EPS-Maximizing Capital Structure[*]

Itzhak Ben-David[†] and Alex Chinco[‡]

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Abstract

Textbook corporate-finance theory assumes that managers maximize the NPV (net present value) of expected future equity payouts. However, in practice, the people running large public companies often seem more concerned with increasing EPS (earnings per share). Perhaps this is a mistake. Or maybe EPS growth is a good second-best proxy for value creation. Whatever the reason, we show that the simplest possible EPS-maximizing model predicts important financing decisions, such as leverage, new issuance, share repurchases, and cash holdings. The principle of EPS maximization leads to a novel microfoundation for value and growth. Managers with an earnings yield above the riskfree rate view equity as expensive (value stocks) and adopt one set of EPS-maximizing policies. Those below this threshold see equity as cheap (growth stocks) and take a different approach to maximizing EPS. We examine the data and find strong empirical support for our model's key predictions.

Keywords: Earnings Per Share, Earnings Yield, Value vs. Growth, Leverage, Equity Issuance, Share Repurchases, Accretion, Dilution, Cash Holdings

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[†]The Ohio State University and NBER. ben-david.1@osu.edu
[‡]Michigan State University. alexchinco@gmail.com

1 Introduction

Textbook corporate-finance theory assumes that managers maximize the net present value (NPV) of expected future equity payouts. However, in practice, the people in charge of large public corporations spend much of their time talking about a different objective. "Corporate chief executives are playing a game that doesn't involve just showing high and ever-rising earnings. It involves showing high and ever-rising earnings per share (EPS)."[1]

EPS growth might be a second-best proxy for value creation, or maybe it is just a mistake. Whatever the reason, managers "need a simple metric of performance… [and] the market has selected EPS to fulfill this role" (Almeida, 2019). Corporate executives "view earnings, especially EPS, as the key metric for an external audience" (Graham, Harvey, and Rajgopal, 2005).

In this paper, we model managers as EPS maximizers and derive the consequences that follow. We study a static model where there are no frictions, information asymmetries, or pricing errors. If our model had an NPV-maximizing manager, it would explain nothing. And yet, by swapping out max NPV for max EPS, we are able to predict a number of important financing choices, such as leverage, new issuance, share repurchases, and cash holdings.

We appreciate that many academic researchers have strong views about EPS. We are not arguing that corporate executives should be maximizing EPS, nor do we claim that EPS accretion is the only thing that matters. Our point is that many empirical patterns fall neatly into place when viewed through the lens of the simplest possible max EPS model.

In Section 2, we begin by writing down a standard NPV-centric capital-structure model. A manager chooses how much leverage to use, $\ell \in [0, 1)$, when buying assets to form a company. She expects the resulting firm to produce a net operating income of $\mathbb{E}[\text{NOI}]$ over the following year. The manager borrows $\text{LoanAmt}(\ell)$ and finances the rest of her asset purchase by issuing $\#\text{Shares}(\ell)$, taking the interest rate $\text{i}(\ell)$ and share price as given.

[1] Allan Sloan "The real reason US airlines and Boeing went for a combined $73.7 billion in buybacks." *The Washington Post.* Apr 15, 2020.

We have pared this model down to the bare essentials. All Modigliani and Miller (1958) assumptions hold, so there is no single NPV-maximizing choice of leverage. Modigliani and Miller (1958) takes it for granted that CEOs think about shareholder value in the same way that debt markets price corporate bonds. And, when everyone measures their slice in the same way, there is no way to make the whole table happier by dividing up the pie differently. For one person to get a bigger slice, someone else must get a smaller one.

In Section 3, we show this zero-sum logic no longer applies when different stakeholders use different valuation metrics. We show that, even though all Modigliani and Miller (1958) assumptions hold, there is still a unique choice of leverage that maximizes

$$\mathrm{EPS}(\ell) \overset{\text{def}}{=} \underbrace{\big(\mathbb{E}[\mathrm{NOI}] - \mathrm{i}(\ell) \cdot \mathrm{LoanAmt}(\ell)\big)}_{\mathbb{E}[\mathrm{Earnings}(\ell)]} \;/\; \#\mathrm{Shares}(\ell) \tag{1}$$

Imagine that an EPS-maximizing manager initially plans on using leverage ℓ. But then, before finalizing the paperwork, she decides to check if she can increase her EPS by adjusting her leverage a tiny amount. She will view her firm's earnings yield as the cost of equity capital, $\mathrm{EY}(\ell) \overset{\text{def}}{=} \frac{\mathrm{EPS}(\ell)}{\mathrm{Price}} = \frac{\mathbb{E}[\mathrm{Earnings}(\ell)]}{\mathrm{MarketCap}(\ell)}$. If her shares are currently trading at Price = \$1/sh, then she has to promise a single share's worth of earnings to raise \$1 of equity, $\mathrm{EY}(\ell) \times \$1$. By contrast, if the manager were to borrow an extra \$1, she would have to pay interest on this \$1. Moreover, because she would be borrowing a bit more, the manager's new interest rate might be slightly higher, $\delta(\ell) \overset{\text{def}}{=} \ell \cdot [\mathrm{i}'(\ell)/\mathrm{i}(\ell)]$. Hence, borrowing an extra \$1 would lower the firm's expected earnings by $\mathrm{i}(\ell) \cdot [1 + \delta(\ell)] \times \$1$.

For the manager's initial choice of leverage to be optimal, $\ell = \ell_\star$, she cannot want to change how the marginal \$1 of capital gets financed. This logic implies that $\mathrm{EY}(\ell_\star) = \mathrm{i}(\ell_\star) \cdot [1 + \delta(\ell_\star)]$ when not at a corner solution. If the manager's initial choice is not optimal, $\ell \neq \ell_\star$, we show that she can iterate toward a unique EPS-maximizing leverage by repeatedly making the following adjustments

$$\mathrm{EY}(\ell) > \mathrm{i}(\ell) \cdot [1 + \delta(\ell)] \quad \Rightarrow \quad \text{increase leverage, equity is expensive} \tag{2a}$$

$$\mathrm{EY}(\ell) < \mathrm{i}(\ell) \cdot [1 + \delta(\ell)] \quad \Rightarrow \quad \underset{\text{(if possible)}}{\text{decrease}} \text{ leverage, debt is expensive} \tag{2b}$$

When $\mathrm{EY}(\ell) > \mathrm{i}(\ell) \cdot [1+\delta(\ell)]$, shareholders want more earnings in exchange for the marginal \$1 of capital than debt markets. So an EPS-maximizing manager would feel "equity is expensive". If she were to issue one less share and borrow an additional \$1, there would be a little extra earnings left over for her remaining shareholders. The opposite logic holds when $\mathrm{EY}(\ell) < \mathrm{i}(\ell) \cdot [1+\delta(\ell)]$. In this scenario, "debt is expensive" because equity markets are willing to give the firm \$1 in exchange for less expected earnings, making it cheaper to issue an additional share and borrow \$1 less.

