Description
Advertising Intensity	Advertising expense divided by sales ($\frac{XAD_t}{SALE_t}$)
ALTGF Earnings	Mean of individual analysts' forecasts for long-term earnings growth
Altman's Z	3.3*(operating income/assets) + 1.4*(retained earnings/assets) + (sales/assets) + 1.2*((current assets - current liabilities)/assets) ($Z_t = 3.3 \times \frac{OIADP_t}{AT_t} + 1.4 \times \frac{RE_t}{AT_t} + \frac{SALE_t}{AT_t} + 1.2 \times \frac{ACT_t - LCT_t}{AT_t}$)
B/M	The ratio of book value of common equity plus deferred taxes to the market value of common equity ($\frac{CEQ_t + TXDB_t}{PRCC\_F_t \times CSHO_t}$)
Barriers to Entry	The mean ratio of property, plant and equipment to total assets ($\frac{PPEGT_t}{AT_t}$) for a particular industry-year pair (FF48 industries used)
Beta	Historical stock beta is calculated by estimating a regression (over 60 months) of a stock excess returns against the market excess returns with the requirement that at least 24 months of data are available
CAPEX	Capital expenditures in year t divided by property, plant, and equipment in year t-1 ($\frac{CAPX_t}{PPEGT_{t-1}}$)
Capital Intensity	Depreciation, depletion, and amortization expense divided by sales ($\frac{DP_t}{SALE_t}$)
Dividend Yield	Common dividends per share divided by price per share ($\frac{DVC_t}{CSHO_t \times PRCC\_F_t}$)
E/P	Income before extraordinary items divided by market value ($\frac{IBCOM_t}{PRCC\_F_t \times CSHO_t}$)
External Financing	Change in total assets minus change in retained earnings divided by total assets ($\frac{(AT_t - AT_{t-1}) - (RE_t - RE_{t-1})}{AT_t}$)
Firm Age	The natural log of years since IPO or years of information on Compustat if IPO year is missing
G	The sustainable growth rate is the product of return on equity and plowback ratio ($\frac{IBCOM_t}{CEQ_t} \times (1 - \frac{DVC_t}{IBCOM_t})$)
GDP Growth 10Y	The GDP growth is the percentage change over 10 years in the Real GDP
Growth EBITDA 1Y	One year growth in EBITDA ($\frac{EBITDA_t - EBITDA_{t-1}}{EBITDA_{t-1}}$)
Growth EBITDA 5Y	Five year annualized per-share growth in EBITDA with reinvestment of cash dividends and other special distributions. $\left(\frac{EBITDA_{t+5}/CSHPRI_{t+5} \times AJEX_{t+5}}{EBITDA_t/CSHPRI_t \times AJEX_t} \times \prod_{n=1}^{5}(1 + \frac{DVC_{t+n}/CSHPRI_{t+n}}{PRCC\_F_{t+n}})\right)^{\frac{1}{5}} - 1$
Growth EBITDA 10Y	Ten year annualized per-share growth in EBITDA with reinvestment of cash dividends and other special distributions. $\left(\frac{EBITDA_{t+10}/CSHPRI_{t+10} \times AJEX_{t+10}}{EBITDA_t/CSHPRI_t \times AJEX_t} \times \prod_{n=1}^{10}(1 + \frac{DVC_{t+n}/CSHPRI_{t+n}}{PRCC\_F_{t+n}})\right)^{\frac{1}{10}} - 1$
Growth Sales 1Y	One year growth in sales ($\frac{SALE_t - SALE_{t-1}}{SALE_{t-1}}$)

Growth Sales 5Y	Five year annualized per-share growth in sales with reinvestment of cash dividends and other special distributions. $\left(\frac{SALE_{t+5}/CSHPRI_{t+5} \times AJEX_{t+5}}{SALE_t/CSHPRI_t \times AJEX_t} \times \prod_{n=1}^{5}(1+\frac{DVC_{t+n}/CSHPRI_{t+n}}{PRCC\_F_{t+n}})\right)^{\frac{1}{5}} - 1$
Growth Sales 10Y	Ten year annualized per-share growth in sales with reinvestment of cash dividends and other special distributions. $\left(\frac{SALE_{t+10}/CSHPRI_{t+10} \times AJEX_{t+10}}{SALE_t/CSHPRI_t \times AJEX_t} \times \prod_{n=1}^{10}(1+\frac{DVC_{t+n}/CSHPRI_{t+n}}{PRCC\_F_{t+n}})\right)^{\frac{1}{10}} - 1$
HHI Sales	Herfindahl index based on company sales (*SALE*) (FF48 industries used)
Industry dummies	Dummies based on the Fama and French 48-industry classification using four-digit *SIC* codes
Industry Entries	Number of company entries for a particular industry-year pair divided by the total number of companies in the same industry and year (FF48 industries used)
Industry Exits	Number of company exits for a particular industry-year pair divided by the total number of companies in the same industry and year (FF48 industries used)
Inflation Rate	The inflation rate is the one year percentage change in the U.S. Consumer Price Index (CPI)
Inst. Ownership	The shares held by all 13-f institutional investors divided by the total number of shares outstanding
Inst. Ownership HHI	Herfindahl index of institutional ownership concentration
Leverage	Total debt divided by total assets ($\frac{DLC_t+DLTT_t}{AT_t}$)
Number Analysts	Natural logarithm of the number of analysts issuing a forecast for long-term growth in EPS
Number of Patents	Natural logarithm of the total number of patents
Payout Ratio	Common dividends divided by income before extraordinary items ($\frac{DVC_t}{IBCOM_t}$)
R&D Intensity	The ratio of research and development expenditures to sales ($\frac{XRD_t}{SALE_t}$)
Risk-Free Rate (RFR)	10Y Treasury Rate
Size	Natural logarithm of total assets ($ln(AT_t)$)

FIGURE 1

Distribution of long-term growth rates in Sales and EBITDA

The figures display the empirical histograms of five year and ten year growth rates in Sales and EBITDA in our sample period 1963 - 2018.

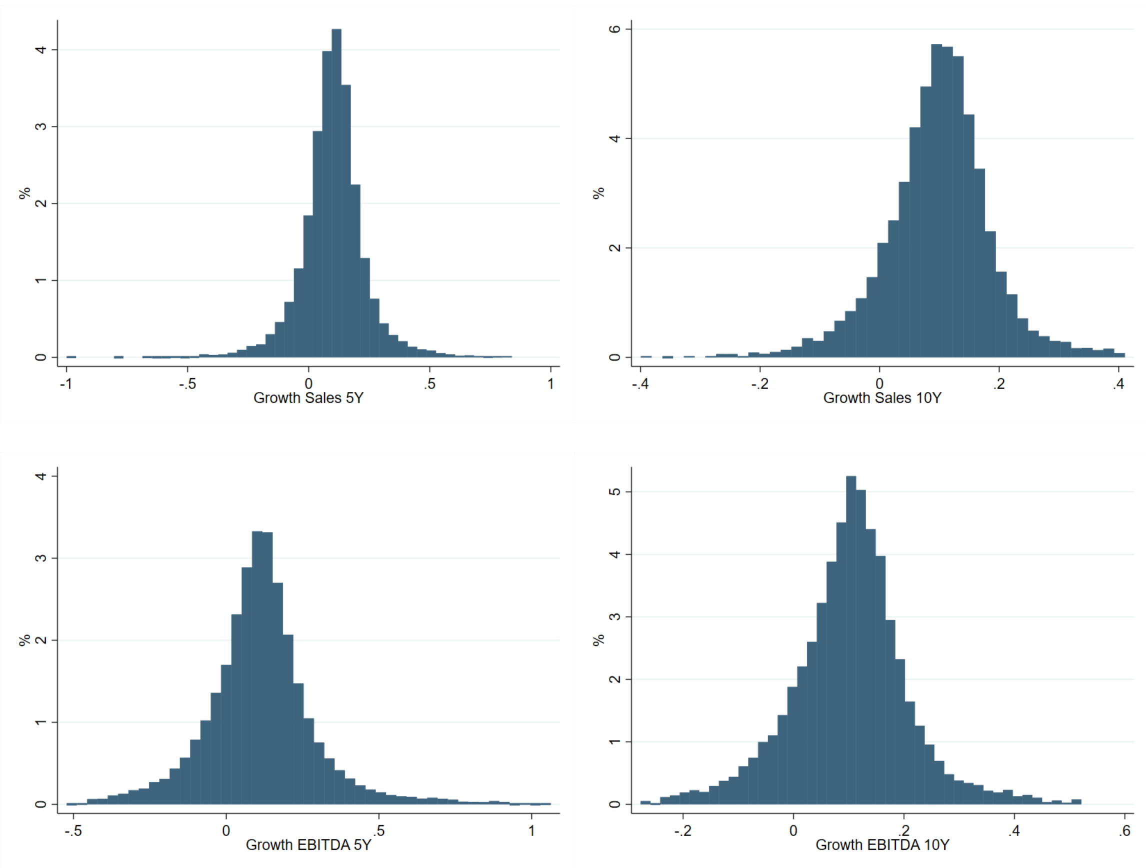


FIGURE 2

Model estimation timeline

This figure illustrates a timeline for the estimation of Model (2) as well as the construction of the LTGR expectations. In period $t+n$ we measure the LTGRs and regress them on the set of explanatory variables X_i measured in period t, i.e., at the beginning of the growth rate measurement period. This estimation generates coefficients $\hat{\alpha}_j$ and $\hat{\beta}_{1,t+n}, \hat{\beta}_{2,t+n}, \ldots, \hat{\beta}_{m,t+n}$, which we then combine with the same explanatory variables X_i, that we use in the estimation of the model but measured in period $t+n$ to obtain predictions for the LTGRs over the next τ years, i.e., from period $t+n$ to period $t+n+\tau$ (see Model (3)).

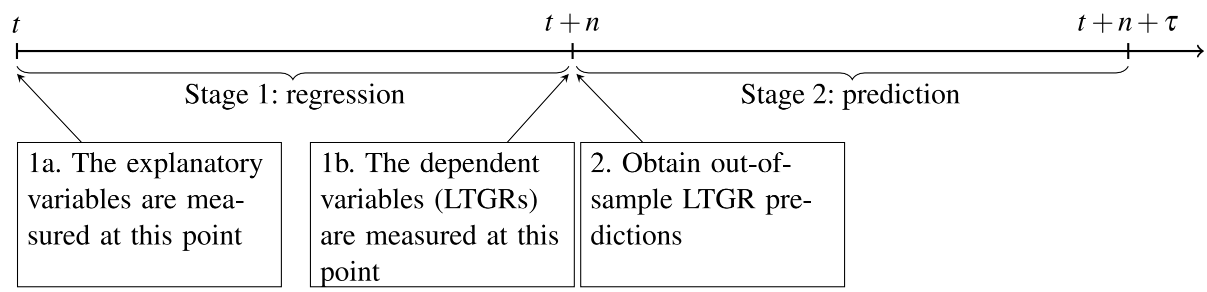


TABLE 1

Descriptive statistics

This table presents descriptive statistics for the variables used in the analyses for the sample period 1963 to 2018 (in Panel A) and the sample period 1981-2018 (in Panel B). To control for the effect of outliers in the subsequent estimations the variables are winsorized at the 1% level in both tails of the distribution.

Panel A (1963-2018)	Obs.	Mean	Stdev.	$Q_{0.01}$	$Q_{0.25}$	$Q_{0.50}$	$Q_{0.75}$	$Q_{0.99}$
Advertising Intensity$_t$	105,007	.01	.03	0	0	0	.01	.16
Altman's Z$_t$	101,612	1.72	2.73	-10.28	1.21	2.21	3	5.55
B/M$_t$	99,199	.73	.65	.05	.31	.54	.93	3.22
Barriers to Entry$_t$	105,005	.43	.15	.15	.3	.43	.53	.76
Beta$_t$	89,981	1.24	.71	-.14	.79	1.16	1.6	3.51
Capex$_t$	92,949	.21	.27	.01	.07	.13	.23	1.45
Capital Intensity$_t$	103,441	.06	.14	0	.02	.03	.05	.59
Dividend Yield$_t$	102,955	.01	.02	0	0	0	.02	.09
E/P$_t$	103,029	0	.26	-.93	0	.05	.08	.28
External Financing$_t$	93,797	.09	.2	-.31	-.01	.05	.14	.87
Firm Age$_t$	103,739	2.11	1.01	0	1.39	2.3	2.89	3.89
G$_t$	104,703	-.03	.51	-2.32	-.01	.07	.13	.49
GDP Growth 10Y$_t$	104,753	.03	.01	.01	.03	.03	.03	.05
Growth EBITDA 1Y$_t$	81,915	.18	1	-2.72	-.09	.12	.34	4.4
Growth EBITDA 5Y$_t$	53,174	.11	.18	-.34	.02	.11	.19	.69
Growth EBITDA 10Y$_t$	34,104	.1	.11	-.19	.05	.11	.16	.4
Growth Sales 1Y$_t$	93,645	.18	.46	-.53	.01	.11	.24	2.28
Growth Sales 5Y$_t$	62,567	.1	.13	-.27	.04	.1	.17	.5
Growth Sales 10Y$_t$	39,353	.1	.09	-.15	.05	.1	.15	.33
HHI Sales$_t$	105,007	.13	.1	.03	.07	.1	.15	.57
Industry Entries$_t$	105,007	.08	.07	0	.02	.06	.11	.3
Industry Exits$_t$	105,007	.08	.13	0	.03	.06	.09	.92
Inflation Rate$_t$	104,753	.04	.03	0	.02	.03	.04	.14
Leverage$_t$	104,596	.2	.18	0	.03	.17	.32	.68
Payout Ratio$_t$	104,705	.16	.39	-.42	0	0	.25	1.98
R&D Intensity$_t$	105,007	.28	2.77	0	0	0	.06	5.9
RFR$_t$	105,007	.06	.03	.02	.04	.06	.08	.14
Size$_t$	105,007	5.24	1.98	1.35	3.8	5.05	6.53	10.26

Panel B (1981-2018)	Obs.	Mean	Stdev.	$Q_{0.01}$	$Q_{0.25}$	$Q_{0.50}$	$Q_{0.75}$	$Q_{0.99}$
Advertising Intensity$_t$	53,469	.01	.03	0	0	0	.01	.17
Altman's Z$_t$	51,381	1.87	1.82	-5.77	1.24	2.08	2.84	5.27
B/M$_t$	50,261	.57	.47	.05	.28	.46	.73	2.18
Barriers to Entry$_t$	53,468	.41	.15	.19	.28	.4	.52	.77
Beta$_t$	47,251	1.27	.72	-.06	.81	1.16	1.61	3.65
Capex$_t$	43,683	.2	.24	.02	.08	.13	.23	1.26
Capital Intensity$_t$	53,131	.05	.08	0	.02	.04	.06	.33
Dividend Yield$_t$	53,079	.01	.02	0	0	0	.02	.08
E/P$_t$	53,171	0	.25	-.81	.01	.04	.07	.18
External Financing$_t$	43,778	.08	.17	-.27	-.02	.04	.13	.69
Firm Age$_t$	52,998	1.91	.98	0	1.1	2.08	2.71	3.56
G$_t$	53,324	.01	.39	-1.7	0	.08	.14	.52
GDP Growth 10Y$_t$	53,305	.03	.01	.01	.03	.03	.03	.04
Growth EBITDA 1Y$_t$	40,358	.16	.79	-2.09	-.07	.11	.31	3.35
Growth EBITDA 5Y$_t$	20,833	.11	.16	-.3	.03	.1	.18	.61
Growth EBITDA 10Y$_t$	10,892	.11	.1	-.14	.06	.1	.15	.38
Growth Sales 1Y$_t$	44,156	.16	.33	-.39	.01	.1	.23	1.44
Growth Sales 5Y$_t$	22,677	.1	.1	-.15	.05	.1	.15	.41
Growth Sales 10Y$_t$	11,525	.1	.07	-.07	.06	.1	.14	.32
HHI Sales$_t$	53,469	.14	.11	.05	.08	.1	.16	.61
Industry Entries$_t$	53,469	.12	.13	0	.04	.09	.16	.89
Industry Exits$_t$	53,469	.12	.14	0	.05	.1	.14	.91
Inflation Rate$_t$	53,305	.03	.02	0	.02	.03	.03	.1
Leverage$_t$	53,211	.19	.18	0	.02	.17	.31	.67
Payout Ratio$_t$	53,325	.17	.47	-.56	0	0	.23	2.18
R&D Intensity$_t$	53,469	.09	.32	0	0	.01	.08	1.62
RFR$_t$	53,469	.06	.03	.02	.04	.06	.07	.14
Size$_t$	53,469	6.18	1.81	2.81	4.82	5.99	7.41	10.75
ALTGF Earnings$_t$	53,469	18.51	11.13	.4	12	15.75	22.5	56
Inst. Ownership$_t$	51,768	.52	.26	.03	.3	.52	.73	.98
Inst. Ownership HHI$_t$	51,825	.11	.11	.02	.04	.07	.13	.59
Number Analysts$_t$	53,469	.92	.82	0	0	.69	1.61	2.83
Number Patents$_t$	39,763	.81	1.4	0	0	0	1.39	5.56

TABLE 2

Predicting long-term growth rates in Sales

This table reports the results from the long-term growth predictive regression estimation described in Section II D. The dependent variables are five and ten year annualized geometric growth rates in Sales (5 YS and 10 YS). The datasets consist of U.S. exchange-listed companies for two different periods: i) 1963 to 2018 and ii) 1981 to 2018. To account for both cross-sectional and time-series serial correlation we report t-statistics in parenthesis that are based on standard errors clustered by firm and year (see Petersen (2009)). The symbols ***, ** and * indicate statistical significance at the 1%, 5%, and 10% levels, respectively.

	1 5YS 1963-2018	2 10YS 1963-2018	3 5YS 1981-2018	4 10YS 1981-2018
Advertising Intensity$_t$	0.0918*	0.0202	0.0559	0.0272
	(1.787)	(0.429)	(0.898)	(0.468)
Altman's Z$_t$	0.0033**	0.0027**	-0.0036*	-0.0041*
	(2.273)	(2.632)	(-1.936)	(-1.955)
B/M$_t$	-0.0169***	-0.0155***	-0.0340***	-0.0279***
	(-4.387)	(-6.095)	(-7.761)	(-4.497)
Barriers to Entry$_t$	0.2285***	0.1823***	0.1726***	0.0805**
	(6.341)	(6.719)	(3.732)	(2.128)
Beta$_t$	-0.0031	-0.0027	-0.0074**	-0.0083***
	(-1.565)	(-1.475)	(-2.605)	(-2.872)
Capex$_t$	0.0293***	0.0234***	0.0256**	0.0209*
	(4.010)	(4.534)	(2.384)	(1.968)
Capital Intensity$_t$	0.1716**	0.1437***	0.0739	0.0222
	(2.656)	(2.910)	(1.510)	(0.404)
Dividend Yield$_t$	0.3330***	0.2117***	0.1255	-0.0367
	(4.046)	(3.388)	(1.027)	(-0.239)
E/P$_t$	0.0277*	0.0224**	-0.0174	0.0034
	(1.894)	(2.129)	(-1.157)	(0.169)
External Financing$_t$	0.0388***	0.0138***	0.0220**	0.0126*
	(4.529)	(2.703)	(2.683)	(1.766)
Firm Age$_t$	-0.0154***	-0.0140***	-0.0059*	-0.0034
	(-6.428)	(-7.419)	(-1.832)	(-0.885)
G$_t$	0.0317***	0.0265***	0.0540***	0.0373***
	(5.561)	(4.724)	(5.090)	(3.172)
GDP Growth 10Y$_t$	0.7645	1.7632***	-0.2890	0.4019
	(1.520)	(3.531)	(-0.674)	(1.115)
Growth Sales 1Y$_t$	-0.0025	-0.0038	0.0022	-0.0005
	(-0.509)	(-1.113)	(0.237)	(-0.057)
HHI Sales$_t$	-0.0133	0.0169	0.0286	0.0449
	(-0.738)	(0.847)	(1.026)	(1.697)
Industry Entries$_t$	-0.0139	0.0007	-0.0391	-0.0298**
	(-0.319)	(0.032)	(-1.559)	(-2.407)
Industry Exits$_t$	-0.1680***	-0.0944***	-0.1062**	-0.0111
	(-3.728)	(-3.385)	(-2.729)	(-0.542)
Inflation Rate$_t$	0.1208	0.1964*	-0.4294*	0.2230
	(0.527)	(1.813)	(-1.719)	(1.411)
Leverage$_t$	-0.0601***	-0.0514***	-0.0588***	-0.0504***
	(-6.848)	(-6.634)	(-4.697)	(-3.287)
Payout Ratio$_t$	0.0006	0.0042**	0.0018	-0.0005
	(0.252)	(2.195)	(0.659)	(-0.180)
R&D Intensity$_t$	-0.0057	-0.0054	0.0414	0.0154
	(-1.384)	(-1.172)	(1.683)	(0.556)
RFR$_t$	0.0553	0.1136	0.1416	-0.0363
	(0.351)	(0.977)	(1.021)	(-0.303)
Size$_t$	-0.0016	-0.0006	-0.0069***	-0.0094***
	(-1.604)	(-0.646)	(-3.182)	(-4.798)
ALTGF Earnings$_t$			0.0009***	0.0011***
			(2.796)	(3.278)
Inst. Ownership$_t$			-0.0027	-0.0100
			(-0.309)	(-1.011)
Inst. Ownership HHI$_t$			-0.0306	0.0263
			(-1.350)	(1.022)
Number Analysts$_t$			0.0036*	0.0070***
			(1.711)	(3.446)
Number Patents$_t$			-0.0009	0.0003
			(-0.732)	(0.255)
Observations	48,373	30,362	12,059	6,386
Adjusted R^2	0.112	0.163	0.147	0.222
Industry Dummies	FF48	FF48	FF48	FF48

TABLE 3

Predicting long-term growth rates in EBITDA

This table reports the results from the long-term growth predictive regression estimation described in Section II D. The dependent variables are five and ten year annualized geometric growth rates in EBITDA (5 YE and 10 YE). The datasets consist of U.S. exchange-listed companies for two different periods: i) 1963 to 2018 and ii) 1981 to 2018. To account for both cross-sectional and time-series serial correlation we report t-statistics in parenthesis that are based on standard errors clustered by firm and year (see Petersen (2009)). The symbols ***, ** and * indicate statistical significance at the 1%, 5%, and 10% levels, respectively.