The same reasoning also applies after a manager has followed through on her initial plan. Let ℓ_0 represent a firm's EPS-maximizing leverage when it was first created. Suppose that since then market conditions have changed a little, and the manager can now borrow at a rate below her earnings yield, $\mathrm{EY}(\ell_0) > \mathrm{i}(\ell_0) \cdot [1+\delta(\ell_0)]$. The company's share price might have dropped, causing $\mathrm{EY}(\ell_0)$ to rise. Or maybe the Fed cut rates, causing $\mathrm{i}(\ell_0) \cdot [1+\delta(\ell_0)]$ to fall. Either way, the manager will now feel equity markets are undervaluing her shares. If she borrowed \$1 and used the money to buy back a share, she would have a little extra earnings left over for her remaining shareholders.

Classic papers like Stein (1996), Baker and Wurgler (2000, 2002), Baker, Stein, and Wurgler (2003), and Shleifer and Vishny (2003) show that a corporate executive can add value by exploiting market mispricings. But, to do so, these papers require the manager to know the correct price of her shares. By contrast, an EPS-maximizing manager simply takes prices as given and responds accordingly. It does not matter how her earnings yield and marginal interest rate were determined or what the theoretically correct values should be.

EPS maximization occupies an interesting middle ground between behavioral and rational. While we can explicitly calculate no-arbitrage state prices and the fair interest rate in our model, these formulas play no role in Equation (2). The EPS-maximizing manager in our model acts like a "cross-market arbitrageur" (Ma, 2019) even in the absence of arbitrage opportunities. Our heterogeneous-objective framework generates predictions that look behavioral without requiring anyone to make a mistake.

Modigliani and Miller (1958) pinpointed precisely which “assumptions needed to be relaxed in order to investigate the determinants of financial structures. (Tirole, 2010)” By couching our analysis in an otherwise-standard corporate-finance model, we are able to spotlight precisely where the differences between EPS- and NPV maximization must lie. An EPS maximizer (a) fails to risk-adjust her expected earnings, (b) disregards changes in the long-term value of her assets and liabilities, and (c) ignores the present value of her default option. If replacing max NPV with max EPS affects a firm’s leverage, the mechanism must operate through some combination of these three channels.

Researchers have been adding one feature after another to the same max NPV framework since Dwight D. Eisenhower was in the Oval Office. Frictions, information asymmetries, price distortions, and dynamics still matter to EPS-maximizing managers. Modigliani and Miller (1958) omitted these ingredients to show that NPV maximization explains nothing without them. We omit them to show that a simple max EPS model can explain a lot even in their absence. NPV maximization is stone soup. EPS maximization has a flavor all its own.

In particular, EPS maximization suggests a new way of defining growth and value stocks as well as a new rationale for distinguishing between them. While the definition of EPS in Equation (1) is smooth and continuous, a firm’s marginal interest rate cannot dip below the riskfree rate. As a result, managers will take different routes to maximizing their EPS, depending on whether their firm’s unlevered earnings yield is above or below the riskfree rate, $\mathrm{EY}(0) \overset{?}{\lessgtr} \mathrm{rf}$.

Consider two EPS-maximizing managers who are in the process of buying assets to create their respective companies, “Firm G” and “Firm V”. Both managers initially plan on using zero leverage, $\ell = 0$. Moreover, the two companies are identical except for one key difference: Firm G’s unlevered earnings yield is below the riskfree rate, $\mathrm{EY}^G(0) < \mathrm{rf}$; whereas, Firm V’s is above, $\mathrm{EY}^V(0) > \mathrm{rf}$.

Equation (2b) says that Firm G’s manager would like to reduce her leverage, but she cannot. She already has zero debt, and she can currently borrow \$1 at the riskfree rate. If debt still seems expensive even on the most favorable terms, then the best that Firm G’s manager can do is stick to her initial plan and remain unlevered, $\ell_\star^G = 0$.

Summary of Predictions	**Growth stocks** "Equity is cheap"	**Value stocks** "Equity is expensive"
Capital structure will be:	All equity	Mostly debt
Will repurchase shares:	No	Yes
Will issue debt:	No	Yes
Will issue equity:	Yes	Rarely
Will accumulate cash:	Yes	No
→ EY	ExcessEY $<$ 0%	ExcessEY $>$ 0%

rf

Figure 1. Growth stocks are on the left (ExcessEY $<$ 0%; EY $<$ rf; PE $>$ 1/rf) and view equity as relatively cheap. Value stocks are on the right (ExcessEY $>$ 0%; EY $>$ rf; PE $<$ 1/rf) and see equity as relatively expensive. These two groups of firms maximize EPS using two distinct sets of corporate policies.

By contrast, Equation (2a) says that Firm V's manager can save $\{\text{EY}^V(0) - \text{rf}\} \times \$1 > \$0$ in expected earnings by borrowing \$1 and issuing one less share. What's more, notice that the resulting increase in earnings will cause her earnings yield to go up, making it even more attractive to borrow a second riskfree \$1. This positive feedback loop will not stop until Firm V's manager has exhausted all her riskfree borrowing capacity, $\ell_\star^V \geq \ell_{\max \text{rf}} \gg 0$.

We call Firm G a "growth stock" because a firm with an earnings yield below the riskfree rate, $\text{ExcessEY} \overset{\text{def}}{=} \text{EY} - \text{rf} < 0\%$, has a high price-to-earnings ratio, $\text{PE} > (\frac{1}{\text{rf}})$. Conversely, Firm V is a "value stock" because ExcessEY $>$ 0% implies that $\text{PE} < (\frac{1}{\text{rf}})$. This classification scheme is related to traditional ways of defining value and growth stocks, but it does not rely on a cross-sectional sorting rule. Growth stocks are not hard-coded as 30% of the market like in, say, Fama and French (1993). What's more, our simple max EPS model says that Firm V will start behaving like Firm G following a sufficiently large rate hike, $\Delta\text{rf} > \text{EY}^V(0) - \text{rf}$, even if its unlevered PE ratio does not change. These observations will be important for our empirical work.

Our simple max EPS model predicts that repurchases should mainly be a value-stock phenomenon. When creating her company, Firm V's manager continued borrowing until her earnings yield matched her marginal interest rate, $\text{EY}^V(\ell_\star^V) = \text{i}^V(\ell_\star^V) \cdot [1 + \delta^V(\ell_\star^V)]$. Going forward, any time this first-order condition falls out of alignment, she will have an incentive to readjust her capital structure. Debt-financed share repurchases are a common tool for doing this. By contrast, this margin is slack for growth stocks, $\text{EY}^G(0) < \text{rf}$. Firm G's manager thinks it is expensive to borrow even a single riskfree \$1, so she sees no need to change anything when the relative cost of debt moves a little bit.

Our model also predicts that growth stocks will accumulate cash while value stocks won't. Holding cash is like lending at the riskfree rate, which does not make a whole lot of sense for a value stock. Firm V has already exhausted its riskfree borrowing capacity, $\text{EY}^V(\ell_\star^V) = \text{i}^V(\ell_\star^V) \cdot [1 + \delta^V(\ell_\star^V)] > \text{rf}$, so any cash that appears on its balance sheet will immediately go towards paying down risky debt. Whereas, for a growth stock, even riskfree debt looks expensive compared to equity, $\text{EY}^G(0) < \text{i}^G(0) \cdot [1 + \delta^G(0)] = \text{rf}$. Thus, growth stocks should rapidly accumulate cash since it is cheaper for them to pay with shares.