	1	2	3	4
	5YE 1963-2018	10YE 1963-2018	5YE 1981-2018	10YE 1981-2018
Advertising Intensity$_t$	0.0737	0.0640	0.1411	0.1205
	(0.999)	(0.983)	(1.650)	(1.623)
Altman's Z$_t$	-0.0135***	-0.0047**	-0.0200***	-0.0108***
	(-5.232)	(-2.394)	(-5.763)	(-3.168)
B/M$_t$	0.0118***	0.0016	-0.0196**	-0.0151*
	(3.149)	(0.478)	(-2.548)	(-1.863)
Barriers to Entry$_t$	0.2220***	0.1046***	0.2064***	0.0817
	(5.134)	(3.656)	(2.962)	(1.535)
Beta$_t$	-0.0058*	-0.0010	-0.0044	-0.0090*
	(-1.789)	(-0.384)	(-0.882)	(-1.976)
Capex$_t$	0.0084	0.0177***	-0.0085	0.0317**
	(0.839)	(3.209)	(-0.491)	(2.183)
Capital Intensity$_t$	0.0226	0.0208	-0.1489	-0.1668
	(0.473)	(0.445)	(-1.402)	(-1.469)
Dividend Yield$_t$	-0.0551	0.1107	-0.0254	-0.0827
	(-0.476)	(1.403)	(-0.141)	(-0.398)
E/P$_t$	-0.0430	-0.0801***	-0.0243	-0.1743***
	(-0.898)	(-3.006)	(-0.574)	(-3.516)
External Financing$_t$	0.0150	-0.0074	0.0148	0.0021
	(1.352)	(-1.071)	(0.863)	(0.210)
Firm Age$_t$	-0.0063**	-0.0082***	-0.0010	-0.0023
	(-2.175)	(-3.883)	(-0.207)	(-0.474)
G$_t$	-0.0382***	-0.0140	-0.0470***	-0.0145
	(-3.559)	(-1.194)	(-3.063)	(-0.739)
GDP Growth 10Y$_t$	0.3101	1.8187***	-0.4669	0.7210
	(0.517)	(4.087)	(-0.615)	(1.443)
Growth EBITDA 1Y$_t$	-0.0184***	-0.0086***	-0.0217***	-0.0034
	(-8.732)	(-5.840)	(-4.036)	(-0.658)
HHI Sales$_t$	-0.0069	0.0239	0.0656	0.0494
	(-0.271)	(1.079)	(1.429)	(1.433)
Industry Entries$_t$	0.0100	-0.0211	-0.0469	-0.0451***
	(0.185)	(-1.009)	(-1.327)	(-2.782)
Industry Exits$_t$	-0.2628***	-0.1067***	-0.1672***	-0.0272
	(-4.634)	(-3.128)	(-2.873)	(-0.717)
Inflation Rate$_t$	0.0340	0.1274	-0.1498	0.6226***
	(0.132)	(1.335)	(-0.385)	(2.860)
Leverage$_t$	-0.0885***	-0.0573***	-0.1056***	-0.0684***
	(-7.177)	(-5.815)	(-5.025)	(-3.589)
Payout Ratio$_t$	0.0036	0.0059**	0.0025	0.0022
	(0.917)	(2.182)	(0.827)	(0.843)
R&D Intensity$_t$	0.2011***	0.0635	0.1464*	0.0117
	(4.505)	(1.529)	(1.843)	(0.177)
RFR$_t$	0.0622	0.1713	-0.0520	-0.1758
	(0.364)	(1.435)	(-0.263)	(-1.135)
Size$_t$	-0.0065***	-0.0031***	-0.0077**	-0.0110***
	(-5.302)	(-2.994)	(-2.688)	(-4.202)
ALTGF Earnings$_t$			0.0018***	0.0005
			(2.936)	(0.960)
Inst. Ownership$_t$			-0.0209	-0.0169
			(-1.555)	(-1.251)
Inst. Ownership HHI$_t$			0.0227	0.0431
			(0.622)	(1.122)
Number Analysts$_t$			0.0020	0.0089***
			(0.623)	(3.694)
Number Patents$_t$			0.0030	0.0038**
			(1.576)	(2.230)
Observations	40,550	25,951	11,085	6,046
Adjusted R^2	0.058	0.080	0.072	0.112
Industry Dummies	FF48	FF48	FF48	FF48

TABLE 4

Model selection for long-term growth expectations

This table reports root mean squared errors (RMSE) and mean absolute errors (MAE) for out-of-sample predictions with different horizon specifications. RMSE is defined as $\sqrt{\frac{1}{n}\sum_{i=1}^{n}(y_i - \hat{y}_i)^2}$ and MAE is defined as $\frac{1}{n}\sum_{i=1}^{n}|y_i - \hat{y}_i|$, where y_i is the actual value and $\hat{y}_i$ is the predicted value. Full, BE and LASSO correspond to i) the full model containing all predictors, ii) a model based on the backward elimination (BE) procedure, and iii) a model based on the Least Absolute Shrinkage and Selection Operator (LASSO) procedure, respectively. The t-statistics are based on HAC standard errors and are reported in parentheses. The symbols ***, ** and * indicate statistical significance at the 1%, 5%, and 10% levels, respectively.

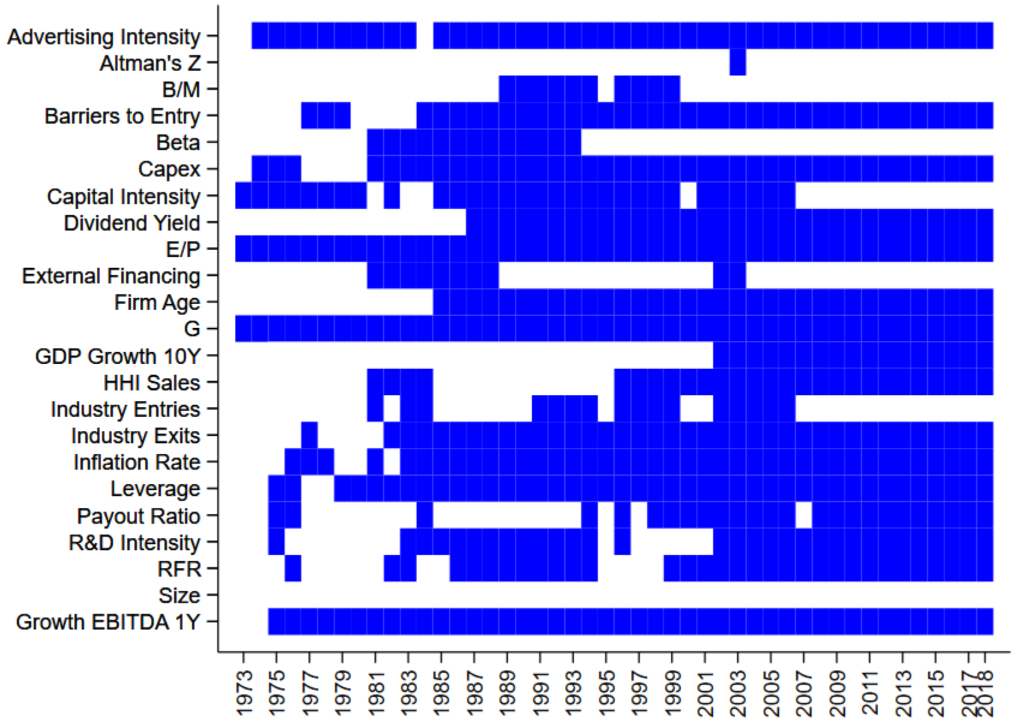
1963-2018	RMSE (Full)	RMSE (BE)	RMSE (LASSO)	MAE (Full)	MAE (BE)	MAE (LASSO)
Exp LTGR5 Sales	0.181***	0.160***	0.128***	0.144***	0.123***	0.093***
	(5.508)	(7.126)	(20.002)	(4.397)	(5.198)	(16.066)
Exp LTGR5 Ebitda	0.273***	0.230***	0.174***	0.218***	0.184***	0.128***
	(4.306)	(4.687)	(38.610)	(3.687)	(3.655)	(27.526)
Exp LTGR10 Sales	0.161***	0.116***	0.093***	0.134***	0.091***	0.069***
	(3.688)	(9.886)	(17.744)	(3.039)	(6.412)	(13.624)
Exp LTGR10 Ebitda	0.192***	0.114***	0.106***	0.165**	0.087***	0.078***
	(2.787)	(17.173)	(40.395)	(2.376)	(12.790)	(32.995)

1981-2018	RMSE (Full)	RMSE (BE)	RMSE (LASSO)	MAE (Full)	MAE (BE)	MAE (LASSO)
Exp LTGR5 Sales	0.107***	0.099***	0.096***	0.081***	0.074***	0.071***
	(15.454)	(20.099)	(19.973)	(15.535)	(24.547)	(20.497)
Exp LTGR5 Ebitda	0.179***	0.156***	0.149***	0.132***	0.114***	0.106***
	(8.898)	(40.014)	(25.358)	(8.863)	(39.899)	(21.645)
Exp LTGR10 Sales	0.156*	0.068***	0.065***	0.095**	0.050***	0.048***
	(1.819)	(12.173)	(14.944)	(2.158)	(10.989)	(12.905)
Exp LTGR10 Ebitda	0.206**	0.102***	0.096***	0.131**	0.075***	0.069***
	(1.998)	(18.131)	(18.582)	(2.355)	(14.599)	(14.155)

FIGURE 3

LASSO selected characteristics for 10Y EBITDA expectations

The figures graphically show which characteristics, from the universe of all characteristics for the respective period, are selected by the LASSO procedure to construct EBITDA Expectations. Blue indicates that the characteristic is selected. Variables that are selected for the construction of the Exp LTGR10 EBITDA LASSO for the period 1973-2018 and the Exp LTGR10 EBITDA LASSO for the period 1991-2018 are depicted in the top and the bottom figure, respectively.



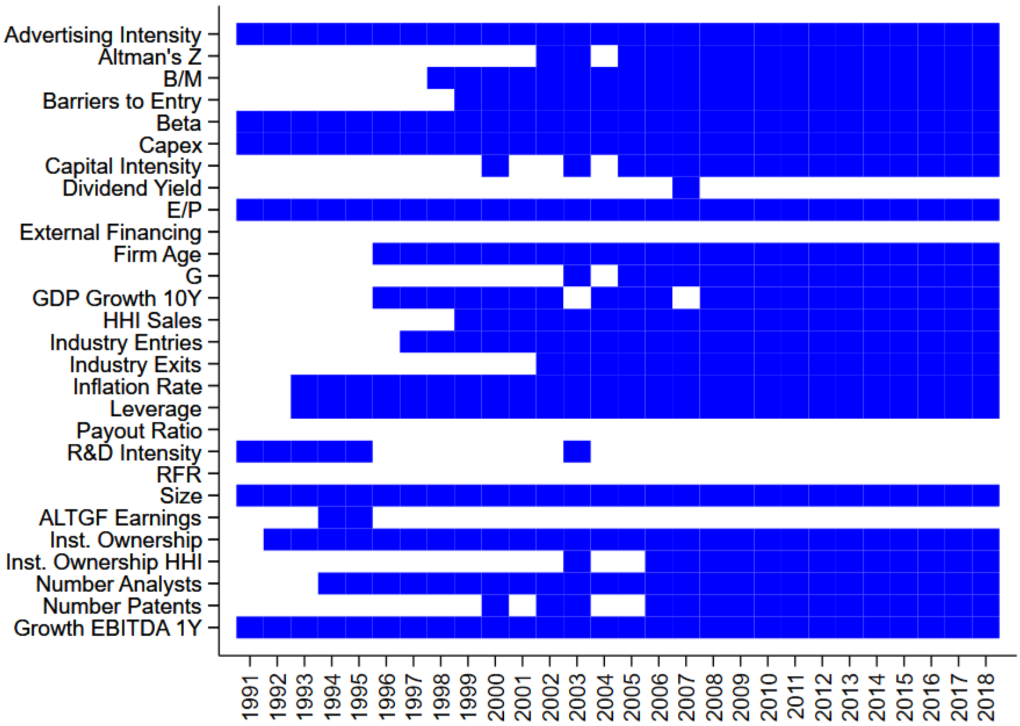


FIGURE 4

Realized versus expected average 10Y EBITDA LTGRs

The figure plots the evolution of annual average realized and expected 10Y EBITDA long-term growth rates (LTGRs) for the period 1973 - 2018. The gray-shaded periods denote NBER recessions.

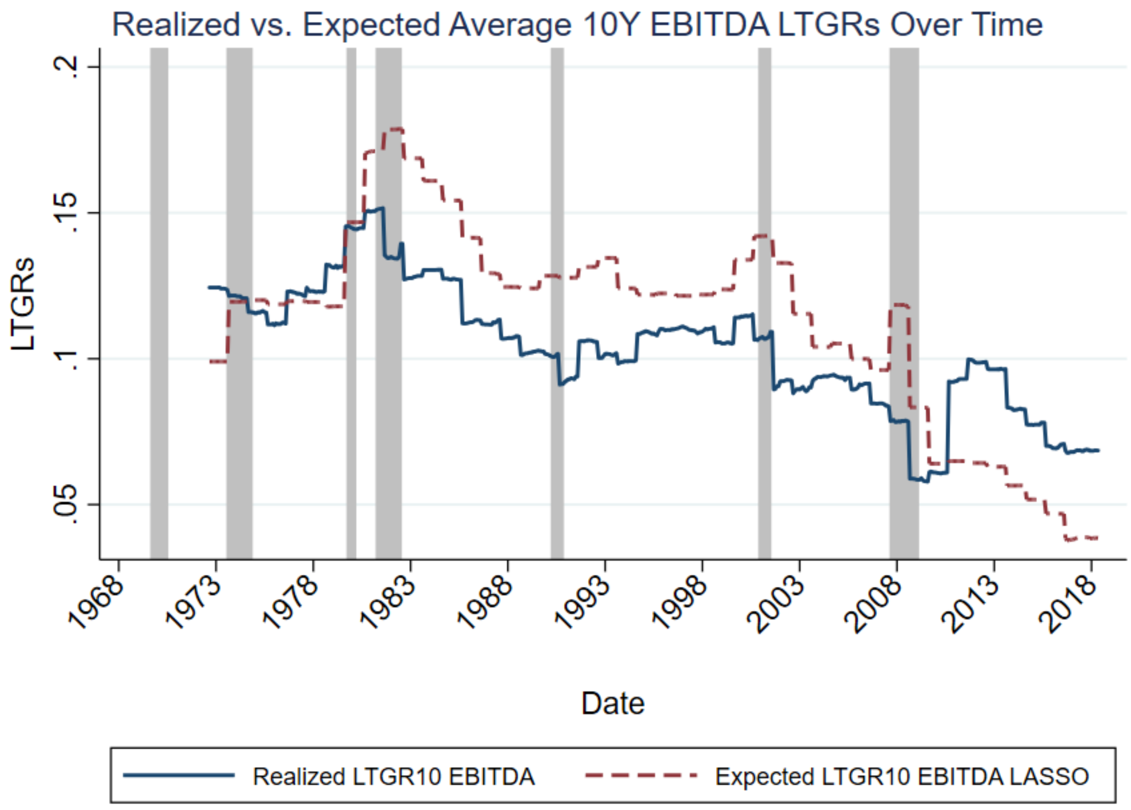


TABLE 5

Descriptive statistics for realized and expected average 10Y EBITDA LTGRs

This table presents descriptive statistics for the Realized LTGR10 EBITDA and Expected LTGR10 EBITDA LASSO. The time-series evolution of the annual averages of these variables is depicted in Figure 4.

	Obs.	Mean	Stdev.	$Q_{0.01}$	$Q_{0.25}$	$Q_{0.50}$	$Q_{0.75}$	$Q_{0.99}$
Realized LTGR10 EBITDA	34,104	.10	.11	-.19	.05	.11	.16	.40
Exp LTGR10 EBITDA LASSO	69,818	.11	.06	-.03	.09	.12	.14	.28

TABLE 6

Fama-MacBeth regressions of monthly returns

This table reports the average slopes from Fama and MacBeth (1973) regressions of monthly returns (in decimal) on expected long-term EBITDA growth rates from the LASSO model for ten years (Exp LTGR10 EBITDA LASSO). The estimation procedure and variable constructions are described in Section V. All independent variables are lagged and winsorized month by month at the 1% level in both tails. We report t-statistics based on standard errors using Newey and West (1987) with optimal truncation lag chosen as suggested by Andrews (1991) in parentheses below the coefficient estimates. The symbols ***, ** and * indicate statistical significance at the 1%, 5%, and 10% levels, respectively.

Panel A (1973-2018)	1	2	3	4	5	6	7
Exp LTGR10 EBITDA LASSO	0.0637**	0.0775**	0.0744***	0.0798***	0.1001***	0.1240***	0.1128***
	(2.334)	(2.568)	(2.653)	(2.919)	(3.625)	(4.207)	(3.953)
Beta		0.0009	0.0012	0.0010	0.0016	0.0020*	0.0020*
		(0.706)	(0.983)	(0.879)	(1.458)	(1.754)	(1.794)
Size		-0.0015***	-0.0013***	-0.0012***	-0.0012***	-0.0015***	-0.0016***
		(-4.195)	(-3.555)	(-3.442)	(-3.466)	(-4.283)	(-4.705)
Book Market		0.0025***	0.0029***	0.0045***	0.0045***	0.0059***	0.0060***
		(2.980)	(3.228)	(6.027)	(5.880)	(7.354)	(7.465)
Profitability			0.0067***	0.0075***	0.0025*	0.0051***	0.0037**
			(4.580)	(5.408)	(1.739)	(3.321)	(2.275)
Investment			-0.0041***	-0.0035***	0.0012	-0.0045***	-0.0034**
			(-4.665)	(-4.135)	(0.756)	(-2.714)	(-1.979)
Momentum				0.0060***	0.0050***	0.0043***	0.0039***
				(4.475)	(3.764)	(3.224)	(2.918)
Reversal				0.0001	-0.0010	-0.0012	-0.0021
				(0.049)	(-0.334)	(-0.409)	(-0.704)
External Financing					-0.0083	0.0038	0.0089***
					(-0.897)	(1.358)	(3.096)
Altman's Z					0.0021***	0.0053***	0.0056***
					(6.180)	(9.207)	(9.448)
Operating Leverage						-0.0059***	-0.0098***
						(-9.601)	(-8.030)
SUE						0.0009***	0.0009***
						(4.542)	(4.485)
Asset Turnover							0.0038***
							(3.384)
Accruals							-0.0278***
							(-8.205)
Constant	0.0089**	0.0245***	0.0199***	0.0170***	0.0107*	0.0094	0.0107*
	(2.250)	(4.285)	(3.503)	(3.043)	(1.800)	(1.542)	(1.772)
Observations	752,286	722,362	718,607	715,266	697,394	667,637	658,911
Average R^2	0.006	0.039	0.044	0.052	0.056	0.061	0.065
Panel B (1991-2018)							
Exp LTGR10 EBITDA LASSO	0.0405**	0.0879**	0.0720**	0.0711**	0.0936**	0.1109**	0.1198***
	(1.983)	(2.102)	(2.133)	(2.208)	(2.148)	(2.544)	(2.774)
Beta		0.0024	0.0027	0.0021	0.0033*	0.0036*	0.0038**
		(1.184)	(1.346)	(1.099)	(1.777)	(1.965)	(2.101)
Size		-0.0007	-0.0004	-0.0005	-0.0004	-0.0007	-0.0007
		(-1.551)	(-0.923)	(-1.112)	(-0.918)	(-1.386)	(-1.486)
Book Market		0.0026**	0.0034***	0.0042***	0.0043***	0.0052***	0.0056***
		(2.335)	(2.697)	(4.150)	(4.042)	(4.622)	(4.856)
Profitability			0.0084***	0.0091***	0.0055*	0.0082***	0.0044
			(3.195)	(3.568)	(1.911)	(2.779)	(1.414)
Investment			-0.0032**	-0.0032**	-0.0053**	-0.0100***	-0.0092***
			(-2.308)	(-2.178)	(-2.471)	(-4.341)	(-4.053)
Momentum				0.0021	0.0016	0.0013	0.0010
				(1.002)	(0.774)	(0.629)	(0.511)
Reversal				-0.0015	-0.0012	-0.0009	-0.0010
				(-0.272)	(-0.204)	(-0.155)	(-0.173)
External Financing					0.0039	0.0135***	0.0187***
					(1.112)	(3.550)	(4.998)
Altman's Z					0.0017***	0.0035***	0.0037***
					(3.654)	(4.895)	(5.117)
Operating Leverage						-0.0046***	-0.0130***
						(-5.339)	(-5.719)
SUE						0.0007**	0.0008**
						(2.386)	(2.548)
Asset Turnover							0.0091***
							(4.410)
Accruals							-0.0287***
							(-4.349)
Constant	0.0081	0.0118	0.0070	0.0079	0.0010	0.0026	0.0001
	(1.547)	(1.272)	(0.748)	(0.840)	(0.109)	(0.270)	(0.012)
Observations	274,380	258,360	254,593	254,448	244,383	232,671	228,524
Average R^2	0.008	0.052	0.061	0.072	0.079	0.086	0.093

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Internet Appendix to

Valuation and Long-Term Growth Expectations

(*Not for Publication*)

TABLE IA1

Robustness: predicting LTGRs with market-implied long-term growth rates

This table reports the results from the long-term growth prediction estimation. The dependent variables are five and ten year annualized geometric growth rates in Sales (5 YS and 10 YS) and in EBITDA (5 YE and 10 YE). The dataset consist of U.S. exchange-listed companies for the periods 1963 to 2018 (Panel A), 1981-2018 (Panel B), and 1992-2018 (Panel C), respectively. In this robustness estimation we are interested in the explanatory power of the variable market implied long-term growth rate (*MILTGR*), as an alternative proxy for market's expectations. The *MILTGR* is estimated by reverse-engineering a constant growth dividend discount model. In particular, we compute $MILTGR_{i,t} = \frac{P_{i,t} \times r_{i,t} - Div_{i,t}}{P_{i,t} + Div_{i,t}}$, where $P_{i,t}$ is the current market price per share, $Div_{i,t}$ is the dividend per share, and $r_{i,t}$ is the cost of equity capital. The cost of equity capital is computed using the Capital Asset Pricing Model as follows: $r_{i,t} = r_f + \beta_{i,t} \times$ MRP, where r_f is the risk-free rate, $\beta_{i,t}$ is the firm-specific beta, and MRP is the market risk premium computed as a historical arithmetic average premium of the S&P 500 index over the T-Bonds rate. We note that we do not apply the *MILTGR* in the main predictive regressions since this variable is collinear with other growth predictors. This robustness test aims at capturing how well the market, on a stand-alone basis, can explain variation in LTGRs. To account for both cross-sectional and time-series serial correlation we report t-statistics in parenthesis that are based on standard errors clustered by firm and year (see Petersen (2009)). The symbols ***, ** and * indicate statistical significance at the 1%, 5%, and 10% levels, respectively.

	1	2	3	4
Panel A	5YS 1963-2018	10YS 1963-2018	5YE 1963-2018	10YE 1963-2018
$MILTGR_t$	0.0701	-0.0029	0.1402***	0.0502
	(1.510)	(-0.085)	(2.902)	(1.172)
Constant	0.0878***	0.0932***	0.0954***	0.0950***
	(11.418)	(14.282)	(12.574)	(14.568)
Observations	54,434	34,283	47,007	30,126
Adjusted R^2	0.001	0.001	0.001	0.002

	1	2	3	4
Panel B	5YS 1981-2018	10YS 1981-2018	5YE 1981-2018	10YE 1981-2018
$MILTGR_t$	0.1918***	0.2421***	0.2408***	0.2046***
	(2.973)	(5.194)	(3.451)	(3.886)
Constant	0.0778***	0.0708***	0.0789***	0.0798***
	(12.298)	(13.407)	(10.857)	(13.346)
Observations	20,531	10,631	19,064	10,118
Adjusted R^2	0.007	0.024	0.004	0.009

	1	2	3	4
Panel C	5YS 1992-2018	10YS 1992-2018	5YE 1992-2018	10YE 1992-2018
$MILTGR_t$	0.0708	0.1734***	0.2202**	0.1578**
	(0.848)	(2.962)	(2.360)	(2.140)
Constant	0.0825***	0.0712***	0.0760***	0.0770***
	(11.966)	(12.907)	(12.328)	(12.007)
Observations	9,508	4,571	9,086	4,420
Adjusted R^2	0.001	0.012	0.004	0.005

The performance of non-surviving firms

By definition, the 5 year and 10 year growth rates in Tables 2 and 3 are estimated for firms that survive the 5 and 10 years estimation period. This may induce a bias in the reported growth rates, since surviving firms may exhibit higher growth rates. It is important to note, however, that "non-surviving" firms include both failed (bankrupt) firms but also successful firms that were acquired, and are therefore no longer in the data base by the end of the estimation period. If, on average, more successful firms leave the sample, we would expect a lower average growth for the survivors, i.e., a downwards bias. To gauge the potential impact of survivorship on our results we therefore examine the behavior of firms that do not survive the entire estimation horizon, and compare the results to firms that survive. In particular, at every fiscal year-end over the sample period we select two sets of firms: firms that survive the following ten years (survivors), and firms that survive over the following five years but not until year ten (non-survivors).

For each group, in Table IA2 we report the distributions of the annualized growth rates over the next five years. It can be seen that the two sets of firms have comparable distributions for realized five-year growth in Sales and EBITDA. For example, the interquartile range of Realized LTGR5 Sales (EBITDA) for the period 1963-2018 is from 5% (4%) to 17% (20%) for survivors and from 2%(-1%) to 15% (18%) for non-survivors. We note that the statistical tests presented in Panel C of Table IA2 indicate that the mean and distribution of survivors is different from that of non-survivors. For example, the mean annualized growth rates are higher for survivors compared to non-survivors, which confirms that survivors realize somewhat higher growth rates compared to non-survivors.

Importantly, in Tables IA3 and IA4 we replicate our predictive regression tests for non-survivors, i.e., firms that do not survive over the entire future horizon of ten years. For comparison, we also report the results for the set of surviving firms. We find very similar results for the long-term growth predictors of non-survivors compared to those of survivors. These results suggest that survivorship does not have a pronounced impact on our results.

TABLE IA2

Robustness: Descriptive statistics for Survivors versus Non-survivors

At every fiscal year-end over the sample period we select two sets of firms: firms that survive over the following ten years (Survivors), and firms that survive over the following five years but thereafter fail to survive until the tenth year (Non-Survivors). Panels A and B report the distributions of annualized growth rates in Sales and EBITDA realized over the next five years for the two sets of firms. Panel C reports the p-values of statistical tests between Survivors and Non-Survivors. In particular, we report the p-values of a t-test for the difference in the means, the p-values of the Kolmogorov-Smirnov (K-S) test of differences in the distribution, and the p-values of the Wilcoxon rank-sum test. The datasets consist of U.S. exchange-listed companies for two different periods: i) 1963 to 2018 and ii) 1981 to 2018.

Panel A

1963-2018	Obs.	Mean	Stdev.	$Q_{0.01}$	$Q_{0.25}$	$Q_{0.50}$	$Q_{0.75}$	$Q_{0.99}$
Realized LTGR5 Sales (Survivors)	41,000	.11	.13	-.24	.05	.11	.17	.5
Realized LTGR5 Sales (Non-Survivors)	21,567	.08	.14	-.32	.02	.08	.15	.5
1981-2018	Obs.	Mean	Stdev.	$Q_{0.01}$	$Q_{0.25}$	$Q_{0.50}$	$Q_{0.75}$	$Q_{0.99}$
Realized LTGR5 Sales (Survivors)	13,089	.12	.1	-.14	.06	.11	.16	.42
Realized LTGR5 Sales (Non-Survivors)	9,588	.09	.11	-.16	.03	.08	.14	.41

Panel B

1963-2018	Obs.	Mean	Stdev.	$Q_{0.01}$	$Q_{0.25}$	$Q_{0.50}$	$Q_{0.75}$	$Q_{0.99}$
Realized LTGR5 EBITDA (Survivors)	34,104	.12	.17	-.31	.04	.12	.2	.68
Realized LTGR5 EBITDA (Non-Survivors)	19,070	.09	.19	-.37	-.01	.09	.18	.71
1981-2018	Obs.	Mean	Stdev.	$Q_{0.01}$	$Q_{0.25}$	$Q_{0.50}$	$Q_{0.75}$	$Q_{0.99}$
Realized LTGR5 EBITDA (Survivors)	12,023	.12	.15	-.28	.05	.12	.19	.62
Realized LTGR5 EBITDA (Non-Survivors)	8,810	.09	.16	-.33	0	.08	.16	.59

Panel C

		Mean	t-test	K-S	Wilcoxon-test
Realized LTGR5 Sales (1963-2018)	Survivors	0.11	0.00	0.00	0.00
	Non-Survivors	0.08			
Realized LTGR5 Sales (1981-2018)	Survivors	0.12	0.00	0.00	0.00
	Non-Survivors	0.09			
Realized LTGR5 EBITDA (1963-2018)	Survivors	0.12	0.00	0.00	0.00
	Non-Survivors	0.09			
Realized LTGR5 EBITDA (1981-2018)	Survivors	0.12	0.00	0.00	0.00
	Non-Survivors	0.09			

TABLE IA3

Predicting long-term growth in Sales for Survivors versus Non-survivors

This table reports the results from the long-term growth predictive regression estimation for Surviving versus Non-Surviving firms. The differentiation between Survivors and Non-Survivors is described in the caption of Table IA2. The dependent variables are five year annualized geometric growth rates in Sales (5 YS). The datasets consist of U.S. exchange-listed companies for two different periods: i) 1963 to 2018 and ii) 1981 to 2018. To account for both cross-sectional and time-series serial correlation we report t-statistics in parenthesis that are based on standard errors clustered by firm and year (see Petersen (2009)). The symbols ***, ** and * indicate statistical significance at the 1%, 5%, and 10% levels, respectively.

	1 Survivors 5YS 1963-2018	2 Non-Survivors 5YS 1963-2018	3 Survivors 5YS 1981-2018	4 Non-Survivors 5YS 1981-2018
Advertising Intensity$_t$	0.0970	0.0775	0.0654	0.0409
	(1.631)	(1.239)	(0.878)	(0.494)
Altman's Z$_t$	0.0011	0.0049***	-0.0040	-0.0051**
	(0.819)	(2.931)	(-1.546)	(-2.370)
B/M$_t$	-0.0139***	-0.0201***	-0.0383***	-0.0266***
	(-3.653)	(-4.509)	(-5.740)	(-5.610)
Barriers to Entry$_t$	0.2487***	0.2159***	0.1741***	0.1383***
	(5.910)	(5.187)	(2.990)	(2.864)
Beta$_t$	-0.0031	-0.0027	-0.0099***	-0.0063*
	(-1.319)	(-0.977)	(-2.794)	(-1.724)
Capex$_t$	0.0263***	0.0387***	0.0241*	0.0269**
	(3.273)	(3.124)	(1.862)	(2.080)
Capital Intensity$_t$	0.1700**	0.1749***	0.0841	0.0964*
	(2.141)	(2.856)	(1.184)	(1.905)
Dividend Yield$_t$	0.2787***	0.3513**	0.0440	0.1903
	(3.079)	(2.635)	(0.237)	(1.252)
E/P$_t$	0.0495***	0.0143	0.0299	-0.0162
	(2.876)	(1.119)	(1.292)	(-1.616)
External Financing$_t$	0.0368***	0.0386***	0.0257**	0.0167
	(4.333)	(3.115)	(2.612)	(1.237)
Firm Age$_t$	-0.0163***	-0.0139***	-0.0062	-0.0051
	(-5.529)	(-4.956)	(-1.401)	(-1.364)
G$_t$	0.0335***	0.0297***	0.0485***	0.0456***
	(3.150)	(5.425)	(3.427)	(3.699)
GDP Growth 10Y$_t$	0.4581	0.5936	2.0317**	-1.3104***
	(0.459)	(1.152)	(2.335)	(-3.126)
Growth Sales 1Y$_t$	-0.0028	-0.0042	-0.0026	0.0061
	(-0.671)	(-0.466)	(-0.144)	(0.717)
HHI Sales$_t$	-0.0120	-0.0180	0.0196	0.0440
	(-0.522)	(-0.773)	(0.579)	(1.468)
Industry Entries$_t$	-0.0112	-0.0125	-0.0426*	-0.0293
	(-0.265)	(-0.246)	(-2.051)	(-0.960)
Industry Exits$_t$	-0.1905***	-0.1339**	-0.1181***	-0.1041**
	(-4.072)	(-2.554)	(-3.034)	(-2.383)
Inflation Rate$_t$	0.1542	0.0909	-0.2753	-0.5051**
	(0.644)	(0.396)	(-0.942)	(-2.499)
Leverage$_t$	-0.0748***	-0.0353***	-0.0746***	-0.0460***
	(-7.765)	(-3.247)	(-4.331)	(-3.215)
Payout Ratio$_t$	0.0027	0.0001	0.0025	0.0009
	(1.026)	(0.029)	(0.718)	(0.339)
R&D Intensity$_t$	-0.0028	-0.0090*	0.0620*	0.0186
	(-0.513)	(-1.958)	(1.901)	(0.745)
RFR$_t$	0.0506	-0.1365	0.2474	0.0013
	(0.219)	(-0.768)	(1.497)	(0.009)
Size$_t$	-0.0012	-0.0033*	-0.0086***	-0.0079***
	(-1.160)	(-1.685)	(-3.144)	(-3.661)
ALTGF Earnings$_t$			0.0012**	0.0007**
			(2.431)	(2.163)
Inst. Ownership$_t$			-0.0093	0.0013
			(-0.876)	(0.112)
Inst. Ownership HHI$_t$			-0.0004	-0.0415
			(-0.014)	(-1.221)
Number Analysts$_t$			0.0033	0.0033
			(1.305)	(1.218)
Number Patents$_t$			-0.0006	-0.0006
			(-0.420)	(-0.336)
Observations	31,526	16,836	7,240	4,812
Adjusted R^2	0.111	0.106	0.183	0.133
Industry Dummies	FF48	FF48	FF48	FF48

TABLE IA4

Predicting long-term growth in EBITDA for Survivors versus Non-survivors

This table reports the results from the long-term growth predictive regression estimation for Surviving versus Non-Surviving Firms. The differentiation between Survivors and Non-Survivors is described in the caption of Table IA2. The dependent variables are five year annualized geometric growth rates in EBITDA (5YE). The datasets consist of U.S. exchange-listed companies for two different periods: i) 1963 to 2018 and ii) 1981 to 2018. To account for both cross-sectional and time-series serial correlation we report t-statistics in parenthesis that are based on standard errors clustered by firm and year (see Petersen (2009)). The symbols ***, ** and * indicate statistical significance at the 1%, 5%, and 10% levels, respectively.

	1	2	3	4
	Survivors	Non-Survivors	Survivors	Non-Survivors
	5YE 1963-2018	5YE 1963-2018	5YE 1981-2018	5YE 1981-2018
Advertising Intensity$_t$	0.1402*	-0.0233	0.2079**	0.0473
	(1.732)	(-0.224)	(2.122)	(0.369)
Altman's Z$_t$	-0.0152***	-0.0125***	-0.0227***	-0.0201***
	(-5.479)	(-3.542)	(-5.063)	(-5.418)
B/M$_t$	0.0186***	0.0091**	-0.0212	-0.0086
	(3.400)	(2.156)	(-1.631)	(-1.108)
Barriers to Entry$_t$	0.2255***	0.2480***	0.2374***	0.1643**
	(4.316)	(4.860)	(2.805)	(2.242)
Beta$_t$	-0.0058	-0.0036	-0.0107	0.0008
	(-1.582)	(-0.815)	(-1.700)	(0.143)
Capex$_t$	0.0203*	-0.0036	0.0177	-0.0362
	(1.979)	(-0.246)	(0.815)	(-1.610)
Capital Intensity$_t$	0.0489	-0.0478	-0.1693	-0.1163
	(0.683)	(-0.550)	(-0.979)	(-1.030)
Dividend Yield$_t$	0.0055	0.0348	-0.0198	0.0874
	(0.042)	(0.270)	(-0.068)	(0.433)
E/P$_t$	-0.1653***	-0.0062	-0.2464***	0.0237
	(-3.175)	(-0.216)	(-3.004)	(1.248)
External Financing$_t$	0.0051	0.0228	0.0212	-0.0006
	(0.330)	(1.582)	(1.027)	(-0.028)
Firm Age$_t$	-0.0058*	-0.0080**	0.0003	-0.0037
	(-1.682)	(-2.279)	(0.043)	(-0.643)
G$_t$	-0.0298	-0.0414***	-0.0263	-0.0501**
	(-1.267)	(-2.972)	(-0.953)	(-2.461)
GDP Growth 10Y$_t$	-0.1379	-0.7049	1.7308	-2.1258**
	(-0.125)	(-1.049)	(1.261)	(-2.606)
Growth EBITDA 1Y$_t$	-0.0157***	-0.0202***	-0.0149**	-0.0230***
	(-8.317)	(-5.875)	(-2.162)	(-3.680)
HHI Sales$_t$	-0.0484	0.0398	0.0385	0.0825
	(-1.442)	(1.339)	(0.740)	(1.597)
Industry Entries$_t$	-0.0037	0.0391	-0.0467	-0.0583
	(-0.064)	(0.629)	(-1.486)	(-1.164)
Industry Exits$_t$	-0.2731***	-0.2581***	-0.1770***	-0.1461**
	(-4.451)	(-3.739)	(-3.050)	(-2.210)
Inflation Rate$_t$	0.1916	-0.0486	0.3685	-0.3286
	(0.737)	(-0.173)	(0.882)	(-0.851)
Leverage$_t$	-0.1073***	-0.0563***	-0.1382***	-0.0738**
	(-7.092)	(-3.447)	(-5.907)	(-2.518)
Payout Ratio$_t$	0.0055	-0.0014	0.0079*	-0.0019
	(1.197)	(-0.291)	(1.705)	(-0.589)
R&D Intensity$_t$	0.2173***	0.1966***	0.1473	0.1636*
	(3.857)	(3.007)	(1.364)	(1.754)
RFR$_t$	-0.0280	-0.2061	-0.0429	-0.2997
	(-0.120)	(-1.058)	(-0.172)	(-1.016)
Size$_t$	-0.0078***	-0.0076***	-0.0138***	-0.0079**
	(-5.544)	(-3.712)	(-3.700)	(-2.378)
ALTGF Earnings$_t$			0.0013	0.0020***
			(1.643)	(3.187)
Inst. Ownership$_t$			-0.0255	-0.0108
			(-1.575)	(-0.562)
Inst. Ownership HHI$_t$			0.0402	0.0341
			(0.989)	(0.608)
Number Analysts$_t$			0.0016	0.0027
			(0.468)	(0.596)
Number Patents$_t$			0.0043*	0.0024
			(1.849)	(0.878)
Observations	26,091	14,443	6,704	4,377
Adjusted R^2	0.074	0.058	0.111	0.076
Industry Dummies	FF48	FF48	FF48	FF48

TABLE IA5

Robustness: out-of-sample predictions with different horizon specifications

This table reports root mean squared errors (RMSE) and mean absolute errors (MAE) for out-of-sample predictions with different horizon specifications. RMSE is defined as $\sqrt{\frac{1}{n}\sum_{i=1}^{n}(y_i-\hat{y}_i)^2}$ and MAE is defined as $\frac{1}{n}\sum_{i=1}^{n}|y_i-\hat{y}_i|$, where y_i is the actual value. In Panel A $\hat{y}_i$ represents the Exp LTGR in Sales or Ebitda using, as a naïve forecast, the most recently realized 5-year or 10-year growth rate in Sales or Ebitda for the period 1963-2018. In Panel B $\hat{y}_i$ represents the Exp LTGR in Sales or Ebitda using, as a naïve forecast, the most recently realized 5-year or 10-year growth rate in Sales or Ebitda for the period 1981-2018. In Panel C $\hat{y}_i$ represents the Exp LTGR in Sales or Ebitda directly using the analyst long-term growth estimate (ALTGF) for the period 1981-2018. For ease of comparability we also report the RMSE and MAE where $\hat{y}_i$ represents the Exp LTGR in Sales or Ebitda using the prediction model based on the LASSO procedure. The t-statistics are based on HAC standard errors and are reported in parentheses. The symbols ***, ** and * indicate statistical significance at the 1%, 5%, and 10% levels, respectively.

Panel A 1963-2018	RMSE (Past Growth)	RMSE (LASSO)	MAE (Past Growth)	MAE (LASSO)
Exp LTGR5 Sales	0.150***	0.128***	0.105***	0.093***
	(18.272)	(20.002)	(20.666)	(16.066)
Exp LTGR5 Ebitda	0.247***	0.174***	0.172***	0.128***
	(25.907)	(38.610)	(25.073)	(27.526)
Exp LTGR10 Sales	0.097***	0.093***	0.072***	0.069***
	(20.767)	(17.744)	(21.081)	(13.624)
Exp LTGR10 Ebitda	0.137***	0.106***	0.100***	0.078***
	(23.403)	(40.395)	(22.465)	(32.995)
Panel B 1981-2018	RMSE (Past Growth)	RMSE (LASSO)	MAE (Past Growth)	MAE (LASSO)
Exp LTGR5 Sales	0.121***	0.096***	0.088***	0.071***
	(20.371)	(19.973)	(21.29)	(20.497)
Exp LTGR5 Ebitda	0.211***	0.149***	0.146***	0.106***
	(28.113)	(25.358)	(24.997)	(21.645)
Exp LTGR10 Sales	0.092***	0.065***	0.068***	0.048***
	(30.672)	(14.944)	(27.944)	(12.905)
Exp LTGR10 Ebitda	0.126***	0.096***	0.091***	0.069***
	(24.595)	(18.582)	(28.109)	(14.155)
Panel C 1981-2018	RMSE (ALTGF)	RMSE (LASSO)	MAE (ALTGF)	MAE (LASSO)
Exp LTGR5 Sales	0.133***	0.096***	0.099***	0.071***
	(11.994)	(19.973)	(11.450)	(20.497)
Exp LTGR5 Ebitda	0.174***	0.149***	0.125***	0.106***
	(20.597)	(25.358)	(17.936)	(21.645)
Exp LTGR10 Sales	0.113***	0.065***	0.085***	0.048***
	(11.445)	(14.944)	(11.151)	(12.905)
Exp LTGR10 Ebitda	0.125***	0.096***	0.092***	0.069***
	(14.524)	(18.582)	(13.829)	(14.155)

TABLE IA6

Robustness: regression realized growth on expected growth

This table reports the average slopes and average R^2 from annual cross-sectional regressions of realized long-term growth rates on expected long-term growth rates from the LASSO model. In particular, we estimate:

$$G_{i,t\rightarrow t+n} = \alpha + \beta_{t+n}\hat{G}_{i,t\rightarrow t+n} + \varepsilon_{i,t+n}$$

where $G_{i,t\rightarrow t+n}$ is the annualized per-share geometric growth rate in Sales or EBITDA with reinvestment of cash dividends and other special distributions from t to $t+n$, $n=5$ or $n=10$. $\hat{G}_{i,t\rightarrow t+n}$ is the predicted growth rate in Sales or EBITDA derived from the LASSO model applying the EBIC criterion for selecting λ. The dependent variables are five and ten-year annualized per-share geometric growth rates in Sales and EBITDA in Panels A and B, respectively. The t-statistics are based on HAC standard errors and are reported in parentheses. The symbols ***, ** and * indicate statistical significance at the 1%, 5%, and 10% levels, respectively.