In Section 4, we empirically verify our model's key predictions. We find that the average growth stock (ExcessEY $<$ 0%) has a 10.2%pt lower leverage than the typical value stock (ExcessEY $>$ 0%) and is 19.8%pt more likely to have almost zero financial leverage. Growth stocks repurchase shares and issue new debt at roughly half the rate of value stocks. We also find that growth stocks accumulate cash 3× faster and issue equity 6.2%pt more often.

When thinking in broad generalities, it is easy to come up with stories for why "growthy" firms might finance themselves differently than companies at the value end of the spectrum. Our model allows us to rule out these competing narratives by drilling down to specifics. A company with a 20× forward PE ratio has an earnings yield of $\text{EY} = \left(\frac{1}{20}\right) = 5\%$. It will act like a growth stock when the riskfree rate is $\text{rf} = 7\%$ since $\text{ExcessEY} = 5\% - 7\% = -2\%\text{pt}$. In this interest-rate environment, a 20× firm should opt for low leverage, never repurchase shares, issue equity, and quickly accumulate cash. By contrast, in a $\text{rf} = 3\%$ regime, our model predicts that the same 20× PE company would behave like a value stock since $\text{ExcessEY} = 5\% - 3\% = +2\%\text{pt}$. Now the EPS-maximizing manager of this firm will lever up by issuing debt, repurchase shares any time rates drop, and quickly spend any available cash.

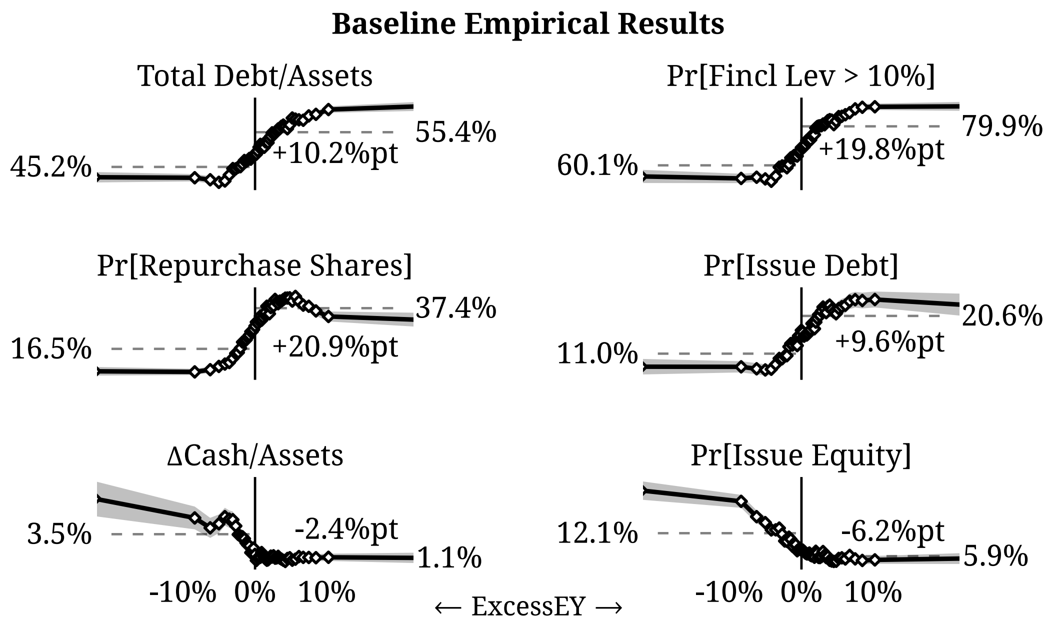

Figure 2. Binned scatterplots using firm-year observations from 1976 to 2023. x-axis: Excess earnings yield in year t, ExcessEY $\stackrel{\text{def}}{=}$ EY − rf. Total Debt/Assets: Total liabilities as percent of total assets in year t. Pr[Fincl Lev >10%]: Percent of obs with >10% financial leverage in year t. Pr[Repurchase Shares]: Percent that repurchase >1% of year t market cap during year $(t+1)$. Pr[Issue Debt]: Percent that issue debt in year $(t+1)$. Pr[Issue Equity]: Percent that issue equity in year $(t+1)$. ΔCash/Assets: Change in cash and cash equivalents in year $(t+1)$ as percent of year t assets. Growth stocks are on the left (ExcessEY $<$ 0%; EY $<$ rf; PE $>$ 1/rf). Value stocks are on the right (ExcessEY $>$ 0%; EY $>$ rf; PE $<$ 1/rf).

This is exactly what happens in the data. Figure 3 shows that in the 1990s when the 10-year Treasury rate was 7%, the average 20× company behaved like a growth stock and saw equity as cheap. Whereas, in the 2010s when rf = 3%, the typical 20× PE firm made financing choices like a value stock, treating equity as expensive. No alternative theories can match this context-dependent decision rule. We are not simply comparing firms with high and low PE ratios. In fact, our results are robust to including PE fixed effects.

The CEOs of large public companies are smart people who have risen to the top of their chosen field. They have long-term goals and are capable of nuance. Our simple static max EPS model ignores all of this and narrowly focuses on a