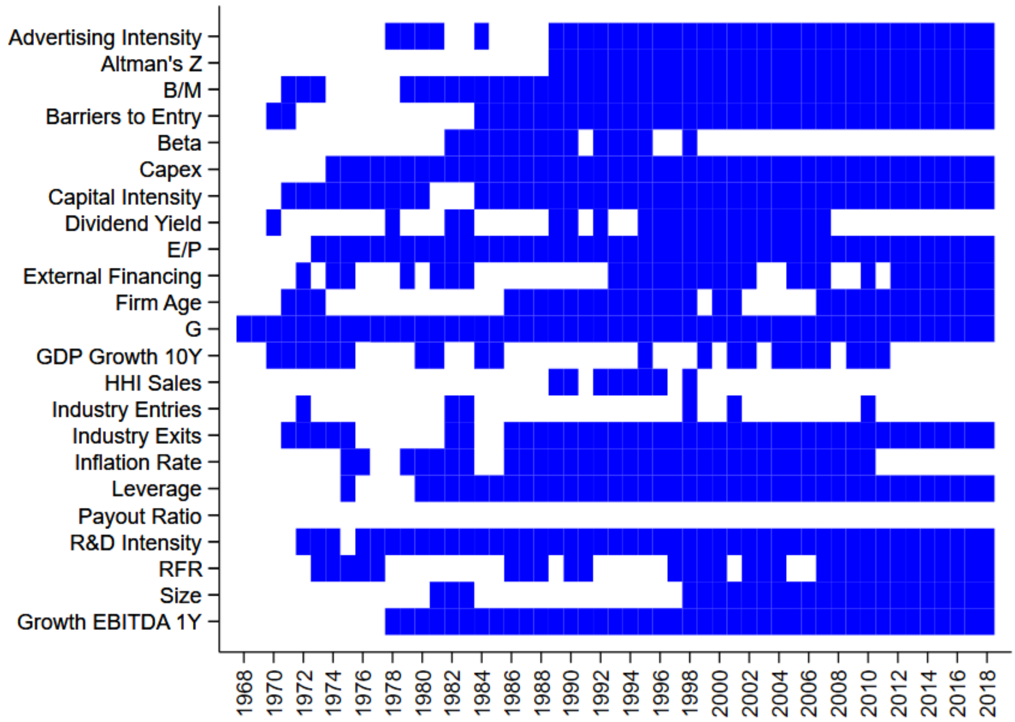
	1	2	3	4
Panel A	5YS 1963-2018	10YS 1963-2018	5YS 1981-2018	10YS 1981-2018
Exp LTGR5 Sales LASSO	0.6068***		0.7520***	
	(10.847)		(5.460)	
Exp LTGR10 Sales LASSO		0.5553***		1.0570***
		(11.390)		(3.485)
Constant	0.0210	0.0171	0.0213	-0.0204
	(1.647)	(1.514)	(1.362)	(-0.609)
Observations	50,733	27,808	14,094	5,715
Average R^2	0.059	0.051	0.088	0.125

	1	2	3	4
Panel B	5YE 1963-2018	10YE 1963-2018	5YE 1981-2018	10YE 1981-2018
Exp LTGR5 EBITDA LASSO	0.6296***		0.3865***	
	(10.147)		(3.789)	
Exp LTGR10 EBITDA LASSO		0.5867***		0.3009*
		(5.903)		(1.755)
Constant	0.0286	0.0241**	0.0643***	0.0657***
	(1.605)	(2.489)	(6.749)	(3.893)
Observations	41,319	24,914	13,653	5,898
Average R^2	0.032	0.015	0.015	0.027

FIGURE IA1

Robustness: LASSO selected characteristics for 5Y EBITDA expectations

The figures graphically show which characteristics, from the universe of all characteristics for the respective period, are selected by the LASSO procedure to construct EBITDA Expectations. Blue indicates that the characteristic is selected. Variables that are selected for the construction of the Exp LTGR5 EBITDA LASSO for the period 1968-2018 and the Exp LTGR5 EBITDA LASSO for the period 1986-2018 are depicted in the top and the bottom figure, respectively.



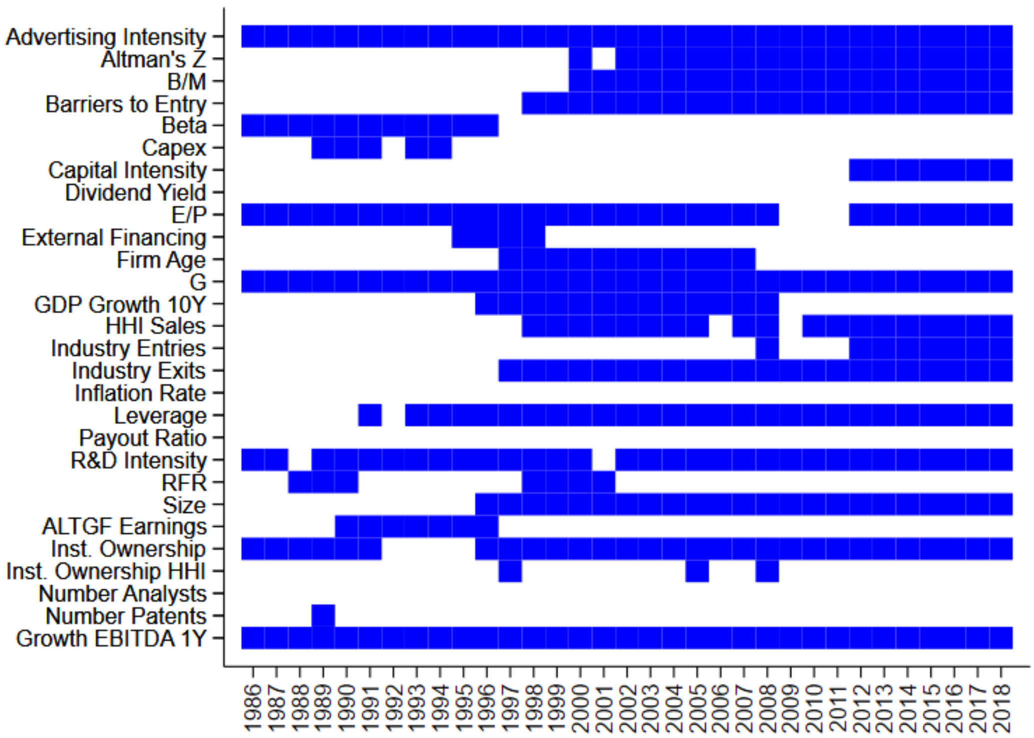


FIGURE IA2

Robustness: realized vs. expected average 5Y EBITDA LTGRs

The figure plots the evolution of annual average realized and expected 5Y EBITDA long-term growth rates (LTGRs) for the period 1968 - 2018. The gray-shaded periods denote NBER recessions.

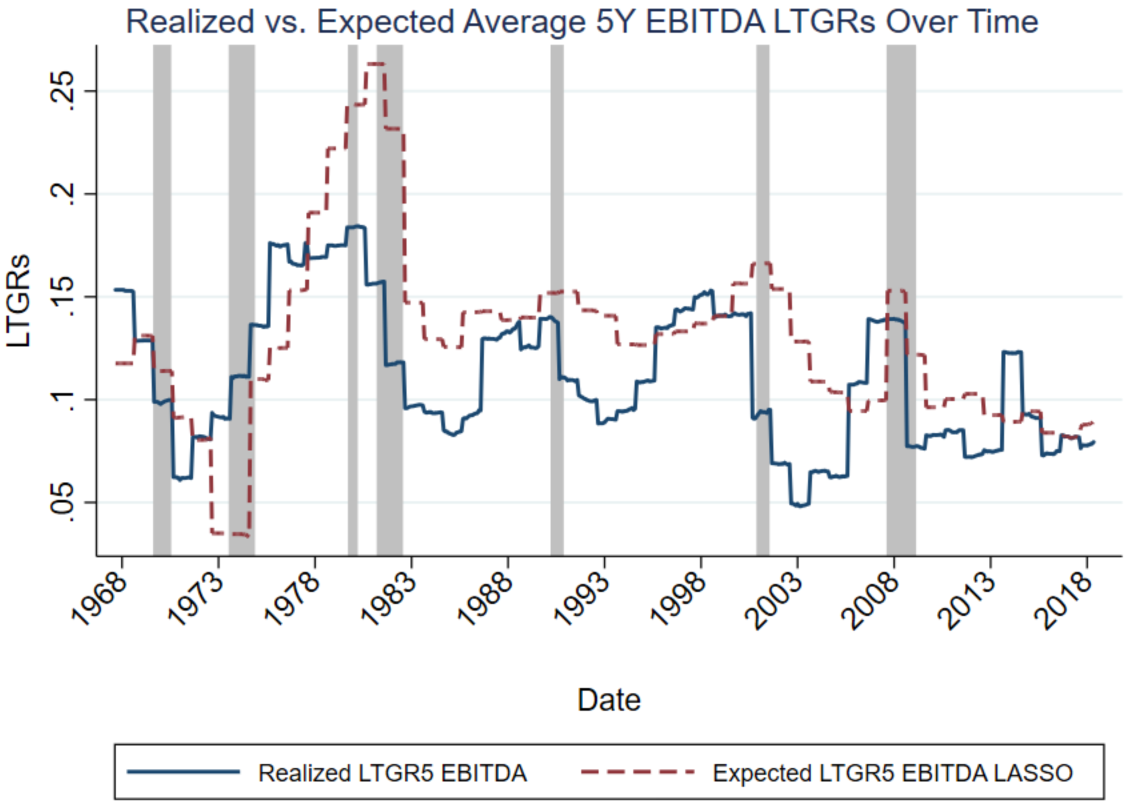


TABLE IA7

Descriptive statistics for realized and expected 5Y EBITDA LTGRs

This table presents descriptive statistics for the Realized LTGR5 EBITDA and Expected LTGR5 EBITDA LASSO. The time-series evolution of the annual averages of these variables is depicted in Figure IA2.

	Obs.	Mean	Stdev.	$Q_{0.01}$	$Q_{0.25}$	$Q_{0.50}$	$Q_{0.75}$	$Q_{0.99}$
Realized LTGR5 EBITDA	53174	.11	.18	-.34	.02	.11	.19	.69
Exp LTGR5 EBITDA LASSO	70405	.13	.11	-.13	.08	.12	.16	.43

TABLE IA8

FMB regressions of monthly returns 1973-2018. Microcaps vs all-but-micro

This table reports the average slopes from Fama and MacBeth (1973) regressions of monthly returns (in decimal) on expected long-term EBITDA growth rates from the LASSO model for ten years (Exp LTGR10 EBITDA LASSO). The estimation procedure and variable constructions are described in Section V. All independent variables are lagged and winsorized month by month at the 1% level in both tails. We report t-statistics based on standard errors using Newey and West (1987) with optimal truncation lag chosen as suggested by Andrews (1991) in parentheses below the coefficient estimates. The symbols ***, ** and * indicate statistical significance at the 1%, 5%, and 10% levels, respectively.

Panel A (Microcaps)	1	2	3	4	5	6	7
Exp LTGR10 EBITDA LASSO	0.0871***	0.0817***	0.0844***	0.0894***	0.1173***	0.1559***	0.1471***
	(2.915)	(2.678)	(2.815)	(3.065)	(3.992)	(4.916)	(4.761)
Beta		0.0023*	0.0023*	0.0026**	0.0033***	0.0038***	0.0038***
		(1.906)	(1.927)	(2.232)	(2.996)	(3.437)	(3.429)
Size		-0.0039***	-0.0035***	-0.0037***	-0.0040***	-0.0045***	-0.0045***
		(-5.839)	(-5.166)	(-5.384)	(-5.946)	(-6.635)	(-6.638)
Book Market		0.0044***	0.0048***	0.0065***	0.0061***	0.0074***	0.0075***
		(4.325)	(4.426)	(6.728)	(6.267)	(7.439)	(7.630)
Profitability			0.0077***	0.0080***	0.0024	0.0062***	0.0040**
			(4.845)	(5.125)	(1.406)	(3.703)	(2.283)
Investment			-0.0037***	-0.0025**	0.0046*	-0.0025	-0.0021
			(-3.009)	(-2.103)	(1.899)	(-1.009)	(-0.796)
Momentum				0.0070***	0.0057***	0.0043***	0.0037***
				(5.356)	(4.370)	(3.204)	(2.703)
Reversal				0.0011	-0.0007	-0.0020	-0.0032
				(0.349)	(-0.233)	(-0.613)	(-0.968)
External Financing					-0.0126	0.0015	0.0084*
					(-0.995)	(0.347)	(1.904)
Altman's Z					0.0026***	0.0062***	0.0063***
					(6.567)	(9.248)	(9.378)
Operating Leverage						-0.0072***	-0.0123***
						(-9.479)	(-8.053)
SUE						0.0015***	0.0015***
						(5.137)	(4.965)
Asset Turnover							0.0056***
							(3.750)
Accruals							-0.0260***
							(-6.072)
Constant	0.0090**	0.0489***	0.0413***	0.0408***	0.0355***	0.0343***	0.0345***
	(2.117)	(5.864)	(4.834)	(4.796)	(4.096)	(3.909)	(3.909)
Observations	350,481	334,859	332,817	330,051	323,506	312,088	308,687
Average R^2	0.006	0.033	0.039	0.047	0.054	0.062	0.067
Panel B (All-but-microcaps)							
Exp LTGR10 EBITDA LASSO	0.0303	0.0375	0.0296	0.0402	0.0579*	0.0633**	0.0538*
	(0.909)	(1.071)	(1.016)	(1.366)	(1.897)	(2.015)	(1.711)
Beta		0.0008	0.0012	0.0006	0.0013	0.0016	0.0017
		(0.545)	(0.838)	(0.487)	(1.032)	(1.269)	(1.388)
Size		-0.0006	-0.0005	-0.0004	-0.0001	-0.0002	-0.0002
		(-1.606)	(-1.367)	(-1.071)	(-0.400)	(-0.455)	(-0.659)
Book Market		0.0006	0.0009	0.0028***	0.0030***	0.0045***	0.0047***
		(0.730)	(1.023)	(3.826)	(3.910)	(5.495)	(5.668)
Profitability			0.0037**	0.0053***	0.0004	0.0015	0.0001
			(2.169)	(3.301)	(0.233)	(0.760)	(0.067)
Investment			-0.0027**	-0.0024**	-0.0004	-0.0053**	-0.0039*
			(-2.499)	(-2.231)	(-0.160)	(-2.403)	(-1.726)
Momentum				0.0065***	0.0059***	0.0060***	0.0057***
				(4.094)	(3.678)	(3.762)	(3.595)
Reversal				0.0016	0.0013	0.0021	0.0019
				(0.419)	(0.351)	(0.566)	(0.503)
External Financing					-0.0022	0.0095***	0.0136***
					(-0.622)	(2.819)	(3.902)
Altman's Z					0.0020***	0.0053***	0.0059***
					(5.281)	(8.846)	(9.324)
Operating Leverage						-0.0054***	-0.0089***
						(-8.116)	(-6.374)
SUE						0.0003	0.0003
						(1.241)	(1.403)
Asset Turnover							0.0031**
							(2.302)
Accruals							-0.0293***
							(-6.478)
Constant	0.0102**	0.0158**	0.0142**	0.0101	0.0010	-0.0017	-0.0017
	(2.287)	(2.314)	(2.205)	(1.588)	(0.142)	(-0.233)	(-0.239)
Observations	401,805	387,503	385,790	385,215	373,888	355,549	350,224
Average R^2	0.008	0.059	0.068	0.084	0.091	0.099	0.105

TABLE IA9

FMB regressions of monthly returns 1991-2018. Microcaps vs all-but-micro

This table reports the average slopes from Fama and MacBeth (1973) regressions of monthly returns (in decimal) on expected long-term EBITDA growth rates from the LASSO model for ten years (Exp LTGR10 EBITDA LASSO). The estimation procedure and variable constructions are described in Section V. All independent variables are lagged and winsorized month by month at the 1% level in both tails. We report t-statistics based on standard errors using Newey and West (1987) with optimal truncation lag chosen as suggested by Andrews (1991) in parentheses below the coefficient estimates. The symbols ***, ** and * indicate statistical significance at the 1%, 5%, and 10% levels, respectively.

Panel A (Microcaps)	1	2	3	4	5	6	7
Exp LTGR10 EBITDA LASSO	0.0652**	0.1094**	0.0959**	0.1024***	0.1794***	0.1815***	0.2053***
	(2.013)	(2.588)	(2.369)	(2.630)	(2.722)	(3.187)	(3.677)
Beta		0.0035*	0.0033*	0.0036*	0.0052***	0.0054***	0.0061***
		(1.791)	(1.686)	(1.843)	(2.766)	(2.937)	(3.326)
Size		-0.0042***	-0.0028**	-0.0030**	-0.0028	-0.0042***	-0.0040***
		(-3.085)	(-2.089)	(-2.173)	(-1.617)	(-2.895)	(-2.691)
Book Market		0.0053***	0.0064***	0.0073***	0.0073***	0.0071***	0.0075***
		(2.967)	(3.410)	(4.383)	(3.676)	(4.064)	(4.294)
Profitability			0.0117***	0.0121***	0.0081*	0.0141***	0.0093**
			(3.122)	(3.056)	(1.847)	(3.126)	(2.202)
Investment			-0.0034	-0.0021	0.0012	-0.0139**	-0.0109*
			(-1.199)	(-0.729)	(0.134)	(-2.311)	(-1.746)
Momentum				0.0038	0.0044	0.0014	0.0020
				(1.395)	(1.156)	(0.492)	(0.558)
Reversal				-0.0007	-0.0042	-0.0032	-0.0040
				(-0.090)	(-0.536)	(-0.424)	(-0.532)
External Financing					-0.0054	0.0197*	0.0260**
					(-0.381)	(1.876)	(2.458)
Altman's Z					0.0017**	0.0041***	0.0043***
					(2.421)	(4.262)	(4.505)
Operating Leverage						-0.0075***	-0.0189***
						(-5.004)	(-4.758)
SUE						0.0015**	0.0013*
						(2.185)	(1.743)
Asset Turnover							0.0120***
							(3.293)
Accruals							-0.0371***
							(-3.264)
Constant	0.0089	0.0509***	0.0322*	0.0321*	0.0192	0.0366*	0.0287
	(1.399)	(2.725)	(1.767)	(1.748)	(0.780)	(1.858)	(1.444)
Observations	86,204	82,284	80,235	80,167	78,637	75,692	74,611
Average R^2	0.012	0.052	0.068	0.085	0.101	0.118	0.136
Panel B (All-but-microcaps)							
Exp LTGR10 EBITDA LASSO	0.0087	0.0605	0.0515	0.0463	0.0647	0.0745	0.0764
	(0.172)	(1.436)	(1.107)	(1.012)	(1.384)	(1.600)	(1.601)
Beta		0.0022	0.0027	0.0016	0.0029	0.0030	0.0032
		(0.965)	(1.205)	(0.800)	(1.462)	(1.533)	(1.599)
Size		-0.0002	-0.0001	-0.0002	0.0001	0.0000	-0.0000
		(-0.391)	(-0.177)	(-0.402)	(0.183)	(0.027)	(-0.037)
Book Market		0.0011	0.0016	0.0024***	0.0027***	0.0036***	0.0040***
		(1.086)	(1.446)	(2.759)	(2.904)	(3.449)	(3.722)
Profitability			0.0055**	0.0060**	0.0018	0.0033	0.0003
			(2.083)	(2.352)	(0.641)	(1.057)	(0.082)
Investment			-0.0017	-0.0015	-0.0033	-0.0070***	-0.0064***
			(-1.225)	(-1.094)	(-1.523)	(-3.155)	(-2.758)
Momentum				0.0026	0.0024	0.0024	0.0024
				(1.178)	(1.099)	(1.115)	(1.149)
Reversal				-0.0008	0.0004	0.0022	0.0021
				(-0.125)	(0.059)	(0.355)	(0.352)
External Financing					0.0028	0.0116***	0.0159***
					(0.759)	(3.024)	(3.964)
Altman's Z					0.0018***	0.0036***	0.0040***
					(3.561)	(4.767)	(5.098)
Operating Leverage						-0.0041***	-0.0115***
						(-4.417)	(-5.016)
SUE						0.0004	0.0005*
						(1.376)	(1.707)
Asset Turnover							0.0077***
							(3.810)
Accruals							-0.0284***
							(-3.319)
Constant	0.0101	0.0054	0.0030	0.0052	-0.0041	-0.0040	-0.0060
	(1.638)	(0.569)	(0.305)	(0.540)	(-0.417)	(-0.391)	(-0.593)
Observations	188,176	176,076	174,358	174,281	165,746	156,979	153,913
Average R^2	0.010	0.066	0.079	0.097	0.106	0.116	0.125

TABLE IA10

Robustness: FMB regressions of monthly returns 1968-2018

This table reports the average slopes from Fama and MacBeth (1973) regressions of monthly returns (in decimal) on expected long-term EBITDA growth rates from the LASSO model for five years (Exp LTGR5 EBITDA LASSO). The estimation procedure and variable constructions are described in Section V. All independent variables are lagged and winsorized month by month at the 1% level in both tails. We report t-statistics based on standard errors using Newey and West (1987) with optimal truncation lag chosen as suggested by Andrews (1991) in parentheses below the coefficient estimates. The symbols ***, ** and * indicate statistical significance at the 1%, 5%, and 10% levels, respectively.

Panel A (Microcaps)	1	2	3	4	5	6	7
Exp LTGR5 EBITDA LASSO	0.0282**	0.0095**	0.0095**	0.0212*	0.0469***	0.0712***	0.0617***
	(2.055)	(2.029)	(2.092)	(1.908)	(4.391)	(6.695)	(3.627)
Beta		-0.0000	0.0004	0.0024**	0.0032***	0.0037***	0.0032***
		(-0.036)	(0.355)	(2.194)	(2.940)	(3.425)	(2.937)
Size		-0.0011***	-0.0009**	-0.0032***	-0.0032***	-0.0036***	-0.0037***
		(-3.206)	(-2.536)	(-4.834)	(-4.889)	(-5.578)	(-5.527)
Book Market		0.0025***	0.0030***	0.0071***	0.0066***	0.0082***	0.0080***
		(3.007)	(3.377)	(7.419)	(6.868)	(8.250)	(8.143)
Profitability			0.0070***	0.0075***	0.0010	0.0052***	0.0027
			(4.763)	(4.768)	(0.583)	(3.060)	(1.263)
Investment			-0.0046***	-0.0023*	0.0066	-0.0001	-0.0000
			(-5.029)	(-1.904)	(1.470)	(-0.045)	(-0.013)
Momentum				0.0081***	0.0067***	0.0049***	0.0033**
				(5.963)	(4.886)	(3.440)	(2.053)
Reversal				0.0033	0.0013	-0.0004	-0.0033
				(1.079)	(0.434)	(-0.114)	(-0.921)
External Financing					-0.0156	-0.0015	0.0058
					(-1.498)	(-0.329)	(1.216)
Altman's Z					0.0032***	0.0075***	0.0077***
					(8.163)	(11.492)	(11.111)
Operating Leverage						-0.0081***	-0.0139***
						(-10.863)	(-8.310)
SUE						0.0018***	0.0018***
						(6.492)	(6.260)
Asset Turnover							0.0060***
							(3.898)
Accruals							-0.0234***
							(-5.242)
Constant	0.0107***	0.0271***	0.0215***	0.0413***	0.0318***	0.0302***	0.0319***
	(3.761)	(5.345)	(4.119)	(5.313)	(3.944)	(3.759)	(3.875)
Observations	432,370	359,774	357,359	339,562	337,477	326,216	317,618
Average R^2	0.006	0.041	0.047	0.052	0.059	0.067	0.080
Panel B (All-but-microcaps)							
Exp LTGR5 EBITDA LASSO	-0.0032	-0.0018	0.0018	0.0103	0.0293***	0.0346***	0.0269*
	(-0.233)	(-0.159)	(0.168)	(1.011)	(2.884)	(3.450)	(1.949)
Beta		-0.0004	0.0003	-0.0001	0.0006	0.0010	0.0011
		(-0.247)	(0.184)	(-0.109)	(0.525)	(0.861)	(0.913)
Size		-0.0002	-0.0001	0.0000	0.0003	0.0003	0.0002
		(-0.455)	(-0.263)	(0.031)	(0.841)	(0.790)	(0.474)
Book Market		0.0004	0.0006	0.0026***	0.0029***	0.0046***	0.0052***
		(0.446)	(0.746)	(3.648)	(3.796)	(5.707)	(5.844)
Profitability			0.0041**	0.0056***	-0.0006	-0.0000	-0.0010
			(2.383)	(3.565)	(-0.367)	(-0.020)	(-0.495)
Investment			-0.0040***	-0.0032***	0.0005	-0.0044**	-0.0032
			(-3.381)	(-2.960)	(0.219)	(-2.033)	(-1.441)
Momentum				0.0078***	0.0073***	0.0073***	0.0072***
				(4.924)	(4.566)	(4.605)	(4.302)
Reversal				0.0020	0.0017	0.0021	0.0018
				(0.568)	(0.476)	(0.585)	(0.499)
External Financing					-0.0056	0.0065**	0.0125***
					(-0.674)	(1.969)	(3.320)
Altman's Z					0.0024***	0.0062***	0.0071***
					(6.751)	(10.521)	(10.116)
Operating Leverage						-0.0059***	-0.0106***
						(-9.090)	(-6.745)
SUE						0.0004**	0.0005**
						(2.184)	(1.997)
Asset Turnover							0.0040***
							(2.894)
Accruals							-0.0307***
							(-6.465)
Constant	0.0117***	0.0141**	0.0110*	0.0076	-0.0030	-0.0062	-0.0063
	(4.038)	(2.453)	(1.893)	(1.351)	(-0.493)	(-0.977)	(-0.997)
Observations	409,580	402,988	401,819	401,220	398,637	379,240	366,208
Average R^2	0.009	0.060	0.070	0.087	0.093	0.102	0.115

TABLE IA11

Robustness: FMB regressions of monthly returns 1986-2018

This table reports the average slopes from Fama and MacBeth (1973) regressions of monthly returns (in decimal) on expected long-term EBITDA growth rates from the LASSO model for five years (Exp LTGR5 EBITDA LASSO). The estimation procedure and variable constructions are described in Section V. All independent variables are lagged and winsorized month by month at the 1% level in both tails. We report t-statistics based on standard errors using Newey and West (1987) with optimal truncation lag chosen as suggested by Andrews (1991) in parentheses below the coefficient estimates. The symbols ***, ** and * indicate statistical significance at the 1%, 5%, and 10% levels, respectively.

Panel A (Microcaps)	1	2	3	4	5	6	7
Exp LTGR5 EBITDA LASSO	0.0452**	0.0332*	0.0341*	0.0420**	-0.0188	-0.0139	0.0360
	(2.301)	(1.805)	(1.780)	(2.062)	(-0.243)	(-0.172)	(1.069)
Beta		0.0033**	0.0031**	0.0034**	0.0044***	0.0050***	0.0050***
		(2.017)	(1.976)	(2.103)	(2.832)	(3.169)	(3.086)
Size		-0.0027**	-0.0015	-0.0019	-0.0029**	-0.0033**	-0.0029**
		(-2.315)	(-1.321)	(-1.598)	(-2.145)	(-2.582)	(-2.312)
Book Market		0.0029*	0.0047***	0.0070***	0.0051**	0.0060**	0.0080***
		(1.799)	(2.638)	(4.397)	(2.025)	(2.141)	(4.511)
Profitability			0.0131***	0.0148***	0.0089*	0.0140***	0.0129***
			(3.823)	(4.375)	(1.960)	(2.632)	(3.229)
Investment			-0.0023	-0.0002	-0.0013	-0.0123**	-0.0075
			(-0.896)	(-0.063)	(-0.226)	(-1.986)	(-1.279)
Momentum				0.0076***	0.0046*	0.0036	0.0032
				(3.432)	(1.849)	(1.348)	(1.306)
Reversal				0.0039	0.0160	0.0148	0.0039
				(0.588)	(1.127)	(1.006)	(0.546)
External Financing					0.0008	0.0187*	0.0253**
					(0.080)	(1.906)	(2.560)
Altman's Z					0.0010	0.0035*	0.0043***
					(0.634)	(1.883)	(3.298)
Operating Leverage						-0.0072***	-0.0180***
						(-5.228)	(-5.400)
SUE						0.0018***	0.0018***
						(3.426)	(3.222)
Asset Turnover							0.0117***
							(3.494)
Accruals							-0.0490***
							(-4.381)
Constant	0.0098***	0.0389***	0.0210	0.0225	0.0386	0.0454*	0.0300*
	(2.609)	(2.742)	(1.460)	(1.530)	(1.611)	(1.963)	(1.730)
Observations	87,651	85,372	83,113	83,060	81,490	78,377	77,284
Average R^2	0.012	0.050	0.066	0.082	0.099	0.114	0.132
Panel B (All-but-microcaps)							
Exp LTGR5 EBITDA LASSO	0.0115*	0.0108*	0.0145*	0.0156**	0.0450***	0.0537***	0.0515***
	(1.762)	(1.711)	(1.874)	(1.966)	(2.958)	(3.461)	(3.122)
Beta		0.0019	0.0024	0.0014	0.0023	0.0026	0.0027
		(1.011)	(1.252)	(0.819)	(1.354)	(1.474)	(1.557)
Size		-0.0003	-0.0001	-0.0002	0.0000	-0.0001	-0.0001
		(-0.630)	(-0.320)	(-0.522)	(0.027)	(-0.208)	(-0.311)
Book Market		0.0007	0.0013	0.0024***	0.0028***	0.0040***	0.0044***
		(0.744)	(1.258)	(2.710)	(3.019)	(4.096)	(4.359)
Profitability			0.0052**	0.0059***	0.0005	0.0024	-0.0002
			(2.291)	(2.705)	(0.185)	(0.926)	(-0.078)
Investment			-0.0023**	-0.0021*	-0.0029	-0.0070***	-0.0065***
			(-2.124)	(-1.913)	(-1.449)	(-3.324)	(-3.074)
Momentum				0.0032*	0.0028	0.0030	0.0028
				(1.651)	(1.466)	(1.602)	(1.538)
Reversal				-0.0013	-0.0008	0.0008	0.0007
				(-0.261)	(-0.170)	(0.157)	(0.142)
External Financing					0.0018	0.0116***	0.0157***
					(0.520)	(3.158)	(4.224)
Altman's Z					0.0025***	0.0048***	0.0052***
					(5.357)	(7.123)	(7.580)
Operating Leverage						-0.0050***	-0.0109***
						(-5.709)	(-5.810)
SUE						0.0005**	0.0007***
						(2.397)	(2.868)
Asset Turnover							0.0060***
							(3.800)
Accruals							-0.0268***
							(-4.186)
Constant	0.0102***	0.0122*	0.0084	0.0094	-0.0012	-0.0012	-0.0023
	(3.033)	(1.767)	(1.195)	(1.355)	(-0.170)	(-0.160)	(-0.318)
Observations	227,960	214,162	212,506	212,414	204,607	194,281	190,666
Average R^2	0.013	0.063	0.074	0.090	0.098	0.106	0.113

TABLE IA12

Correlation matrix

This table presents pairwise correlation coefficients. *Exp LTGR10 EBITDA LASSO* and *Exp LTGR5 EBITDA LASSO* are the ten- and five-year growth expectations obtained from the LASSO model. *Beta* is computed from a rolling-window regression of the excess return of a company on the excess return of the market over the past five years of monthly data, with the requirement that at least 24 months of data are available. *Size* is computed as the log of market capitalization, and *Book to Market* is computed as the log of book-to-market. *Profitability* is computed as $(sales_{t-1} - cogs_{t-1})/assets_{t-1}$, and *Investment* is computed $(assets_{t-1} - assets_{t-2})/assets_{t-2}$. *Momentum* is computed as the cumulative return from month $t-12$ to month $t-2$, and *Reversal* is computed as the return from month $t-1$ to month t. *External Financing* is computed as the change in total assets minus the change in retained earnings divided by total assets ($\frac{(at_t - at_{t-1}) - (re_t - re_{t-1})}{at_t}$) and *Altman's Z* is computed as $3.3 \times \frac{oiadp_t}{at_t} + 1.4 \times \frac{re_t}{at_t} + \frac{sale_t}{at_t} + 1.2 \times \frac{act_t - lct_t}{at_t}$. *Operating Leverage* is computed as $(cogs_t + xsga_t)/assets_t$, and Standardized Unexpected Earnings (*SUE*) is computed as $(ibcom_t - ibcom_{t-1})/sd(ibcom)$, where $sd(ibcom)$ is the standard deviation of *ibcom* over the prior six years (two years minimum). *Asset Turnover* is computed as $revt_t/assets_t$, and *Accruals* is computed as $((act_t - act_{t-1}) - (che_t - che_{t-1}) - ((lct_t - lct_{t-1}) - (dlc_t - dlc_{t-1}) - (txp_t - txp_{t-1})) - dp_t)/assets_t$. *ALTGF Earnings* is computed as the mean of individual analysts' forecasts for long-term earnings growth. All correlation coefficients are significant at the 5% level or lower.

Variables	Exp LTGR10 EBITDA LASSO	Exp LTGR5 EBITDA LASSO	Beta	Size	Book Market	Profitability	Investment	Momentum	Reversal	External Financing	Altman's Z	Operating Leverage	SUE	Asset Turnover	Accruals	ALTGF Earnings
Exp LTGR10 EBITDA LASSO	1.000															
Exp LTGR5 EBITDA LASSO	0.791	1.000														
Beta	0.013	0.107	1.000													
Size	-0.287	-0.285	-0.087	1.000												
Book Market	-0.002	0.015	-0.021	-0.381	1.000											
Profitability	0.042	0.053	-0.058	-0.077	-0.266	1.000										
Investment	-0.013	0.017	0.081	0.014	-0.128	-0.064	1.000									
Momentum	-0.007	0.004	0.027	0.119	-0.400	0.058	0.012	1.000								
Reversal	0.024	0.023	0.009	0.051	-0.136	0.018	-0.018	0.007	1.000							
External Financing	0.098	0.143	0.133	-0.051	-0.116	-0.132	0.599	-0.008	-0.014	1.000						
Altman's Z	-0.251	-0.269	-0.287	0.081	-0.069	0.419	-0.007	0.079	0.028	-0.204	1.000					
Operating Leverage	-0.022	-0.013	-0.114	-0.196	0.074	0.373	-0.065	-0.002	0.002	-0.056	0.479	1.000				
SUE	-0.171	-0.285	-0.033	0.092	-0.198	0.129	0.119	0.120	0.005	-0.010	0.147	0.015	1.000			
Asset Turnover	-0.073	-0.068	-0.154	-0.133	-0.010	0.493	-0.097	0.038	0.014	-0.145	0.598	0.632	0.080	1.000		
Accruals	-0.103	-0.168	-0.033	-0.083	-0.049	0.034	0.274	-0.034	-0.018	0.216	0.165	0.066	0.180	0.067	1.000	
ALTGF Earnings	0.302	0.391	0.294	-0.221	-0.244	0.003	0.310	0.022	-0.007	0.351	-0.268	-0.095	0.062	-0.152	0.109	1.000

Interaction effect between analysts' growth forecasts and long-term growth expectations derived from the LASSO model

In Table IA13 we assess if there is an interaction effect between analysts' growth forecasts and long-term growth expectations derived from the LASSO model. To differentiate between more optimistic versus more pessimistic analyst forecasts, we construct a dummy variable, $ALTGF_{i,t}$, that is equal to one if the firm-year mean of the individual analysts' long-term earnings growth forecasts is larger than the cross-sectional mean of the analysts' long-term earnings growth forecasts for companies in the same industry for that same year. We then interact this dummy variable with long-term growth expectations derived from the LASSO model. In particular, each month we estimate a cross-sectional OLS regression as follows:

$$(5) \qquad R_{i,t+1} = \alpha + \beta_1 \hat{G}_{i,t} + \beta_2 ALTGF_{i,t} + \beta_3 \hat{G}_{i,t} \times ALTGF_{i,t} + \gamma X_{i,t} + \varepsilon_{i,t+1}$$

where $R_{i,t+1}$ is the stock return (in decimal) for company i in month $t+1$, $\hat{G}_{i,t}$ is the long-term growth expectation for ten-year EBITDA, and $ALTGF_{i,t}$ is the dummy variable that differentiates between optimistic versus pessimistic analyst forecasts (above vs. below industry-year average). In this estimation β_1 captures the association between the *Exp LTGR10 EBITDA LASSO* and subsequent returns when analyst growth forecasts are pessimistic. Further, β_3 captures the difference in the association between the *Exp LTGR10 EBITDA LASSO* and subsequent returns when analyst growth forecasts are optimistic.

Table IA13 Panels A and B present the results for microcaps and all-but-microcaps, respectively. We find that the coefficient estimate of $ALTGF_{i,t}$ is negative in both panels. This evidence is consistent with prior literature that documents that returns on stocks with optimistic analyst long-term earnings growth forecasts are lower than those on stocks with pessimistic forecasts (see e.g., Bordalo, Gennaioli, La Porta, and Shleifer (2019) for a discussion on the topic). We also find that β_1 is positive and statistically significant in the microcaps sub-sample. This evidence is consistent with the evidence presented in Table 12 in the paper. Importantly, controlling for $ALTGF_{i,t}$ has little impact on this positive association. Further, we find that β_3 is insignificant in the microcaps sub-sample indicating that there is no difference in the association between long-term growth expectations and stock returns for pessimistic and optimistic analyst forecasts in this sub-sample.

For the all-but-microcaps sub-sample we find that β_1 is insignificant and β_3 is positive and statistically significant. This result indicates that long-term growth expectations from our LASSO model are able to successfully identify firms that perform well among firms with optimistic analyst long-term growth estimates. In other words, research has shown that analysts and investors who follow them or think like them overreact to certain stocks, namely stocks that receive optimistic analyst long-term growth estimates, and these stocks exhibit poor stock market performance in the future (Bordalo et al., 2019). Among these stocks growth predictions from our LASSO model are able to differentiate between those stocks that indeed underperform and those stocks that perform well going forward.

On the whole, investors' rational inattention due to bounded cognitive resources could be one plausible explanation for these findings. In particular, investors may allocate their attention based on the trade-off between expected cost and payoff. Costs are related to predicting long-term growth, which in turn requires access to data and training in financial economics. The payoff, on the other hand, is uncertain since it is about long-term growth and it is unclear when expectations will converge to realizations from an ex-ante perspective. Our results are stronger for smaller companies, which arguably suffer more from rational inattention.

However, in the spirit of Kozak, Nagel, and Santosh (2018), we would like to note that is it challenging to differentiate between ”risk-based” and ”behavioral” explanations in our framework.

TABLE IA13

FMB regressions of monthly returns 1991-2018. Interaction with ALTGF

The estimation procedure is described in Equation 5 and variable constructions are described in the caption of Table IA12. All independent variables are lagged and winsorized month by month at the 1% level in both tails. We report t-statistics based on standard errors using Newey and West (1987) with optimal truncation lag chosen as suggested by Andrews (1991) in parentheses below the coefficient estimates. The constant is not reported for brevity. The symbols ***, ** and * indicate statistical significance at the 1%, 5%, and 10% levels, respectively.

Panel A (Microcaps)	1	2	3	4	5	6	7
Exp LTGR10 EBITDA LASSO	0.0566**	0.1145**	0.0745**	0.0250**	0.1156**	0.1750**	0.1922***
	(2.124)	(1.993)	(2.319)	(2.324)	(1.971)	(2.569)	(2.915)
ALTGF	-0.0057	-0.0017	-0.0135	0.0065	-0.0068	-0.0051	-0.0055
	(-0.677)	(-0.213)	(-1.196)	(0.372)	(-0.640)	(-0.401)	(-0.453)
ALTGF x Exp LTGR10 EBITDA LASSO	0.0528	0.0103	0.1260	-0.0472	0.0922	0.0490	0.0622
	(0.679)	(0.139)	(1.209)	(-0.315)	(0.971)	(0.419)	(0.563)
Beta		0.0034*	0.0030	0.0038*	0.0049***	0.0053***	0.0058***
		(1.747)	(1.551)	(1.906)	(2.657)	(2.871)	(3.207)
Size		-0.0044***	-0.0023	-0.0051**	-0.0043***	-0.0039***	-0.0037**
		(-3.245)	(-1.604)	(-2.188)	(-2.919)	(-2.639)	(-2.475)
Book Market		0.0047***	0.0076***	0.0032	0.0090***	0.0067***	0.0069***
		(2.703)	(3.134)	(0.754)	(2.707)	(3.592)	(3.807)
Profitability			0.0104**	0.0126***	0.0070	0.0131***	0.0064
			(2.522)	(3.305)	(1.495)	(2.730)	(1.376)
Investment			-0.0024	-0.0048	0.0008	-0.0140**	-0.0132**
			(-0.718)	(-1.385)	(0.091)	(-2.316)	(-2.243)
Momentum				0.0063	0.0066	0.0004	-0.0004
				(1.376)	(1.159)	(0.143)	(-0.141)
Reversal				0.0039	-0.0027	-0.0017	-0.0014
				(0.451)	(-0.364)	(-0.225)	(-0.185)
External Financing					-0.0078	0.0194*	0.0259**
					(-0.506)	(1.861)	(2.442)
Altman's Z					0.0024***	0.0041***	0.0044***
					(3.019)	(4.176)	(4.496)
Operating Leverage						-0.0070***	-0.0171***
						(-4.562)	(-4.317)
SUE						0.0015**	0.0016**
						(2.223)	(2.390)
Asset Turnover							0.0115***
							(3.117)
Accruals							-0.0355***
							(-3.107)
Observations	86,204	82,284	80,235	80,167	78,637	75,692	74,611
Average R^2	0.025	0.064	0.080	0.096	0.112	0.129	0.147

Panel B (All-but-microcaps)	1	2	3	4	5	6	7
Exp LTGR10 EBITDA LASSO	-0.0442	-0.0011	-0.0059	-0.0096	0.0087	0.0187	0.0170
	(-0.846)	(-0.029)	(-0.128)	(-0.213)	(0.184)	(0.400)	(0.356)
ALTGF	-0.0124**	-0.0145**	-0.0126**	-0.0118**	-0.0113**	-0.0107**	-0.0112**
	(-2.212)	(-2.549)	(-2.441)	(-2.356)	(-2.163)	(-2.030)	(-2.114)
ALTGF x Exp LTGR10 EBITDA LASSO	0.1335**	0.1511***	0.1370***	0.1335***	0.1324***	0.1297**	0.1378***
	(2.480)	(2.821)	(2.796)	(2.778)	(2.636)	(2.564)	(2.714)
Beta		0.0019	0.0023	0.0012	0.0025	0.0026	0.0027
		(0.873)	(1.070)	(0.622)	(1.310)	(1.365)	(1.405)
Size		-0.0002	-0.0001	-0.0002	0.0001	0.0001	0.0000
		(-0.549)	(-0.212)	(-0.402)	(0.251)	(0.104)	(0.055)
Book Market		0.0010	0.0017	0.0026***	0.0029***	0.0039***	0.0043***
		(1.090)	(1.555)	(2.968)	(3.116)	(3.665)	(3.946)
Profitability			0.0056**	0.0063**	0.0021	0.0038	0.0008
			(2.154)	(2.470)	(0.731)	(1.192)	(0.252)
Investment			-0.0020	-0.0020	-0.0038*	-0.0077***	-0.0071***
			(-1.481)	(-1.421)	(-1.743)	(-3.426)	(-3.011)
Momentum				0.0027	0.0024	0.0024	0.0023
				(1.192)	(1.086)	(1.108)	(1.122)
Reversal				-0.0006	0.0004	0.0022	0.0021
				(-0.106)	(0.059)	(0.353)	(0.335)
External Financing					0.0025	0.0115***	0.0157***
					(0.679)	(2.987)	(3.876)
Altman's Z					0.0018***	0.0037***	0.0041***
					(3.643)	(4.920)	(5.314)
Operating Leverage						-0.0043***	-0.0116***
						(-4.571)	(-5.000)
SUE						0.0003	0.0005
						(1.220)	(1.546)
Asset Turnover							0.0075***
							(3.674)
Accruals							-0.0293***
							(-3.482)
Observations	188,176	176,076	174,358	174,281	165,746	156,979	153,913
Average R^2	0.023	0.073	0.085	0.103	0.112	0.123	0.132

Predicting long-term growth without market-based variables

We start with estimating Model (2) by excluding market-based predictors, i.e., using only information that would be available for private companies. We present the results in Table IA14. As in Section III we report regressions with different forecasting horizons (five and ten years) and different dependent variables, i.e., growth in Sales and growth in EBITDA. We again concentrate on variables that have statistically significant estimates in at least 75% of the estimations and have the same coefficient sign. The results are quantitatively and qualitatively very similar to the ones discussed in Section III. In particular, we find that *External Financing* has a positive and statistically significant coefficient in the Sales growth estimations. A one-standard-deviation increase in *External Financing* is associated with a 6.6 percent increase in long-term Sales growth.