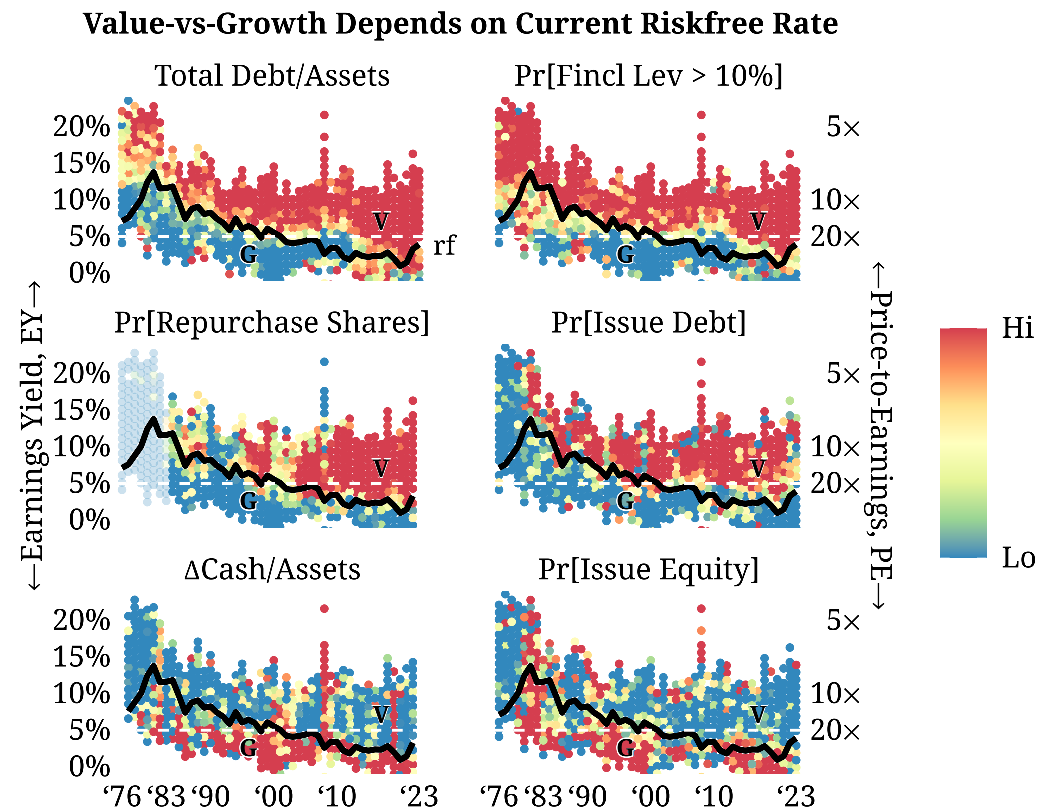

Figure 3. Each dot represents a group of firms in a 1%pt earnings-yield bin (left *y*-axis; EY) during a given year (*x*-axis). Bins with high average values are red. Those with low average values are blue. The black line depicts the 10-year Treasury rate, rf. Value stocks are above the black line (ExcessEY $>$ 0%; EY $>$ rf; PE $<$ 1/rf). Growth stocks are below the black line (ExcessEY $<$ 0%; EY $<$ rf; PE $>$ 1/rf). Shaded region is pre-1983 period when repurchases were insider trading. Horizontal white dotted line denotes EY = 5% and PE = 1/5% = 20×.

single objective: near-term EPS growth. In principle, this could be too much of an oversimplification. But, in practice, we find that a simple static max EPS model is able to explain a lot, especially when compared to a simple static max NPV model, which explains nothing on its own. Our model captures an important kernel of truth about what real-world corporate executives are actually trying to accomplish. It does not predict everything, but it is a much better starting point for researchers to build on going forward.

2 NPV Maximization

How do the people running large public corporations decide how much to borrow? This section outlines the standard modeling approach, which assumes that the manager aims to maximize the net present value of expected future equity payouts. The idea is to start with frictionless static max NPV model that makes zero predictions on its own. In the next section, we then move to max EPS and show this one change generates a number of sharp testable predictions.

2.1 Standard Framework

A manager is buying assets to form a company in year $t = 0$. In year $t = 1$, she will collect the firm's net operating income and then sell its assets at their prevailing market price. We work with a classic binomial model with only one period of uncertainty as in Dixit and Pindyck (1994).

Cash Flows. Let NOI_t denote the net operating income that the firm realizes in year t. The expected cash flows of the manager's firm will grow at an average rate of $\text{g} \geq 0\%$ per year in all future periods $h = 1, 2, \ldots$

$$\mathbb{E}[\text{NOI}_{t+h}] = (1 + \text{g})^h \cdot \text{NOI}_t \tag{3}$$

However, as shown in Figure 4, there is uncertainty about the conditional expectation of these cash flows in year $t = 1$. Let p_u and $\text{p}_d = 1 - \text{p}_u$ denote the probabilities of the up and down state in year $t = 1$.

The manager expects her company to earn $\mathbb{E}[\text{NOI}_1] = (1{+}\text{g}) \cdot \text{NOI}_0$ on average in year $t = 1$. But, she also knows that, if the up state is realized, her expected cash flows will be $u > 0\%$ higher than the unconditional average. Whereas, if the down state occurs, her expected cash flows will be $d \in (0\%, 100\%)$ lower

$$\text{NOI}_1 = (1 + \text{g}) \cdot \text{NOI}_0 \times \begin{cases} (1 + u) & \text{in the up state} \\ (1 - d) & \text{in the down state} \end{cases} \tag{4}$$

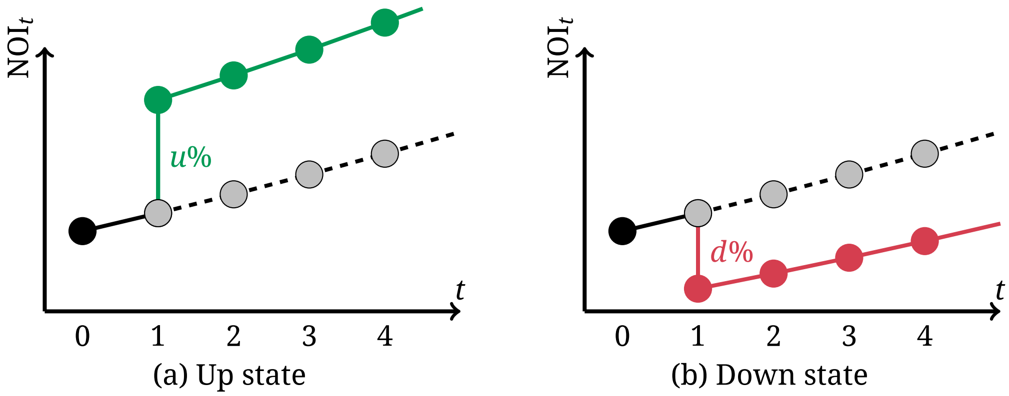

Figure 4. Left panel: Cash flows if up state is realized in year $t = 1$. Right panel: Cash flows if down state is realized. **(Black dot)** NOI_0 in year $t = 0$ prior to purchase; same in both panels. **(Gray dots)** Unconditional average cash flows $\mathbb{E}[\mathrm{NOI}_t]$ in years $t = 1, 2, 3, 4$; same in both panels. **(Green dots)** Conditional expectation of NOI_t in years $t = 1, 2, 3, 4$ following a positive shock. **(Red dots)** Conditional expectation of NOI_t in years $t = 1, 2, 3, 4$ following negative shock.

We use $\mathrm{NOI}_u \overset{\text{def}}{=} (1+u)\times\mathbb{E}[\mathrm{NOI}_1]$ and $\mathrm{NOI}_d \overset{\text{def}}{=} (1-d)\times\mathbb{E}[\mathrm{NOI}_1]$ as shorthand for the conditional expectation of NOI_1 in each future state of the world next year at time $t = 1$. We do not need the firm's cash flows to literally grow at a deterministic rate from time $t = 2$ onward. We are just collapsing this part of the tree for analytical convenience. Because the firm's expected cash flows grow at a rate of g per year in all future years, including in year $t = 1$, the unconditional expectation in year $t = 1$ must satisfy $\mathbb{E}[\mathrm{NOI}_1] = \mathrm{p}_u \cdot \mathrm{NOI}_u + \mathrm{p}_d \cdot \mathrm{NOI}_d$.

Firm Value. The manager in our model buys assets to create her firm at time $t = 0$. She pays $\mathrm{CostOfAssets} = \mathrm{ValueOfAssets}_0$ for these assets. The previous owners keep the cash flow produced in year $t = 0$, NOI_0. In year $t = 1$, the manager collects NOI_1 and then sells the firm's assets for $\mathrm{ValueOfAssets}_1$. The total value that the manager gets from owning the firm in year $t = 1$ is given by

$$\mathrm{ValueOfFirm}_1 \overset{\text{def}}{=} \mathrm{NOI}_1 + \mathrm{ValueOfAssets}_1 \tag{5}$$

Just like with cash flows, we use $\mathrm{ValueOfFirm}_1 \in \{\mathrm{ValueOfFirm}_u, \mathrm{ValueOfFirm}_d\}$ to denote the two possible realizations in each state of the world.