We also find that *Capex* has a positive and statistically significant relation to future long-term Sales growth. A one-standard-deviation increase in *Capex* is associated with a 6.6 percent increase in long-term Sales growth. Similar to the main results we find that *Leverage* has a negative and statistically significant relation to future long-term growth rates. A one-standard-deviation increase in *Leverage* is associated with an 11.7 percent decrease in long-term Sales growth and an 11.3 percent decrease in long-term EBITDA growth.

We also document a positive and statistically significant association between the *Barriers to Entry* variable and future long-term growth rates. A one-standard-deviation increase in *Barriers to Entry* is associated with a 31.7 percent increase in long-term Sales growth and a 21.6 percent increase in long-term EBITDA growth. Moreover, *Industry Exits* predicts lower long-term growth rates for those companies that remain in the industry. A one-standard-deviation increase in *Industry Exits* is associated with a 17.7 percent decrease in long-term Sales growth and 23.0 percent decrease in long-term EBITDA growth.

We document a negative and statistically significant relation between *Firm Age* and subsequent long-term growth. A one-standard-deviation increase in *Firm Age* is associated with a 12.7 percent decrease in long-term Sales growth and 5.8 percent decrease in long-term EBITDA growth. The *Size* variable is also negative and statistically significant across EBITDA growth specifications. A one-standard-deviation increase in *Size* is associated with a 10.0 percent decrease in long-term EBITDA growth. We also document a positive and statistically significant relation between *Capital Intensity* and subsequent long-term growth in Sales. A one-standard-deviation increase in *Capital Intensity* is associated with a 19.4 percent increase in long-term Sales growth. Similarly, the *Payout Ratio* is positive and statistically significantly related to subsequent long-term Sales growth. A one-standard-deviation increase in the *Payout Ratio* is associated with a 4.3 percent increase in long-term Sales growth.

Finally, we document that the *Growth EBITDA 1Y* variable is negatively associated with subsequent long-term growth in EBITDA. A one-standard-deviation increase in *Growth EBITDA 1Y* is associated with a 8.6 percent decrease in long-term EBITDA growth.

Model selection for long-term growth expectations without market-based variables

We follow the methodology outlined in Section IV and apply in addition to the full model specification the backward elimination and the LASSO procedures. The results are presented in Table IA15. The table shows that the LASSO model delivers the lowest RMSE and MAE during all periods, which is consistent with the results presented in Section IV. Furthermore, Figure IA3 graphically shows, over the period 1973-2018, which characteristics from the universe of all characteristics are selected by the LASSO procedure. The figure indicates that the characteristics selected in this estimation are similar to the characteristics selected in the main LASSO estimation and presented in Figure 3.

Long-term growth expectations without market-based variables and stock returns

To test the predictive power of *Exp LTGR10 EBITDA LASSO* constructed without predictors based on market information, i.e., information available only for private companies, similarly to Section V, we perform Fama and MacBeth (1973) regression tests. [1]

Table IA16 presents the results. The results in the table indicate that *Exp LTGR10 EBITDA LASSO* has a positive association with subsequent stock returns. Similar to before, these results are statistically significant in the microcaps sub-sample. *Exp LTGR10 EBITDA LASSO* retains significant predictive power even after we include the major known predictors of returns.

Overall, the results are in line with the main results presented in Section V. Assuming that private firms are similar to public firms in the dimensions examined in the paper our model also provides useful input for the valuation of private firms, for which market-based variables are not available.

[1] At the end of the the Internet Appendix we present evidence from portfolio sorts in Table IA23. The long-short portfolio produces positive and highly statistically significant abnormal returns. These results are positive and robust throughout the alternative estimations and highly statistically significant in the 5-f and 6-f alpha estimations.

TABLE IA14

Robustness: Excluding market-based predictors. Predicting LTGRs

This table reports the results from the long-term growth prediction estimation described in Section II D. The dependent variables are five and ten year annualized geometric growth rates in Sales (5 YS and 10 YS) and in EBITDA (5 YE and 10 YE). The dataset consist of U.S. exchange-listed companies for the period 1963 to 2018. To account for both cross-sectional and time-series serial correlation we report t-statistics in parenthesis that are based on standard errors clustered by firm and year (see Petersen (2009)). The symbols ***, ** and * indicate statistical significance at the 1%, 5%, and 10% levels, respectively.

	1	2	3	4
	5YS 1963-2018	10YS 1963-2018	5YE 1963-2018	10YE 1963-2018
Advertising Intensity$_t$	0.1138**	0.0416	0.0817	0.0694
	(2.248)	(0.902)	(1.132)	(1.113)
Altman's Z$_t$	0.0035**	0.0030***	-0.0130***	-0.0052***
	(2.621)	(2.957)	(-5.019)	(-2.786)
Barriers to Entry$_t$	0.2360***	0.1860***	0.2036***	0.1029***
	(6.184)	(6.700)	(4.462)	(3.604)
Capex$_t$	0.0273***	0.0213***	0.0144	0.0214***
	(2.863)	(3.657)	(1.641)	(4.475)
Capital Intensity$_t$	0.1587**	0.1185**	0.0434	0.0222
	(2.317)	(2.262)	(0.931)	(0.472)
External Financing$_t$	0.0448***	0.0214***	0.0092	-0.0077
	(5.444)	(3.804)	(0.866)	(-1.208)
Firm Age$_t$	-0.0137***	-0.0115***	-0.0055**	-0.0064***
	(-6.800)	(-6.979)	(-2.247)	(-3.565)
G$_t$	0.0443***	0.0350***	-0.0717***	-0.0491***
	(7.146)	(6.168)	(-2.949)	(-5.192)
GDP Growth 10Y$_t$	0.7943	1.9009***	0.3572	1.8501***
	(1.651)	(4.214)	(0.568)	(4.443)
Growth Sales 1Y$_t$	-0.0006	-0.0021		
	(-0.134)	(-0.654)		
HHI Sales$_t$	-0.0042	0.0219	-0.0089	0.0202
	(-0.236)	(1.138)	(-0.346)	(0.987)
Industry Entries$_t$	-0.0031	0.0079	-0.0045	-0.0211
	(-0.075)	(0.398)	(-0.083)	(-1.024)
Industry Exits$_t$	-0.1743***	-0.0986***	-0.2660***	-0.1121***
	(-3.808)	(-3.742)	(-4.369)	(-3.387)
Inflation Rate$_t$	0.0754	0.1302	0.0634	0.0793
	(0.363)	(1.517)	(0.238)	(0.973)
Leverage$_t$	-0.0695***	-0.0608***	-0.0772***	-0.0558***
	(-7.849)	(-8.308)	(-6.025)	(-5.839)
Payout Ratio$_t$	0.0110***	0.0111***	-0.0003	0.0062*
	(4.288)	(4.583)	(-0.089)	(1.985)
R&D Intensity$_t$	-0.0023	-0.0029	0.1837***	0.0637
	(-0.527)	(-0.582)	(4.333)	(1.594)
RFR$_t$	0.1209	0.1698	0.0638	0.1958
	(0.798)	(1.530)	(0.360)	(1.660)
Size$_t$	-0.0013	-0.0004	-0.0074***	-0.0034***
	(-1.236)	(-0.450)	(-6.027)	(-3.435)
Growth EBITDA 1Y$_t$			-0.0176***	-0.0087***
			(-9.189)	(-6.135)
Observations	54,189	34,014	45,167	28,954
Adjusted R^2	0.106	0.148	0.056	0.078
Industry Dummies	FF48	FF48	FF48	FF48

TABLE IA15

Robustness: Excluding market-based predictors. Model selection

This table reports root mean squared errors (RMSE) and mean absolute errors (MAE) for out-of-sample predictions with different horizon specifications. RMSE is defined as $\sqrt{\frac{1}{n}\sum_{i=1}^{n}(y_i-\hat{y}_i)^2}$ and MAE is defined as $\frac{1}{n}\sum_{i=1}^{n}|y_i-\hat{y}_i|$, where y_i is the actual value and $\hat{y}_i$ is the predicted value. Full, BE and LASSO correspond to i) the full model containing all predictors, ii) a model based on the backward elimination (BE) procedure, and iii) a model based on the Least Absolute Shrinkage and Selection Operator (LASSO) procedure, respectively. The t-statistics are based on HAC standard errors and are reported in parentheses. The symbols ***, ** and * indicate statistical significance at the 1%, 5%, and 10% levels, respectively.

1963-2018	RMSE (Full)	RMSE (BE)	RMSE (LASSO)	MAE (Full)	MAE (BE)	MAE (LASSO)
Exp LTGR5 Sales	0.174***	0.167***	0.129***	0.138***	0.130***	0.094***
	(6.508)	(5.497)	(19.060)	(4.964)	(4.142)	(16.343)
Exp LTGR5 Ebitda	0.260***	0.230***	0.177***	0.213***	0.185***	0.132***
	(4.684)	(4.613)	(31.902)	(3.832)	(3.626)	(24.210)
Exp LTGR10 Sales	0.152***	0.115***	0.096***	0.125***	0.087***	0.071***
	(4.408)	(12.998)	(16.585)	(3.394)	(7.795)	(13.610)
Exp LTGR10 Ebitda	0.199***	0.175***	0.107***	0.173**	0.148**	0.080***
	(2.688)	(2.982)	(39.049)	(2.304)	(2.492)	(31.159)

FIGURE IA3

Excluding market-based predictors. LASSO selected characteristics

The figure graphically shows which characteristics from the universe of all characteristics are selected by the LASSO procedure for the construction of the Exp LTGR10 EBITDA LASSO. Blue indicates that the characteristic is selected.

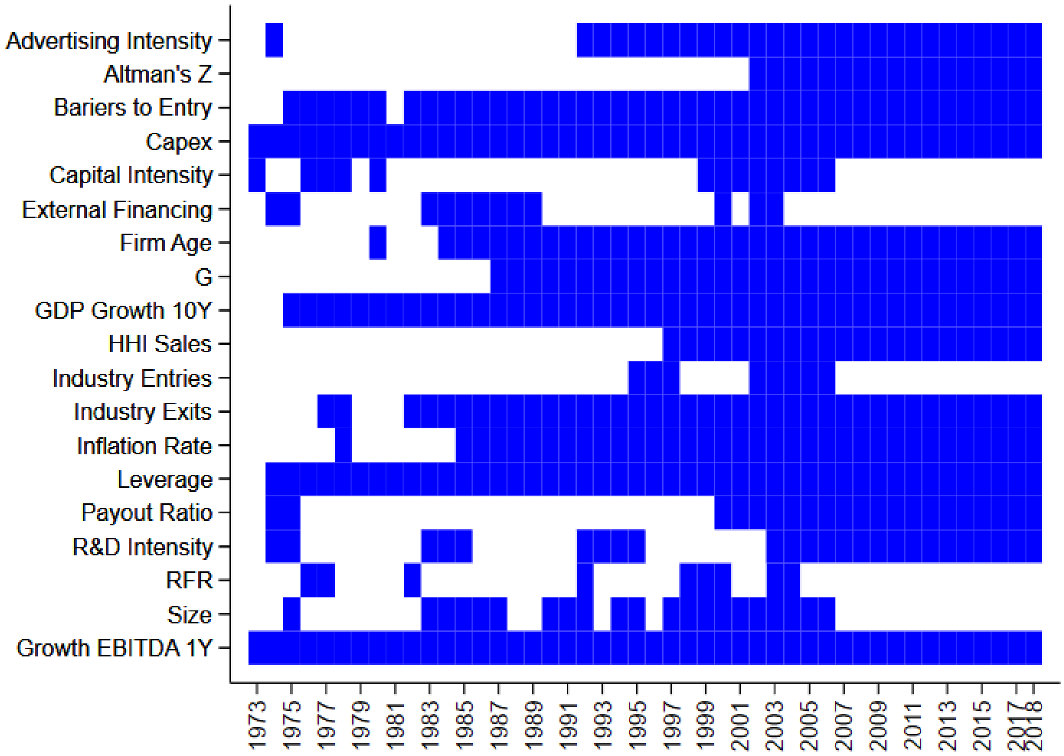


TABLE IA16

Excluding market-based predictors. FMB regressions 1973-2018

This table reports the average slopes from Fama and MacBeth (1973) regressions of monthly returns (in decimal) on expected long-term EBITDA growth rates from the LASSO model for ten years (Exp LTGR10 EBITDA LASSO). The estimation procedure and variable constructions are described in Section V. All independent variables are lagged and winsorized month by month at the 1% level in both tails. We report t-statistics based on standard errors using Newey and West (1987) with optimal truncation lag chosen as suggested by Andrews (1991) in parentheses below the coefficient estimates. The symbols ***, ** and * indicate statistical significance at the 1%, 5%, and 10% levels, respectively.

Panel A (Microcaps)	1	2	3	4	5	6	7
Exp LTGR10 EBITDA LASSO	0.0470***	0.0395***	0.0437***	0.0491***	0.0809***	0.1205***	0.1147***
	(2.842)	(2.631)	(2.848)	(3.085)	(3.394)	(4.699)	(4.632)
Beta		0.0019	0.0019*	0.0022*	0.0029***	0.0033***	0.0033***
		(1.642)	(1.662)	(1.953)	(2.681)	(3.046)	(3.091)
Size		-0.0039***	-0.0035***	-0.0037***	-0.0040***	-0.0045***	-0.0045***
		(-5.795)	(-5.109)	(-5.324)	(-5.913)	(-6.644)	(-6.650)
Book Market		0.0044***	0.0048***	0.0066***	0.0062***	0.0074***	0.0076***
		(4.263)	(4.351)	(6.683)	(6.251)	(7.410)	(7.609)
Profitability			0.0078***	0.0080***	0.0022	0.0061***	0.0038**
			(4.917)	(5.193)	(1.343)	(3.693)	(2.149)
Investment			-0.0037***	-0.0025**	0.0049**	-0.0023	-0.0018
			(-3.016)	(-2.117)	(2.025)	(-0.905)	(-0.673)
Momentum				0.0072***	0.0059***	0.0045***	0.0040***
				(5.598)	(4.555)	(3.389)	(2.922)
Reversal				0.0005	-0.0015	-0.0026	-0.0038
				(0.146)	(-0.452)	(-0.791)	(-1.138)
External Financing					-0.0132	0.0007	0.0077*
					(-1.196)	(0.167)	(1.737)
Altman's Z					0.0027***	0.0062***	0.0064***
					(6.704)	(9.286)	(9.382)
Operating Leverage						-0.0073***	-0.0129***
						(-9.531)	(-8.624)
SUE						0.0015***	0.0014***
						(4.970)	(4.791)
Asset Turnover							0.0061***
							(4.204)
Accruals							-0.0254***
							(-6.126)
Constant	0.0140***	0.0541***	0.0461***	0.0455***	0.0400***	0.0392***	0.0391***
	(3.661)	(6.673)	(5.501)	(5.421)	(4.636)	(4.526)	(4.503)
Observations	370,170	339,833	337,810	335,011	329,337	317,778	314,327
Average R^2	0.005	0.032	0.038	0.047	0.053	0.061	0.067
Panel B (All-but-microcaps)							
Exp LTGR10 EBITDA LASSO	-0.0041	-0.0042	0.0019	0.0120	0.0289	0.0360	0.0326
	(-0.141)	(-0.142)	(0.071)	(0.435)	(1.029)	(1.257)	(1.159)
Beta		0.0006	0.0010	0.0004	0.0011	0.0014	0.0015
		(0.419)	(0.704)	(0.345)	(0.886)	(1.121)	(1.262)
Size		-0.0006	-0.0005	-0.0004	-0.0001	-0.0002	-0.0002
		(-1.547)	(-1.316)	(-1.034)	(-0.379)	(-0.411)	(-0.613)
Book Market		0.0007	0.0010	0.0028***	0.0029***	0.0045***	0.0048***
		(0.789)	(1.050)	(3.729)	(3.854)	(5.535)	(5.752)
Profitability			0.0035**	0.0050***	0.0000	0.0013	-0.0002
			(2.045)	(3.164)	(0.027)	(0.703)	(-0.093)
Investment			-0.0025**	-0.0022**	-0.0002	-0.0051**	-0.0037
			(-2.281)	(-2.045)	(-0.072)	(-2.318)	(-1.637)
Momentum				0.0065***	0.0059***	0.0060***	0.0057***
				(4.083)	(3.687)	(3.758)	(3.589)
Reversal				0.0016	0.0015	0.0022	0.0020
				(0.414)	(0.391)	(0.580)	(0.546)
External Financing					-0.0025	0.0093***	0.0135***
					(-0.705)	(2.766)	(3.889)
Altman's Z					0.0021***	0.0054***	0.0060***
					(5.604)	(9.089)	(9.520)
Operating Leverage						-0.0055***	-0.0096***
						(-8.383)	(-6.864)
SUE						0.0003	0.0003
						(1.318)	(1.466)
Asset Turnover							0.0037***
							(2.733)
Accruals							-0.0292***
							(-6.545)
Constant	0.0141***	0.0208***	0.0176***	0.0135**	0.0042	0.0013	0.0005
	(3.452)	(3.155)	(2.753)	(2.125)	(0.625)	(0.184)	(0.078)
Observations	431,942	391,159	389,443	388,856	378,256	359,644	354,230
Average R^2	0.008	0.058	0.068	0.083	0.090	0.098	0.104

FIGURE IA4

Excluding market-based predictors. LASSO characteristics

The figures graphically show which characteristics from the universe of all characteristics for this period are selected by the LASSO procedure for the construction of the Exp LTGR5 EBITDA LASSO. Blue indicates that the characteristic is selected.

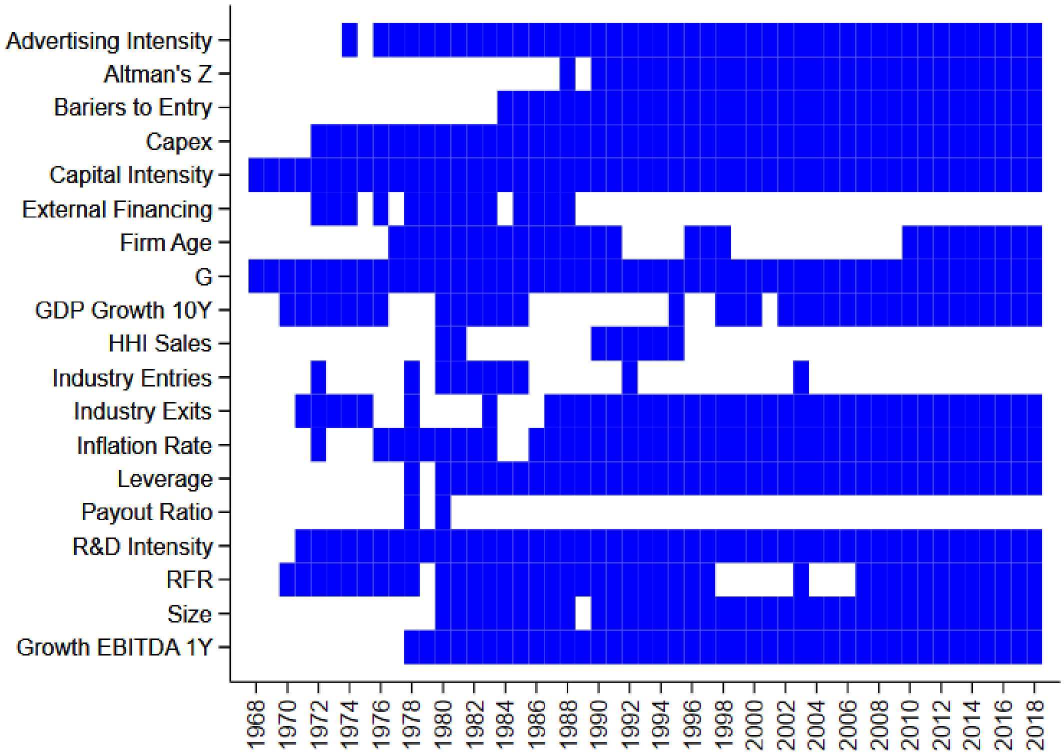


TABLE IA17

Excluding market-based predictors. FMB regressions 1968-2018

This table reports the average slopes from Fama and MacBeth (1973) regressions of monthly returns (in decimal) on expected long-term EBITDA growth rates from the LASSO model for five years (Exp LTGR5 EBITDA LASSO). The estimation procedure and variable constructions are described in Section V. All independent variables are lagged and winsorized month by month at the 1% level in both tails. We report t-statistics based on standard errors using Newey and West (1987) with optimal truncation lag chosen as suggested by Andrews (1991) in parentheses below the coefficient estimates. The symbols ***, ** and * indicate statistical significance at the 1%, 5%, and 10% levels, respectively.