Given the setup so far, we can compute the value of the firm's assets as

$$\text{ValueOfAssets}_t = \mathbb{E}_t[\text{NOI}_{t+1}] \times \left(\frac{1}{\text{r} - \text{g}}\right) \tag{6}$$

where $\text{r} > \text{g}$ is the discount rate on the firm's cash flows. When the manager sells her assets at time $t = 1$, they will be worth $\text{ValueOfAssets}_1 = \mathbb{E}_1[\text{NOI}_2]/(\text{r} - \text{g})$. Because year $t = 1$ cash flows are unknown at time $t = 0$, the firm's future asset value is a random variable, $\text{ValueOfAssets}_1 \in \{\text{ValueOfAssets}_u, \text{ValueOfAssets}_d\}$.

State Prices. Investors correctly price all future payouts in our model. We use q_u to denote the price in year $t = 0$ of an asset pays out \$1 in year $t = 1$ if the up state is realized. Similarly, we use q_d to denote the analogous down-state price. Let $\text{rf} > 0\%$ denote the prevailing riskfree rate. While $\text{p}_u + \text{p}_d = 1$, the price of a \$1 riskfree bond is given by $\text{q}_u + \text{q}_d = \frac{1}{1+\text{rf}} < 1$.

Our binomial setup allows us to solve for these state prices in closed form

$$\text{q}_u = \frac{1}{1+\text{rf}} \cdot \left\{ \frac{(1+\text{rf}) \cdot \text{CostOfAssets} - \text{ValueOfFirm}_d}{\text{ValueOfFirm}_u - \text{ValueOfFirm}_d} \right\} \tag{7a}$$

$$\text{q}_d = \frac{1}{1+\text{rf}} \cdot \left\{ \frac{\text{ValueOfFirm}_u - (1+\text{rf}) \cdot \text{CostOfAssets}}{\text{ValueOfFirm}_u - \text{ValueOfFirm}_d} \right\} \tag{7b}$$

Let $X \in \{X_u, X_d\}$ denote an arbitrary random variable defined over the two future states of the world next year. We use $\mathbb{PV}[X] \overset{\text{def}}{=} \text{q}_u \cdot X_u + \text{q}_d \cdot X_d$ to denote its present discounted value (i.e., the risk-neutral expectation).

Interest Rate. Let $\ell \in [0, 1)$ denote the manager's leverage as a fraction of the total purchase price of her assets, $\text{LoanAmt}(\ell) \overset{\text{def}}{=} \ell \cdot \text{CostOfAssets}$. We write the fair interest rate on the manager's debt as $\text{i}(\ell) \geq \text{rf}$. We will assume the manager takes out a single loan, but you can think about any small changes in her leverage as junior liens if you like. Since all Modigliani and Miller (1958) assumptions hold, it makes no difference in our model.

In exchange for getting LoanAmt at time $t = 0$, the manager must promise to repay principal plus interest, $(1 + \text{i}) \cdot \text{LoanAmt}$, at time $t = 1$. The present value of this promised debt repayment is given by

$$\begin{aligned}\mathbb{PV}[\text{DebtPayouts}] = \mathrm{q}_u \cdot \{(1+\mathrm{i}) \cdot \text{LoanAmt}\} \\ + \mathrm{q}_d \cdot \min\{(1+\mathrm{i}) \cdot \text{LoanAmt}, \text{ValueOfFirm}_d\}\end{aligned} \tag{8}$$

If the up state gets realized in year $t = 1$, the manager will make her promised payment, $(1+\mathrm{i}) \cdot \text{LoanAmt}$. However, if the down state gets realized in year $t = 1$, the manager will choose to default and receive \$0 whenever her promised payment exceeds the value of her firm, $(1+\mathrm{i}) \cdot \text{LoanAmt} > \text{ValueOfFirm}_d$.

The manager has a finite riskfree borrowing capacity. Suppose she takes out a \$1 loan in year $t = 0$. Given how little she borrowed, the value of her firm at time $t = 1$ is guaranteed to be higher than her promised payment, $\text{ValueOfFirm}_d > (1+\text{rf}) \cdot \$1$. The same logic holds for any leverage ratio up to

$$\ell_{\max\text{rf}} = \frac{1}{1+\text{rf}} \cdot \left(\frac{\text{ValueOfFirm}_d}{\text{CostOfAssets}}\right) \tag{9}$$

But if the manager takes out a sufficiently large loan, her promised payment will exceed her firm's value in the down state, $\text{ValueOfFirm}_d < (1+\mathrm{i}) \cdot \text{LoanAmt}$. In that case, she would prefer to receive nothing than to pay her lender more than the firm is worth. The lender anticipates a default in the down state of the world when $\ell > \ell_{\max\text{rf}}$ and quotes the manager a higher interest rate

$$\mathrm{i}(\ell) = \frac{(1-\mathrm{q}_u) \cdot \text{LoanAmt}(\ell) - \mathrm{q}_d \cdot \text{ValueOfFirm}_d}{\mathrm{q}_u \cdot \text{LoanAmt}(\ell)} > \text{rf} \tag{10}$$

We use $\text{DefaultSavings}_1 \in \{\text{DefaultSavings}_u, \text{DefaultSavings}_d\}$ to denote the amount of money the manager would save by defaulting at time $t = 1$. Since the manager never defaults in the up state, we have $\text{DefaultSavings}_u = \$0$. Whereas, the default savings in the down state depends on the size of the loan

$$\text{DefaultSavings}_d = \max\{(1+\mathrm{i}) \cdot \text{LoanAmt} - \text{ValueOfFirm}_d, \$0\} \tag{11}$$

The derivation of the fair interest rate and default savings will be important when comparing max NPV to max EPS.

Share Price. After borrowing LoanAmt at time $t = 0$, the manager finances the rest of the purchase price of her assets by issuing #Shares

$$\begin{aligned} \text{MarketCap} &= \text{CostOfAssets} - \text{LoanAmt} \qquad (12a) \\ &= \text{\#Shares} \cdot \text{Price} \qquad (12b) \end{aligned}$$

We use MarketCap to denote the total amount of capital raised by the manager via public equity markets at time $t = 0$.

At time $t = 1$, shareholders get any remaining firm value left over after paying off the debt. The present value of these future equity payouts is given by

$$\begin{aligned} \mathbb{PV}[\text{EquityPayouts}] = \mathrm{q}_u \cdot \{&\text{ValueOfFirm}_u - (1 + \mathrm{i}) \cdot \text{LoanAmt}\} \\ &+ \mathrm{q}_d \cdot \max\{\text{ValueOfFirm}_d - (1 + \mathrm{i}) \cdot \text{LoanAmt}, \$0\} \end{aligned} \qquad (13)$$

The owner of each share is entitled to a fraction $(1/\text{\#Shares})$ of the time $t = 1$ equity payout. Just like the lender, we assume that shareholders price these future payouts correctly at time $t = 0$.

Without loss of generality, we will normalize things so that Price = \$1. Once the market has set Price, the manager takes this value as given. In our model, investors price all assets correctly, including the company's equity. However, even if this were not the case, managers would not be able to increase their EPS by changing the size of each share. We also note that, following a reverse split, companies are required to retroactively update their previously reported EPS values to reflect the new share count (see Appendix IA.1).

At this point, it is helpful to signpost the role that Equation (13) will play in our analysis. The calculation matters to an NPV-maximizing manager; however, in the following section, we will see that an EPS maximizer never computes this quantity. She simply takes her share price as given and responds accordingly. It is possible to predict how an EPS-maximizing manager will behave without specifying a proper pricing kernel. But we are aiming for more than just good predictions. We want to compare and contrast max NPV and max EPS. So we need to characterize what an NPV-maximizing manager would do.

2.2 Modigliani-Miller

How should a manager choose her firm's leverage to maximize shareholder value? The answer depends on how the manager thinks about "shareholder value". Textbook corporate-finance assumes that corporate executives think about shareholder value in the same way that debt markets price the company's corporate bonds.

In standard models, managers aim to push the present value of future equity payouts above the cost investors had to pay for them

$$\text{NPV} \overset{\text{def}}{=} \mathbb{PV}[\text{EquityPayouts}] - \text{MarketCap} \tag{14}$$

If this is how the manager in our simple model thought, then Modigliani and Miller (1958) tells us that there will be no optimal choice of leverage in the absence of frictions, information asymmetries, or price distortions.

Proposition 2.2 (Modigliani and Miller, 1958)**.** *Assume that* (a) *the cash-flow distribution is fixed and* (b) *there are no frictions, information asymmetries, or price distortions. In this idealized benchmark, the present value of future equity payouts is always equal to the upfront cost of purchasing these claims*

$$\mathbb{PV}[\text{EquityPayouts}(\ell)] = \text{MarketCap}(\ell) \qquad \textit{for any } \ell \in [0,1) \tag{15}$$

Much of modern corporate finance is organized as a response to this capital-structure irrelevance theorem. The preface to Tirole (2010) calls Modigliani and Miller's capital-structure irrelevancy theorem a "detonator for the theory of corporate finance, a benchmark whose assumptions needed to be relaxed in order to investigate the determinants of financial structures." Papers make claims about which specific frictions, information asymmetries, and/or price distortions are responsible for firms' leverage decisions.

The researcher program demands two missing ingredients to make the manager's problem well-posed. The first ingredient needs to cause managers to deviate from the idealized benchmark. The second ingredient is there to ensure that the resulting deviation is not infinitely large. For example, trade-off theory

(Taggart, 1977) argues that NPV-maximizing managers lever up to exploit an interest tax shield but are limited by bankruptcy costs. It is a similar workflow to limits-to-arbitrage in behavioral finance (Shleifer and Vishny, 1997).

3 EPS Maximization

This section explores what happens if the people running large public companies have different ideas about how to boost "shareholder value". What if, instead of maximizing NPV, they maximize EPS. This is what the real-world CEOs often say they are targeting. And, we now show that, by replacing max NPV with max EPS in our simple model, it is possible to predict a number of important financing decisions even before introducing further complications.

3.1 How EPS Differs From NPV

Suppose that the manager chooses the leverage ratio that results in the highest EPS. How is this objective different? To answer this question, it will be helpful to look at

$$\mathrm{NPVratio} \overset{\mathrm{def}}{=} \frac{\mathbb{PV}[\mathrm{EquityPayouts}]}{\mathrm{MarketCap}} \tag{16}$$

rather than $\mathrm{NPV} = \mathbb{PV}[\mathrm{EquityPayouts}] - \mathrm{MarketCap}$. The economic content is the same. However, it will be more natural to juxtapose EPS with a ratio.

Proposition 3.1 (How EPS Differs From NPV)**.** *Consider a textbook corporate-finance model that predicts firm leverage by relaxing one of the Modigliani and Miller (1958) assumptions, and let* $\mathbb{PV}[\cdot]$ *denote the present-value operator implied by this model. There are three reasons why this* max NPV *model and our* max EPS *model might lead to different capital-structures decisions*

$$\begin{aligned}\mathrm{NPVratio} - \mathrm{EPS} \propto (\mathbb{PV} - \mathbb{E})[\mathrm{NOI} - \mathrm{i} \cdot \mathrm{LoanAmt}] \\ + \mathbb{PV}[\mathrm{ValueOfAssets} - \mathrm{LoanAmt}] \\ + \mathbb{PV}[\mathrm{DefaultSavings}]\end{aligned} \tag{17}$$

Since all Modigliani and Miller (1958) assumptions hold in our model, any choice of leverage is just as good as every other. EPS maximization is merely a selection criterion. However, if one of the Modigliani and Miller (1958) assumptions is relaxed, then max EPS and max NPV can lead to different capital-structure decisions. Proposition 3.1 tells us where to look for the effects of replacing max NPV with max EPS in such a model.

There are three possible sources of disagreement, each associated with a different term in Equation (17):

(a) The first term, $(\mathbb{PV} - \mathbb{E})[\mathrm{NOI} - \mathrm{i} \cdot \mathrm{LoanAmt}]$, says that EPS-maximizing managers do not risk-adjust their firms' expected cash flows next year. $1 of expected operating income matters as much as $1 of interest expense, even if one future cash flow is much riskier than the other.

(b) The second term, $\mathbb{PV}[\mathrm{ValueOfAssets} - \mathrm{LoanAmt}]$, says that EPS-maximizing managers do not account for long-term changes in firm value. This omission explains why people worry about EPS maximization leading to short-term thinking (Dimon and Buffett, 2018; Terry, 2023).

    While this paper focuses on firms' financing decisions, it is important to emphasize that max EPS does not always lead to under-investment. EPS maximizers ignore long-term changes on both sides of their balance sheet. They invest in projects with large expected short-term payoffs and costs that can be amortized over the long run. We explore how EPS maximization shapes capital budgeting in Ben-David and Chinco (2025a).

(c) The third term, $\mathbb{PV}[\mathrm{DefaultSavings}]$, is not as widely appreciated. Even if the manager knows she will default in the down state, GAAP accounting standards say her expected earnings must reflect her promised debt payment. An EPS-maximizing manager will treat promised interest payments as a known expense rather than a random variable.

3.2 Marginal Cost Of Capital

We now characterize how an EPS-maximizing manager thinks about the cost of financing the marginal $1. Imagine that the manager was initially planning on purchasing her assets using leverage $\ell \in [0,1)$. Then she asked herself: "What would happen to my EPS if I were to change my initial plan a little bit?" To be concrete, suppose that the manager is now considering borrowing \$1 more, which amounts to a tiny \$1/CostOfAssets = $\epsilon > 0$ increase in leverage.