Panel A (Microcaps)	1	2	3	4	5	6	7
Exp LTGR5 EBITDA LASSO	0.0314**	0.0153*	0.0122*	0.0186*	0.0519***	0.0805***	0.0714***
	(2.407)	(1.683)	(1.843)	(1.917)	(3.827)	(6.135)	(4.333)
Beta		0.0016	0.0017	0.0021**	0.0027***	0.0032***	0.0027**
		(1.453)	(1.549)	(1.967)	(2.618)	(3.014)	(2.535)
Size		-0.0033***	-0.0028***	-0.0031***	-0.0032***	-0.0037***	-0.0037***
		(-5.073)	(-4.261)	(-4.749)	(-4.844)	(-5.599)	(-5.502)
Book Market		0.0049***	0.0053***	0.0073***	0.0070***	0.0084***	0.0083***
		(4.805)	(5.016)	(7.548)	(7.228)	(8.692)	(8.604)
Profitability			0.0077***	0.0079***	0.0012	0.0052***	0.0025
			(4.792)	(5.070)	(0.696)	(3.079)	(1.219)
Investment			-0.0040***	-0.0024**	0.0062	-0.0003	-0.0001
			(-3.435)	(-2.130)	(0.667)	(-0.128)	(-0.036)
Momentum				0.0083***	0.0069***	0.0051***	0.0035**
				(6.071)	(5.022)	(3.641)	(2.217)
Reversal				0.0030	0.0011	-0.0007	-0.0037
				(0.973)	(0.360)	(-0.230)	(-1.006)
External Financing					-0.0154	-0.0016	0.0058
					(-0.787)	(-0.377)	(1.295)
Altman's Z					0.0033***	0.0076***	0.0079***
					(8.623)	(11.823)	(11.389)
Operating Leverage						-0.0081***	-0.0144***
						(-10.941)	(-8.710)
SUE						0.0016***	0.0017***
						(6.016)	(5.887)
Asset Turnover							0.0065***
							(4.233)
Accruals							-0.0234***
							(-5.216)
Constant	0.0132***	0.0485***	0.0406***	0.0413***	0.0310***	0.0298***	0.0311***
	(4.456)	(6.338)	(5.111)	(5.268)	(3.793)	(3.625)	(3.713)
Observations	390,498	354,382	352,414	349,827	348,916	337,143	328,466
Average R^2	0.006	0.035	0.041	0.051	0.058	0.066	0.079
Panel B (All-but-microcaps)							
Exp LTGR5 EBITDA LASSO	0.0069	-0.0021	0.0006	0.0003	0.0230**	0.0234***	0.0136
	(0.432)	(-0.166)	(0.059)	(0.033)	(2.464)	(2.638)	(1.248)
Beta		-0.0004	0.0001	-0.0003	0.0004	0.0008	0.0009
		(-0.310)	(0.068)	(-0.256)	(0.347)	(0.657)	(0.730)
Size		-0.0002	-0.0001	-0.0000	0.0003	0.0003	0.0002
		(-0.570)	(-0.386)	(-0.084)	(0.755)	(0.763)	(0.472)
Book Market		0.0005	0.0008	0.0026***	0.0028***	0.0045***	0.0052***
		(0.557)	(0.861)	(3.627)	(3.823)	(5.757)	(5.911)
Profitability			0.0039**	0.0053***	-0.0008	-0.0000	-0.0011
			(2.254)	(3.369)	(-0.488)	(-0.013)	(-0.543)
Investment			-0.0039***	-0.0033***	-0.0001	-0.0047**	-0.0036*
			(-3.305)	(-3.031)	(-0.039)	(-2.272)	(-1.706)
Momentum				0.0076***	0.0071***	0.0070***	0.0069***
				(4.804)	(4.424)	(4.439)	(4.127)
Reversal				0.0025	0.0021	0.0022	0.0020
				(0.714)	(0.599)	(0.621)	(0.547)
External Financing					-0.0045	0.0075**	0.0135***
					(-1.352)	(2.305)	(3.685)
Altman's Z					0.0025***	0.0063***	0.0072***
					(6.831)	(10.560)	(10.135)
Operating Leverage						-0.0060***	-0.0110***
						(-9.290)	(-7.066)
SUE						0.0004*	0.0004*
						(1.730)	(1.672)
Asset Turnover							0.0043***
							(3.058)
Accruals							-0.0306***
							(-6.525)
Constant	0.0110***	0.0150**	0.0122**	0.0095*	-0.0015	-0.0046	-0.0048
	(3.685)	(2.575)	(2.069)	(1.663)	(-0.253)	(-0.721)	(-0.765)
Observations	451,452	408,380	406,764	406,152	404,865	385,094	372,020
Average R^2	0.009	0.060	0.070	0.086	0.092	0.101	0.114

Additional corporate governance growth predictors

Firm's corporate governance can influence its long-term growth in a number of different ways. We therefore include additional corporate governance predictors related to characteristics about firm's CEO. We obtain information on CEO's holdings and characteristics from ExecuComp. In particular, we consider CEO ownership and compensation. Consistent with existing literature we proxy for ownership by constructing the CEO's fractional ownership from all stock holdings (*CEO Stock Ownership*). We also construct a variable that captures the alignment in compensation arrangements of the CEO and shareholders' interest, namely the CEO's fractional equity and stock options compensation from total compensation (*CEO Stk.&Opt. Compensation*).

We also include measures for CEO age and tenure, which are likely to be related to career concerns and managerial entrenchment. In particular, we include the natural logarithm of the age of the CEO (*CEO Age*) and the experience that the CEO has with the company measured as the natural logarithm of CEO tenure in years (*CEO Tenure*). We also include an indicator variable whether the CEO is also representative of the board during the respective fiscal year (*CEO Duality*) as a further measure of CEO entrenchment (see Jensen (1993)).

The dataset that covers CEO information has a much shorter time span, from 1992 to 2018, due to data availability related to CEO characteristics. This data set contains 21,460 firm-year observations for 2,151 unique firms. Table IA18 provides summary statistics, which are in line with our main summary statistics. We estimate Equation (2) by including these additional variables. Tables IA19 and IA20 show the results from these estimations. Overall, the results indicate that CEO characteristics do not have consistently statistically significant predictive power for subsequent long-term growth realizations and therefore do not contribute to our understanding of the determinants of corporate long-term growth. Thus, for brevity, we refrain from the interpretation of these results.

TABLE IA18

Robustness: descriptive statistics for the sample period 1992 to 2018

This table presents descriptive statistics for the variables used in the analyses for the sample period 1992 to 2018. *CEO Age* is defined as the natural logarithm of CEO age in years. *CEO Duality* is a dummy when the CEO is also a representative of the board of directors during the fiscal year. *CEO Stock Ownership* is the CEO's fractional ownership from all stock holdings. *CEO Stk.&Opt. Compensation* is the CEO's fractional equity and stock options compensation from total compensation. *CEO Tenure* is the natural logarithm of CEO tenure in years. To control for the effect of outliers in the subsequent estimations the variables are winsorized at the 1% level in both tails of the distribution.

1992-2018	Obs.	Mean	Stdev.	$Q_{0.01}$	$Q_{0.25}$	$Q_{0.50}$	$Q_{0.75}$	$Q_{0.99}$
Advertising Intensity$_t$	21460	.01	.03	0	0	0	.01	.15
Altman's Z$_t$	20745	2.09	1.3	-2.25	1.39	2.09	2.81	5.19
B/M$_t$	19683	.48	.37	.05	.25	.4	.61	1.79
Barriers to Entry$_t$	21460	.42	.16	.2	.27	.39	.54	.78
Beta$_t$	20766	1.22	.68	.03	.77	1.12	1.56	3.39
Capex$_t$	17959	.15	.15	.02	.07	.11	.18	.73
Capital Intensity$_t$	21409	.05	.05	0	.02	.04	.06	.21
Dividend Yield$_t$	21403	.01	.01	0	0	0	.02	.06
E/P$_t$	21436	.02	.2	-.5	.02	.04	.06	.16
External Financing$_t$	18097	.05	.15	-.27	-.03	.03	.1	.58
Firm Age$_t$	21431	2.11	.84	0	1.61	2.3	2.77	3.3
G$_t$	21420	.07	.28	-1.01	.03	.1	.16	.68
GDP Growth 10Y$_t$	21414	.03	.01	.01	.02	.03	.03	.04
Growth EBITDA 1Y$_t$	17469	.14	.54	-1.24	-.04	.1	.26	2.26
Growth EBITDA 5Y$_t$	9331	.1	.14	-.27	.03	.1	.16	.51
Growth EBITDA 10Y$_t$	4523	.09	.09	-.14	.05	.1	.14	.34
Growth Sales 1Y$_t$	18123	.11	.24	-.37	.01	.08	.18	.94
Growth Sales 5Y$_t$	9777	.09	.09	-.15	.04	.09	.14	.35
Growth Sales 10Y$_t$	4680	.09	.06	-.08	.05	.09	.12	.26
HHI Sales$_t$	21460	.16	.12	.07	.09	.12	.19	.73
Industry Entries$_t$	21460	.1	.16	0	0	.05	.12	1
Industry Exits$_t$	21460	.1	.18	0	.02	.06	.11	1
Inflation Rate$_t$	21412	.02	.01	0	.02	.02	.03	.04
Leverage$_t$	21362	.2	.17	0	.04	.19	.31	.64
Payout Ratio$_t$	21421	.18	.46	-.75	0	0	.29	1.94
R&D Intensity$_t$	21460	.05	.09	0	0	.01	.07	.41
RFR$_t$	21460	.04	.02	.02	.03	.04	.06	.07
Size$_t$	21460	7.38	1.59	4.44	6.21	7.25	8.4	11.43
ALTGF Earnings$_t$	21460	15.55	8.3	-1.9	10.7	14.25	19	45
Inst. Ownership$_t$	20523	.7	.2	.05	.57	.73	.86	.99
Inst. Ownership HHI$_t$	20525	.06	.05	.02	.03	.05	.06	.3
Number Analysts$_t$	21460	1.13	.81	0	.69	1.1	1.79	2.89
Number Patents$_t$	14762	1.22	1.72	0	0	0	2.3	6.33
CEO Age$_t$	20677	4.01	.13	3.66	3.91	4.01	4.09	4.3
CEO Duality$_t$	21460	.98	.15	0	1	1	1	1
CEO Stock Ownership$_t$	14659	3.55	6.93	0	.2	.73	2.92	35
CEO Stk.&Opt. Compensation$_t$	21301	.6	.29	0	.41	.68	.84	.98
CEO Tenure$_t$	18642	1.67	.94	0	1.1	1.79	2.4	3.5

TABLE IA19

Robustness: predicting long-term growth rates in Sales

This table reports the results from the long-term growth prediction estimation described in Section II D. The dependent variables are five and ten year annualized geometric growth rates in Sales (5 YS and 10 YS). The datasets consist of U.S. exchange-listed companies for three different dataset periods: i) 1963 to 2018, ii) 1981 to 2018, and iii) 1992 to 2018. To account for both cross-sectional and time-series serial correlation we report t-statistics in parenthesis that are based on standard errors clustered by firm and year (see Petersen (2009)). The symbols ***, ** and * indicate statistical significance at the 1%, 5%, and 10% levels, respectively.

	1	2	3	4	5	6
	5YS 1963-2018	10YS 1963-2018	5YS 1981-2018	10YS 1981-2018	5YS 1992-2018	10YS 1992-2018
Advertising Intensity$_t$	0.0918*	0.0202	0.0559	0.0272	-0.0818	0.0617
	(1.787)	(0.429)	(0.898)	(0.468)	(-0.625)	(0.390)
Altman's Z$_t$	0.0033**	0.0027**	-0.0036*	-0.0041*	-0.0097***	-0.0102**
	(2.273)	(2.632)	(-1.936)	(-1.955)	(-3.241)	(-2.154)
B/M$_t$	-0.0169***	-0.0155***	-0.0340***	-0.0279***	-0.0474***	-0.0461***
	(-4.387)	(-6.095)	(-7.761)	(-4.497)	(-5.873)	(-4.442)
Barriers to Entry$_t$	0.2285***	0.1823***	0.1726***	0.0805**	0.1006	0.0459
	(6.341)	(6.719)	(3.732)	(2.128)	(1.359)	(0.727)
Beta$_t$	-0.0031	-0.0027	-0.0074**	-0.0083***	-0.0035	0.0032
	(-1.565)	(-1.475)	(-2.605)	(-2.872)	(-0.666)	(0.622)
Capex$_t$	0.0293***	0.0234***	0.0256**	0.0209*	0.0050	0.0217
	(4.010)	(4.534)	(2.384)	(1.968)	(0.286)	(1.325)
Capital Intensity$_t$	0.1716**	0.1437***	0.0739	0.0222	0.0905	-0.0917
	(2.656)	(2.910)	(1.510)	(0.404)	(1.144)	(-0.816)
Dividend Yield$_t$	0.3330***	0.2117***	0.1255	-0.0367	0.0398	0.0755
	(4.046)	(3.388)	(1.027)	(-0.239)	(0.248)	(0.225)
E/P$_t$	0.0277*	0.0224**	-0.0174	0.0034	-0.0457***	-0.1002**
	(1.894)	(2.129)	(-1.157)	(0.169)	(-3.821)	(-2.225)
External Financing$_t$	0.0388***	0.0138***	0.0220**	0.0126*	0.0194	0.0097
	(4.529)	(2.703)	(2.683)	(1.766)	(1.019)	(0.700)
Firm Age$_t$	-0.0154***	-0.0140***	-0.0059*	-0.0034	-0.0145**	-0.0056
	(-6.428)	(-7.419)	(-1.832)	(-0.885)	(-2.481)	(-0.836)
G$_t$	0.0317***	0.0265***	0.0540***	0.0373***	0.0724***	0.0717***
	(5.561)	(4.724)	(5.090)	(3.172)	(4.702)	(5.394)
GDP Growth 10Y$_t$	0.7645	1.7632***	-0.2890	0.4019	-0.0381	-2.1935*
	(1.520)	(3.531)	(-0.674)	(1.115)	(-0.036)	(-1.829)
Growth Sales 1Y$_t$	-0.0025	-0.0038	0.0022	-0.0005	-0.0173	-0.0314**
	(-0.509)	(-1.113)	(0.237)	(-0.057)	(-1.452)	(-2.175)
HHI Sales$_t$	-0.0133	0.0169	0.0286	0.0449	-0.0327	-0.0136
	(-0.738)	(0.847)	(1.026)	(1.697)	(-0.689)	(-0.372)
Industry Entries$_t$	-0.0139	0.0007	-0.0391	-0.0298**	-0.0401	-0.0288*
	(-0.319)	(0.032)	(-1.559)	(-2.407)	(-0.882)	(-1.925)
Industry Exits$_t$	-0.1680***	-0.0944***	-0.1062**	-0.0111	-0.0258	-0.0500
	(-3.728)	(-3.385)	(-2.729)	(-0.542)	(-0.565)	(-1.265)
Inflation Rate$_t$	0.1208	0.1964*	-0.4294*	0.2230	-0.4981	-0.5195
	(0.527)	(1.813)	(-1.719)	(1.411)	(-1.498)	(-1.324)
Leverage$_t$	-0.0601***	-0.0514***	-0.0588***	-0.0504***	-0.0699***	-0.0873***
	(-6.848)	(-6.634)	(-4.697)	(-3.287)	(-3.221)	(-3.956)
Payout Ratio$_t$	0.0006	0.0042**	0.0018	-0.0005	0.0005	0.0051
	(0.252)	(2.195)	(0.659)	(-0.180)	(0.177)	(1.406)
R&D Intensity$_t$	-0.0057	-0.0054	0.0414	0.0154	-0.0754	-0.1256**
	(-1.384)	(-1.172)	(1.683)	(0.556)	(-1.556)	(-2.473)
RFR$_t$	0.0553	0.1136	0.1416	-0.0363	-0.5287	-0.3979
	(0.351)	(0.977)	(1.021)	(-0.303)	(-0.991)	(-0.904)
Size$_t$	-0.0016	-0.0006	-0.0069***	-0.0094***	-0.0033	-0.0041
	(-1.604)	(-0.646)	(-3.182)	(-4.798)	(-1.063)	(-1.003)
ALTGF Earnings$_t$			0.0009***	0.0011***	0.0017***	0.0018**
			(2.796)	(3.278)	(3.107)	(2.731)
Inst. Ownership$_t$			-0.0027	-0.0100	0.0297	0.0130
			(-0.309)	(-1.011)	(1.577)	(0.677)
Inst. Ownership HHI$_t$			-0.0306	0.0263	0.0239	0.0904
			(-1.350)	(1.022)	(0.424)	(0.754)
Number Analysts$_t$			0.0036*	0.0070***	0.0067*	0.0093***
			(1.711)	(3.446)	(1.862)	(3.318)
Number Patents$_t$			-0.0009	0.0003	0.0015	0.0053*
			(-0.732)	(0.255)	(0.612)	(1.811)
CEO Age$_t$					-0.0222	0.0134
					(-1.065)	(0.526)
CEO Duality$_t$					0.0164	0.0417*
					(1.087)	(1.756)
CEO Stock Ownership$_t$					0.0005	0.0004
					(1.155)	(1.063)
CEO Stk.&Opt. Compensation$_t$					-0.0147	-0.0186**
					(-1.548)	(-2.774)
CEO Tenure$_t$					-0.0052	-0.0090*
					(-1.398)	(-2.060)
Observations	48,373	30,362	12,059	6,386	2,494	994
Adjusted R^2	0.112	0.163	0.147	0.222	0.181	0.377
Industry Dummies	FF48	FF48	FF48	FF48	FF48	FF48

TABLE IA20

Robustness: predicting long-term growth rates in Ebitda

This table reports the results from the long-term growth prediction estimation described in Section II D. The dependent variables are five and ten year annualized geometric growth rates in Ebitda (5 YE and 10 YE). The datasets consist of U.S. exchange-listed companies for three different periods: i) 1963 to 2018, ii) 1981 to 2018, and iii) 1992 to 2018. To account for both cross-sectional and time-series serial correlation we report t-statistics in parenthesis that are based on standard errors clustered by firm and year (see Petersen (2009)). The symbols ***, ** and * indicate statistical significance at the 1%, 5%, and 10% levels, respectively.