On the one hand, if the manager were to borrow an additional \$1, then she would have to pay interest on that dollar. And, to make matters worse, if she had already used up all her riskfree borrowing capacity, $\ell > \ell_{\text{max rf}}$, then her interest rate would also increase a little bit. We write the additional interest the manager would have to pay if she were to borrow an additional dollar as

$$\mathrm{i}(\ell) \cdot [1 + \delta(\ell)] = \lim_{\epsilon \searrow 0} \left\{ \frac{(\ell+\epsilon)\cdot \mathrm{LoanAmt}(\ell+\epsilon) - \ell \cdot \mathrm{LoanAmt}(\ell)}{\epsilon} \right\} \tag{18}$$

where $\delta(\ell) \overset{\text{def}}{=} \ell \cdot [\mathrm{i}'(\ell)/\mathrm{i}(\ell)]$ is the elasticity of interest.

On the other hand, with a share price of \$1/sh, the manager has to promise a single share's worth of her earnings to raise \$1 of equity capital. So, if the manager were to borrow \$1 more, then she could issue one less share and divide up her remaining earnings across a slightly smaller base. For any arbitrary choice of $\ell \in [0,1)$, her firm's earnings yield is given by

$$\mathrm{EY}(\ell) = \frac{\mathrm{EPS}(\ell)}{\mathrm{Price}} = \frac{\mathbb{E}[\mathrm{Earnings}(\ell)]}{\mathrm{MarketCap}(\ell)} \tag{19}$$

Let $\mathrm{EY}(\ell)$ denote the earnings yield that each shareholder would require in a world where the manager followed through on her initial plan.

An EPS-maximizing manager compares her current earnings yield to the additional interest she would have to pay if she borrowed an additional \$1. If the interest payment is lower, $\mathrm{EY}(\ell) > \mathrm{i}(\ell) \cdot [1 + \delta(\ell)]$, the manager will view equity as relatively expensive and try to lever up, $\mathrm{EPS}'(\ell) > 0$. She will think that equity investors are undervaluing her firm since bond markets are offering her better financing terms for the marginal \$1 of capital. Whereas, if her current shareholders are asking for less earnings in exchange for the marginal \$1 of financing, $\mathrm{EY}(\ell) < \mathrm{i}(\ell) \cdot [1 + \delta(\ell)]$, an EPS maximizer will see debt markets as expensive and try to reduce her leverage, $\mathrm{EPS}'(\ell) < 0$.

Proposition 3.2 (Marginal Cost Of Capital)**.** *Suppose an EPS-maximizing manager was initially planning on using leverage level* ℓ*. If the manager were to borrow an additional* \$1 *and issue one less share, then her EPS would change by*

$$\text{EPS}'(\ell) \propto \text{EY}(\ell) - \text{i}(\ell) \cdot [1 + \delta(\ell)] \tag{20}$$

Proposition 3.2 explains why managers often talk about their earnings yield like it is a cost of capital (Graham and Harvey, 2001). They are constantly thinking to themselves: "A higher earnings yield means equity is more expensive than debt. A higher earnings yield means equity is more expensive than debt. [...] A higher earnings yield means equity is more expensive than debt." Recite this mantra enough times, and you too might start thinking in similar terms. That being said, the economics of EPS maximization turns out to be surprisingly rich. There is a subtle internal logic behind thinking about a firm's earnings yield as the cost of equity capital.

In essence, the principle of EPS maximization suggests that corporate executives will behave like "cross-market arbitrageurs" (Ma, 2019). This is surprising in the context of our model because there are no arbitrage opportunities. All future payouts are priced correctly using the state prices in Equation (7). But because an EPS-maximizing manager is not thinking about shareholder value in the same way that her lender prices her promised debt payments, in her eyes she can still create value for her shareholders by adjusting her leverage.

An EPS-maximizing manager does not need to know why her earnings yield is above/below her marginal interest rate. Whatever the reason, she will respond in the same way. By contrast, a manager must know the correct price of her shares to exploit a true pricing error (Stein, 1996; Baker and Wurgler, 2000, 2002; Baker et al., 2003; Shleifer and Vishny, 2003). In practice, CEOs are capable of nuance. They do not exclusively maximize EPS at the expense of all other considerations. We are not arguing that corporate executives never try to exploit pricing errors. Reality is rich enough for both mechanisms to coexist. But they are fundamentally different mechanisms.

3.3 EPS-Maximizing Leverage

Right now, corporate-finance textbooks assume that CEOs think about shareholder value in the same way that boldholders price their debt (Berk and DeMarzo, 2007; Tirole, 2010; Ross, Westerfield, and Jordan, 2017; Brealey, Myers, and Marcus, 2023). When everyone measures their slices in the same way, it is not possible to create value by cutting the pie differently. For one person to get a bigger portion, another must get a smaller one. But this logic no longer applies when different stakeholders apply different valuation metrics.

It is well known that "Modigliani and Miller (1958)'s theory is exceptionally difficult to test directly. (Myers, 2001)" In principle, our max EPS model could be just as empirically vacuous. We now show that this is not the case. EPS maximization makes a sharp testable leverage prediction even in a setting where NPV maximization famously makes no predictions whatsoever.

Proposition 3.3 (EPS-Maximizing Leverage)**.** *Either* $\mathrm{EPS}(\ell)$ *is maximized at* $\ell_\star = 0$ *with* $\mathrm{EPS}'(0) < 0$*, or there is a single interior* $\ell_\star \in (0,1)$ *such that*

$$\mathrm{EPS}'(\ell_\star) = 0 \tag{21}$$

Either way, given any initial starting point $\ell \in [0,1)$*, the logic outlined in Proposition 3.2 produces a unique EPS-maximizing leverage ratio,* $\ell_\star$*.*

When the manager's earnings yield is higher than her marginal interest rate, she levers up a bit. When her earnings yield is lower, she tries to reduce her leverage. Proposition 3.3 shows that iterating on this process will lead her to a single EPS-maximizing leverage level given any initial leverage level, $\ell \in [0,1)$, even in a world where all Modigliani and Miller (1958) assumptions hold.

We are not interested in debating why managers are maximizing EPS or whether this is a good idea. However, we can say with some certainty that EPS maximization is robust to competitive pressures. We have run that experiment. It has not happened yet. Financial economists have been trying to convince managers to abandon EPS for decades (May, 1968; Stern, 1974). Maybe one day things will change, but right now even researchers who think it is "time to get rid of EPS (Almeida, 2019)" also acknowledge that managers "need a simple metric of performance…[and] the market has selected EPS to fulfill this role."

We also do not believe that EPS growth is all that matters. We note that Modigliani and Miller (1958) chose to omit these things as well. Their goal was to show that an NPV-maximizing model can explain nothing in the absence of realistic complications. We omitted these same ingredients to emphasize that, even before including them, an EPS-maximizing model still explains a lot. Frictions, information asymmetries, and price distortions matter in a max EPS world. We look forward to future research exploring precisely how.

3.4 Growth vs. Value

EPS maximization provides a microfoundation for the distinction between value and growth. There are two different sets of EPS-maximizing policies, depending on whether a firm's earnings yield is above or below the riskfree rate. This sharp qualitative change in behavior stems from the fact that a firm's marginal interest rate cannot be less than the riskfree rate, $\mathrm{i}(\ell) \cdot [1 + \delta(\ell)] \geq \mathrm{rf}$.