	1	2	3	4	5	6
	5YE 1963-2018	10YE 1963-2018	5YE 1981-2018	10YE 1981-2018	5YE 1992-2018	10YE 1992-2018
Advertising Intensity$_t$	0.0737	0.0640	0.1411	0.1205	-0.0629	0.0741
	(0.999)	(0.983)	(1.650)	(1.623)	(-0.372)	(0.321)
Altman's Z$_t$	-0.0135***	-0.0047**	-0.0200***	-0.0108***	-0.0292***	-0.0109*
	(-5.232)	(-2.394)	(-5.763)	(-3.168)	(-5.903)	(-1.871)
B/M$_t$	0.0118***	0.0016	-0.0196**	-0.0151*	-0.0456***	-0.0468***
	(3.149)	(0.478)	(-2.548)	(-1.863)	(-3.570)	(-3.106)
Barriers to Entry$_t$	0.2220***	0.1046***	0.2064***	0.0817	0.1185	0.0014
	(5.134)	(3.656)	(2.962)	(1.535)	(1.146)	(0.016)
Beta$_t$	-0.0058*	-0.0010	-0.0044	-0.0090*	0.0014	0.0021
	(-1.789)	(-0.384)	(-0.882)	(-1.976)	(0.178)	(0.305)
Capex$_t$	0.0084	0.0177***	-0.0085	0.0317**	-0.0459	0.0270
	(0.839)	(3.209)	(-0.491)	(2.183)	(-1.373)	(1.147)
Capital Intensity$_t$	0.0226	0.0208	-0.1489	-0.1668	-0.3168*	-0.3399
	(0.473)	(0.445)	(-1.402)	(-1.469)	(-1.913)	(-1.549)
Dividend Yield$_t$	-0.0551	0.1107	-0.0254	-0.0827	-0.0379	0.1197
	(-0.476)	(1.403)	(-0.141)	(-0.398)	(-0.118)	(0.268)
E/P$_t$	-0.0430	-0.0801***	-0.0243	-0.1743***	-0.0148	-0.2262**
	(-0.898)	(-3.006)	(-0.574)	(-3.516)	(-0.331)	(-2.319)
External Financing$_t$	0.0150	-0.0074	0.0148	0.0021	0.0184	0.0059
	(1.352)	(-1.071)	(0.863)	(0.210)	(0.809)	(0.304)
Firm Age$_t$	-0.0063**	-0.0082***	-0.0010	-0.0023	-0.0157*	-0.0005
	(-2.175)	(-3.883)	(-0.207)	(-0.474)	(-1.842)	(-0.044)
G$_t$	-0.0382***	-0.0140	-0.0470***	-0.0145	-0.0078	0.0275
	(-3.559)	(-1.194)	(-3.063)	(-0.739)	(-0.256)	(0.934)
GDP Growth 10Y$_t$	0.3101	1.8187***	-0.4669	0.7210	-0.0798	-2.7806
	(0.517)	(4.087)	(-0.615)	(1.443)	(-0.057)	(-1.445)
Growth EBITDA 1Y$_t$	-0.0184***	-0.0086***	-0.0217***	-0.0034	-0.0265***	-0.0262***
	(-8.732)	(-5.840)	(-4.036)	(-0.658)	(-3.165)	(-3.450)
HHI Sales$_t$	-0.0069	0.0239	0.0656	0.0494	-0.0381	0.0566
	(-0.271)	(1.079)	(1.429)	(1.433)	(-0.611)	(0.861)
Industry Entries$_t$	0.0100	-0.0211	-0.0469	-0.0451***	-0.0524	-0.0081
	(0.185)	(-1.009)	(-1.327)	(-2.782)	(-0.850)	(-0.276)
Industry Exits$_t$	-0.2628***	-0.1067***	-0.1672***	-0.0272	-0.0831	-0.1183**
	(-4.634)	(-3.128)	(-2.873)	(-0.717)	(-1.239)	(-2.160)
Inflation Rate$_t$	0.0340	0.1274	-0.1498	0.6226***	-0.6948	-0.1033
	(0.132)	(1.335)	(-0.385)	(2.860)	(-1.455)	(-0.126)
Leverage$_t$	-0.0885***	-0.0573***	-0.1056***	-0.0684***	-0.1297***	-0.0809**
	(-7.177)	(-5.815)	(-5.025)	(-3.589)	(-3.624)	(-2.870)
Payout Ratio$_t$	0.0036	0.0059**	0.0025	0.0022	0.0052	0.0132**
	(0.917)	(2.182)	(0.827)	(0.843)	(0.567)	(2.292)
R&D Intensity$_t$	0.2011***	0.0635	0.1464*	0.0117	0.0019	-0.1550
	(4.505)	(1.529)	(1.843)	(0.177)	(0.016)	(-1.336)
RFR$_t$	0.0622	0.1713	-0.0520	-0.1758	-0.7972	-0.8796
	(0.364)	(1.435)	(-0.263)	(-1.135)	(-1.135)	(-1.141)
Size$_t$	-0.0065***	-0.0031***	-0.0077**	-0.0110***	-0.0035	-0.0079
	(-5.302)	(-2.994)	(-2.688)	(-4.202)	(-0.791)	(-1.353)
ALTGF Earnings$_t$			0.0018***	0.0005	0.0020**	0.0014
			(2.936)	(0.960)	(2.190)	(1.526)
Inst. Ownership$_t$			-0.0209	-0.0169	-0.0121	-0.0257
			(-1.555)	(-1.251)	(-0.376)	(-0.833)
Inst. Ownership HHI$_t$			0.0227	0.0431	0.0290	0.1699
			(0.622)	(1.122)	(0.300)	(0.889)
Number Analysts$_t$			0.0020	0.0089***	0.0061	0.0131**
			(0.623)	(3.694)	(1.226)	(2.843)
Number Patents$_t$			0.0030	0.0038**	0.0052	0.0088**
			(1.576)	(2.230)	(1.220)	(2.199)
CEO Age$_t$					0.0341	0.0345
					(0.901)	(0.851)
CEO Duality$_t$					0.0301	0.1069**
					(1.444)	(2.151)
CEO Stock Ownership$_t$					0.0007	0.0002
					(0.896)	(0.243)
CEO Stk.&Opt. Compensation$_t$					-0.0082	-0.0131
					(-0.591)	(-1.174)
CEO Tenure$_t$					-0.0118*	-0.0117
					(-1.958)	(-1.538)
Observations	40,550	25,951	11,085	6,046	2,336	948
Adjusted R^2	0.058	0.080	0.072	0.112	0.098	0.184
Industry Dummies	FF48	FF48	FF48	FF48	FF48	FF48

Portfolio sorts

As another robustness test to the estimations in Section V we conduct portfolio-sort tests as follows. We allocate firms into deciles according to their long-term growth forecasts for EBITDA. We then calculate the returns of these portfolios for a one-year holding period. For the one-year holding period, the portfolios are rebalanced once a year. We ensure that we use information that was publicly available on each rebalancing date in accordance with previous literature (see e.g., Lakonishok et al. (1994) and Dechow and Sloan (1997)).

We report the time-series average excess returns of each decile as well as the returns from a strategy that goes long the stocks in the top decile and short the ones in the bottom decile, where each equally-weighted decile is based on the long-term growth forecast in the respective operating performance variable.[2] We also report alphas in four variations: 1.) CAPM alphas - time-series trading strategy average adjusted for the return of the market portfolio, 2.) 3-f alphas - time-series trading strategy average returns adjusted for the three Fama-French factors (Fama and French, 1993), 3.) 5-f alphas - time-series trading strategy average returns adjusted for the five Fama-French factors (Fama and French, 2015), 4.) 6-f alphas - time-series trading strategy average returns adjusted for the five Fama-French factors and the momentum factor. We report t-statistics based on standard errors using Newey and West (1987) with optimal truncation lag chosen as suggested by Andrews (1991) in parentheses below the coefficient estimates.

Tables IA21 and IA22 in the Internet Appendix report the average monthly excess returns as well as monthly abnormal returns for the ten stock portfolios. Panel A reports results for *Exp LTGR5 EBITDA LASSO* and Panel B for *Exp LTGR10 EBITDA LASSO*,

[2]We concentrate on equally-weighted (1/N) portfolio returns to eliminate any bias towards large-cap, possibly mature and/or overvalued stocks. We have also computed value-weighted portfolio returns and found weaker excess and abnormal return results (untabulated). These results indicate that the stock performance is concentrated in smaller companies with high growth potential.

respectively. The last column reports these returns for the long-short portfolio (i.e., the average excess (abnormal) return of portfolio ten minus the average excess (abnormal) return of portfolio one). The long-short portfolio produces positive and statistically significant abnormal returns. For example, using information for the sample period 1963-2018, the 6-f alphas which are based on *Exp LTGR5 EBITDA LASSO* are 0.91% per month. These results are positive and robust throughout the alternative estimations and highly statistically significant in the 5-f and 6-f alpha estimations.[3] The portfolio sorts based on the *Exp LTGR10 EBITDA LASSO* variable produce comparable 6-f alphas of 0.85% per month. Using information from the shorter period, 1981 - 2018, the 6-f alphas based on *Exp LTGR5 EBITDA LASSO* are 1.08% per month, and the 6-f alphas based on *Exp LTGR10 EBITDA LASSO* are 1.00% per month.[4] Given the magnitude of these alphas, they are likely to survive if we account for transaction costs, etc.[5] This even more so, since the trading strategy only requires portfolio rebalancing once annually. Overall, these results provide support for the findings in Section V.

[3]The *t*-statistics of the 5-f and 6-f alphas are greater than three, as advocated by Harvey et al. (2016). The long-short portfolio returns adjusted for multiple factors have somewhat higher average returns compared to the raw long-short portfolio returns. This is also consistent with the literature (see e.g., Wang (2019)).

[4]We note that the alphas in some of the tables are positive for all decile portfolios. This is a deficiency of the portfolio sorting methodology that results from the fact that the set of firms in the market or factor portfolios is different from the set of firms in the test portfolio. In particular, a company is required to have a valid set of long-term growth predictors to enter the test portfolios. The Fama and MacBeth (1973) tests in Section V alleviate this deficiency by providing stock-level evidence.

[5]For a valuable discussion on anomalies, trading costs, and cost mitigation techniques see Novy-Marx and Velikov (2015).

TABLE IA21

Robustness: decile portfolio sorts for the period 1963-2018

The tables present results for equally-weighted one year portfolio trading strategies based on expected growth rate in EBITDA. Panel A reports results for expected long-term growth derived from the LASSO model in EBITDA for five years and Panel B for ten years, respectively. The results are reported in decimal in five variations: 1.) Excess (E) returns, 2.) CAPM alphas, 3.) Fama-French (3-f) alphas, 4.) Fama-French (5-f) alphas 5.) Fama-French-Carhart (6-f) alphas. We report t-statistics based on standard errors using Newey and West (1987) with optimal truncation lag chosen as suggested by Andrews (1991) in parentheses below the coefficient estimates.

Panel A	P1	P2	P3	P4	P5	P6	P7	P8	P9	P10	P10-P1
E Return	0.0103	0.0095	0.0088	0.0094	0.0089	0.0098	0.0101	0.0096	0.0112	0.0165	0.0062
	(3.5144)	(3.6317)	(3.6009)	(3.8709)	(3.5930)	(3.9093)	(3.9456)	(3.4673)	(3.7681)	(4.3939)	(2.2082)
CAPM alpha	0.0039	0.0032	0.0028	0.0034	0.0028	0.0037	0.0039	0.0032	0.0045	0.0092	0.0052
	(2.5114)	(2.4003)	(2.3005)	(2.8356)	(2.3873)	(3.0399)	(3.0925)	(2.3314)	(2.9230)	(3.8993)	(2.0875)
3-f alpha	0.0028	0.0016	0.0012	0.0019	0.0014	0.0025	0.0026	0.0021	0.0039	0.0080	0.0051
	(2.4719)	(1.8931)	(1.4991)	(2.9553)	(1.9444)	(3.7802)	(3.7847)	(2.6510)	(3.8661)	(4.5379)	(2.1184)
5-f alpha	0.0012	0.0003	0.0001	0.0007	0.0003	0.0018	0.0022	0.0020	0.0041	0.0092	0.0080
	(1.1837)	(0.3662)	(0.1649)	(1.1023)	(0.4445)	(2.5933)	(3.0115)	(2.5911)	(3.7160)	(4.9436)	(3.5834)
6-f alpha	0.0021	0.0013	0.0009	0.0016	0.0015	0.0029	0.0033	0.0034	0.0057	0.0113	0.0091
	(2.2172)	(1.6729)	(1.2415)	(2.6869)	(2.3839)	(4.4957)	(4.8157)	(4.6624)	(5.3510)	(5.5221)	(3.8332)
Beta CAPM	1.1997	1.1069	1.0607	1.0621	1.0695	1.0873	1.0886	1.1423	1.1811	1.2923	0.0994
	(28.7055)	(24.6665)	(25.7135)	(27.5380)	(26.8098)	(31.1793)	(28.2499)	(30.0924)	(30.8736)	(22.3647)	(1.7730)

Panel B	P1	P2	P3	P4	P5	P6	P7	P8	P9	P10	P10-P1
E Return	0.0114	0.0108	0.0103	0.0097	0.0106	0.0102	0.0105	0.0109	0.0124	0.0157	0.0042
	(4.0026)	(3.9615)	(3.9576)	(3.8111)	(4.2282)	(4.0182)	(4.2093)	(4.0139)	(4.1447)	(4.1266)	(2.7748)
CAPM alpha	0.0041	0.0033	0.0029	0.0024	0.0034	0.0030	0.0038	0.0035	0.0048	0.0078	0.0036
	(2.6552)	(2.3578)	(2.2023)	(1.966)8	(2.9203)	(2.4117)	(2.8631)	(2.5817)	(3.0463)	(3.1802)	(2.6819)
3-f alpha	0.0021	0.0021	0.0021	0.0017	0.0027	0.0023	0.0032	0.0029	0.0041	0.0063	0.0042
	(2.0438)	(2.5437)	(2.3713)	(2.3553)	(3.8456)	(3.0863)	(4.1706)	(3.7068)	(3.8870)	(3.6319)	(2.8693)
5-f alpha	0.0009	0.0011	0.0005	0.0004	0.0015	0.0017	0.0021	0.0027	0.0039	0.0080	0.0070
	(0.7938)	(1.2199)	(0.5767)	(0.5127)	(2.0794)	(2.0675)	(2.7086)	(2.9503)	(3.6847)	(4.1826)	(3.3292)
6-f alpha	0.0017	0.0021	0.0013	0.0010	0.0023	0.0025	0.0029	0.0036	0.0052	0.0102	0.0085
	(1.6025)	(2.7950)	(1.7390)	(1.5920)	(3.3741)	(3.3631)	(3.9874)	(4.6800)	(5.0708)	(4.9556)	(3.5424)
Beta CAPM	1.1806	1.0860	1.0674	1.0471	1.0410	1.0437	1.0559	1.0727	1.0946	1.2353	0.0711
	(27.8572)	(28.0697)	(29.7321)	(30.9372)	(35.2026)	(32.3039)	(32.0928)	(33.3956)	(26.9516)	(18.9744)	(1.1834)

TABLE IA22

Robustness: decile portfolio sorts for the period 1981-2018

The tables present results for equally-weighted one year portfolio trading strategies based on expected growth rate in EBITDA. Panel A reports results for expected long-term growth derived from the LASSO model in EBITDA for five years and Panel B for ten years, respectively. The results are reported in decimal in five variations: 1.) Excess (E) returns, 2.) CAPM alphas, 3.) Fama-French (3-f) alphas, 4.) Fama-French (5-f) alphas 5.) Fama-French-Carhart (6-f) alphas. We report t-statistics based on standard errors using Newey and West (1987) with optimal truncation lag chosen as suggested by Andrews (1991) in parentheses below the coefficient estimates.

Panel A	P1	P2	P3	P4	P5	P6	P7	P8	P9	P10	P10-P1
E Return	0.0109	0.0094	0.0091	0.0089	0.0095	0.0101	0.0088	0.0094	0.0123	0.0159	0.0049
	(2.8275)	(3.2559)	(3.2906)	(3.2945)	(3.4938)	(3.7251)	(2.9525)	(2.8825)	(3.2666)	(3.2782)	(1.8250)
CAPM alpha	0.0035	0.0026	0.0024	0.0022	0.0027	0.0031	0.0011	0.0010	0.0032	0.0058	0.0026
	(1.3698)	(1.4184)	(1.4324)	(1.4164)	(1.7966)	(2.1646)	(0.7698)	(0.6602)	(1.5665)	(1.9300)	(1.1398)
3-f alpha	0.0026	0.0015	0.0014	0.0012	0.0020	0.0025	0.0008	0.0009	0.0037	0.0062	0.0042
	(1.1810)	(1.1318)	(1.1674)	(1.0937)	(1.8522)	(2.3377)	(0.7699)	(0.8719)	(2.4616)	(2.8658)	(1.9135)
5-f alpha	-0.0006	-0.0009	-0.0008	-0.0007	0.0001	0.0012	0.0001	0.0019	0.0055	0.0091	0.0101
	(-0.4312)	(-0.7815)	(-0.7802)	(-0.7110)	(0.1107)	(1.1061)	(0.1164)	(1.7541)	(3.9997)	(4.4703)	(4.6164)
6-f alpha	0.0005	0.0004	0.0002	0.0003	0.0011	0.0021	0.0013	0.0032	0.0066	0.0114	0.0108
	(0.3203)	(0.4027)	(0.2612)	(0.3603)	(1.3394)	(2.1559)	(1.3222)	(3.3182)	(4.8102)	(5.5381)	(4.8998)
Beta CAPM	1.1521	1.0084	0.9894	1.0038	1.0146	1.0340	1.1381	1.2500	1.3444	1.4936	0.3977
	(17.9639)	(17.9195)	(20.2210)	(21.1795)	(23.6674)	(27.1276)	(29.5315)	(25.9110)	(24.2890)	(18.0767)	(3.9168)

Panel B	P1	P2	P3	P4	P5	P6	P7	P8	P9	P10	P10-P1
E Return	0.0112	0.0097	0.0103	0.0102	0.0116	0.0106	0.0102	0.0099	0.0134	0.0172	0.0060
	(2.9019)	(2.7522)	(3.0013)	(3.1827)	(3.4110)	(3.1942)	(2.9853)	(2.5988)	(3.2964)	(3.1795)	(2.5314)
CAPM alpha	0.0028	0.0018	0.0027	0.0028	0.0041	0.0034	0.0030	0.0022	0.0052	0.0073	0.0043
	(1.1769)	(0.8943)	(1.3588)	(1.5034)	(2.2554)	(1.8941)	(1.5461)	(1.0708)	(2.2424)	(2.1518)	(2.1984)
3-f alpha	0.0014	0.0007	0.0016	0.0016	0.0032	0.0024	0.0019	0.0013	0.0047	0.0074	0.0060
	(0.7461)	(0.4342)	(1.0381)	(1.2193)	(2.5116)	(1.9735)	(1.4493)	(0.8364)	(2.9204)	(2.8214)	(2.9779)
5-f alpha	-0.0006	-0.0008	-0.0004	-0.0001	0.0013	0.0012	0.0004	0.0004	0.0051	0.0091	0.0092
	(-0.3179)	(-0.5512)	(-0.2498)	(-0.1004)	(0.9578)	(0.9521)	(0.3448)	(0.2427)	(3.1707)	(3.7351)	(3.5775)
6-f alpha	0.0011	0.0005	0.0009	0.0008	0.0020	0.0019	0.0013	0.0015	0.0063	0.0112	0.0100
	(0.6856)	(0.3650)	(0.6801)	(0.7658)	(1.7120)	(1.6719)	(1.1056)	(1.0532)	(4.1314)	(4.6796)	(3.7088)
Beta CAPM	1.2616	1.1257	1.0962	1.0669	1.0696	1.0246	1.0281	1.1005	1.1744	1.4676	0.2087
	(18.9055)	(22.0643)	(22.1757)	(21.7581)	(26.1080)	(22.2472)	(22.2795)	(21.0649)	(24.5889)	(16.9606)	(2.1969)

TABLE IA23

Robustness: portfolios excluding predictors based on market information

The tables present results for equally-weighted one year portfolio trading strategies based on expected growth rate in EBITDA. Panel A reports results for expected long-term growth derived from the LASSO model in EBITDA for five years and Panel B for ten years, respectively. The results are reported in decimal in five variations: 1.) Excess (E) returns, 2.) CAPM alphas, 3.) Fama-French (3-f) alphas, 4.) Fama-French (5-f) alphas 5.) Fama-French-Carhart (6-f) alphas. We report t-statistics based on standard errors using Newey and West (1987) with optimal truncation lag chosen as suggested by Andrews (1991) in parentheses below the coefficient estimates.

Panel A	P1	P2	P3	P4	P5	P6	P7	P8	P9	P10	P10-P1
E Return	0.0090	0.0106	0.0103	0.0099	0.0108	0.0108	0.0111	0.0120	0.0136	0.0155	0.0064
	(3.2482)	(4.1718)	(4.1120)	(3.9545)	(4.3449)	(4.2258)	(4.2744)	(4.3207)	(4.4099)	(4.0899)	(2.2401)
CAPM alpha	0.0026	0.0038	0.0037	0.0033	0.0043	0.0041	0.0043	0.0050	0.0062	0.0072	0.0043
	(2.0453)	(3.1936)	(3.0228)	(2.6665)	(3.4451)	(3.3637)	(3.2939)	(3.5488)	(3.6927)	(3.2219)	(2.0138)
3-f alpha	0.0016	0.0022	0.0019	0.0014	0.0025	0.0022	0.0025	0.0034	0.0048	0.0057	0.0040
	(1.8952)	(2.6682)	(2.4244)	(1.8832)	(3.5259)	(3.5606)	(3.8080)	(4.4035)	(4.7306)	(3.6371)	(2.1073)
5-f alpha	0.0002	0.0007	0.0003	0.0001	0.0015	0.0017	0.0023	0.0034	0.0056	0.0078	0.0075
	(0.3073)	(0.8737)	(0.4042)	(0.1042)	(1.9217)	(2.3777)	(3.2421)	(4.4805)	(5.3172)	(4.8592)	(4.8064)
6-f alpha	0.0012	0.0014	0.0010	0.0010	0.0024	0.0026	0.0032	0.0041	0.0068	0.0098	0.0086
	(1.5769)	(2.0681)	(1.4588)	(1.5836)	(3.6038)	(3.9024)	(4.7839)	(5.5912)	(6.4422)	(5.8020)	(5.0198)
Beta CAPM	1.1960	1.0872	1.0587	1.0490	1.0479	1.0612	1.0759	1.1122	1.1798	1.3336	0.1663
	(28.2754)	(28.3555)	(28.8565)	(28.7481)	(30.2281)	(28.3980)	(28.4532)	(29.5832)	(27.7551)	(23.4626)	(2.9394)

Panel B	P1	P2	P3	P4	P5	P6	P7	P8	P9	P10	P10-P1
E Return	0.0109	0.0107	0.0100	0.0101	0.0111	0.0105	0.0107	0.0113	0.0126	0.0147	0.0038
	(3.8156)	(4.0388)	(3.8390)	(3.8854)	(4.3052)	(4.1601)	(3.9960)	(4.1845)	(4.1541)	(3.8282)	(2.6638)
CAPM alpha	0.0035	0.0033	0.0026	0.0028	0.0038	0.0034	0.0034	0.0039	0.0049	0.0058	0.0022
	(2.3937)	(2.4690)	(2.0560)	(2.1304)	(2.9190)	(2.7459)	(2.5343)	(2.8486)	(3.0781)	(2.4921)	(2.3739)
3-f alpha	0.0018	0.0020	0.0017	0.0019	0.0031	0.0026	0.0027	0.0032	0.0042	0.0055	0.0037
	(1.8353)	(2.2204)	(2.2700)	(2.2788)	(3.9787)	(3.8880)	(3.4408)	(4.1124)	(4.2322)	(3.2099)	(2.7072)
5-f alpha	0.0003	0.0005	0.0002	0.0006	0.0018	0.0020	0.0022	0.0034	0.0046	0.0076	0.0073
	(0.3126)	(0.5111)	(0.2863)	(0.7047)	(2.2866)	(2.6493)	(2.4794)	(4.2959)	(4.3570)	(4.1706)	(3.9028)
6-f alpha	0.0010	0.0013	0.0010	0.0014	0.0026	0.0029	0.0030	0.0043	0.0060	0.0098	0.0087
	(1.0476)	(1.7097)	(1.4749)	(1.7409)	(3.9567)	(4.3680)	(3.7716)	(5.8681)	(6.3009)	(5.2180)	(4.2705)
Beta CAPM	1.1840	1.1129	1.0703	1.0628	1.0509	1.0338	1.0631	1.0642	1.1187	1.2967	0.1205
	(29.1535)	(29.0269)	(29.9394)	(29.9975)	(30.1934)	(33.0275)	(31.6609)	(31.4618)	(27.3500)	(21.8628)	(1.8894)