We define a firm's excess cap rate as the difference between its unlevered earnings yield and the riskfree rate, $\mathrm{ExcessCapRate} \overset{\text{def}}{=} \mathrm{EY}(0) - \mathrm{rf} = (\mathrm{r} - \mathrm{g}) - \mathrm{rf}$. The name comes from the fact that earnings are the same as expected cash flows in the absence of debt. So Gordon-growth logic would imply that

$$\frac{1}{\mathrm{EY}(0)} = \frac{\mathrm{MarketCap}(0)}{\mathbb{E}[\mathrm{Earnings}(0)]} = \frac{\mathrm{CostOfAssets}}{\mathbb{E}[\mathrm{NOI}]} = \left(\frac{1}{\mathrm{r} - \mathrm{g}}\right) \tag{22}$$

The quantity $(\mathrm{r} - \mathrm{g})$ is often referred to as a firm's cash-flow capitalization rate (a.k.a., "cap rate"). Think back to Equation (6).

Consider an EPS-maximizing manager who is initially planning on buying her firm's assets using no debt whatsoever, $\ell = 0$. Suppose you suggest that she should instead borrow \$1 riskfree and issue one less share. Will she adopt your proposed change? If the manager's unlevered earnings yield is below the riskfree rate, $\mathrm{EY}(0) = (\mathrm{r} - \mathrm{g}) < \mathrm{rf}$, then Proposition 3.2 tells us she would like to reduce her leverage. But $\ell = 0$ is as low as she can go. So she will do the next best thing and stick with her initial all-equity plan, $\ell_\star = 0$. A low earnings yield implies a high price-to-earnings (PE) ratio, so we call any company where $\text{ExcessCapRate} < 0\%$ a "growth stock". A growth stock has $\text{PE} > (\frac{1}{\text{rf}})$.

But what if the exact same manager had created a different kind of company that had a higher cap rate, $\text{EY}(0) = (\text{r} - \text{g}) > \text{rf}$? We call this kind of company a "value stock", and Proposition 3.2 tells us that the manager could now increase her EPS by borrowing at least \$1 riskfree. Proposition 3.4 shows that an EPS-maximizing value stock will never stop at just \$1 of riskfree debt.

If the manager of this value stock were to increase her leverage by a tiny amount $\epsilon > 0$, her earnings yield would go up, $\text{EY}(\epsilon) > \text{EY}(0)$, but her cost of debt would remain the same, $\text{rf} = \text{i}(\epsilon) \cdot [1 + \delta(\epsilon)]$. And the same will be true for any $\ell \in [0, \ell_{\max \text{rf}}]$. Hence, if it makes sense for her to borrow one riskfree dollar, $\text{EY}(0) > \text{rf}$, it will make even more sense for her to borrow a second riskfree dollar, $\text{EY}(\epsilon) > \text{EY}(0) > \text{rf}$. This positive feedback loop will continue until the manager has exhausted all her riskfree borrowing capacity, $\ell_\star \geq \ell_{\max \text{rf}}$.

Proposition 3.4 (Growth vs. Value)**.** *There will be a large qualitative change in the EPS-maximizing choice of leverage at the threshold,* $\text{EY}(0) = \text{rf}$

$$\ell_\star \begin{cases} = 0 & \textit{if}\ \text{EY}(0) < \text{rf} \qquad \text{growth stocks; PE} > 1/\text{rf} \\ \geq \ell_{\max \text{rf}} & \textit{if}\ \text{EY}(0) > \text{rf} \qquad \text{value stocks; PE} < 1/\text{rf} \end{cases} \tag{23}$$

Growth stocks use no debt. Value stocks exhaust their riskfree borrowing capacity.

Figure 5 illustrates the intuition with a numerical simulation. Each line shows $\text{EPS}(\ell)$ over the full range of leverage ratios $\ell \in [0, 1)$ when using a different riskfree rate, $\text{rf} \in \{2\%, 4\%, 6\%\}$. Everything else is the same for all three lines: $\mathbb{E}[\text{NOI}] = \$5.00$, $u = 27\%$, $d = 18\%$, $\text{r} = 10\%$, $\text{g} = 5\%$, and $\text{p}_u = 40\%$. When $\text{rf} = 6\%$, the firm is a growth stock, $\text{ExcessCapRate} = -1\%$. In this scenario, the highest point on the blue line is indicated by the diamond all the way on the left-hand side of the figure. The manager maximizes her EPS by using no leverage, $\ell_\star = 0.00$. By contrast, when $\text{rf} = 2\%$ and 4%, the firm is a value stock. In both cases, the firm's excess cap rate is positive, $\text{ExcessCapRate} = 3\%$ and 5% respectively. So the manager maximizes EPS by borrowing a lot.

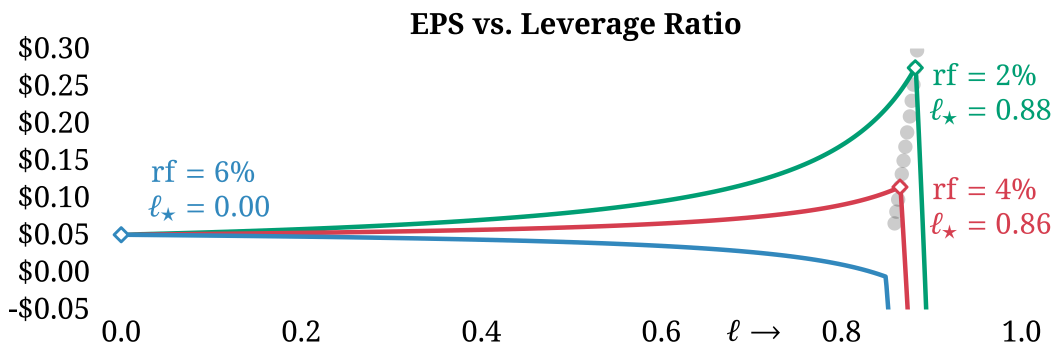

Figure 5. x-axis: Candidate leverage ratio, $\ell \in [0, 1)$. y-axis: Earnings per share, $\text{EPS}(\ell)$. Each line reports results for a different riskfree rate, $\text{rf} \in \{2\%, 4\%, 6\%\}$. All other parameters are the same for all three lines: $\mathbb{E}[\text{NOI}] = \$5.00$, $u = 27\%$, $d = 18\%$, $\text{r} = 10\%$, $\text{g} = 5\%$, and $\text{p}_u = 40\%$. White diamonds show the EPS-maximizing leverage for a particular rf. Gray dots show EPS-maximizing leverages associated with other riskfree rates less than 5% at 25bps increments.

3.5 Mapping To Observables

Our empirical analysis uses excess earnings yield to distinguish growth from value stocks

$$\text{ExcessEY} \overset{\text{def}}{=} \text{EY}(\ell_\star) - \text{rf} \tag{24}$$

We do this because equity analysts forecast each company's earnings yield given the manager's choice of leverage, $\text{EY}(\ell_\star)$. They do not usually submit a separate unlevered cap-rate forecast, $\text{EY}(0) = (\text{r} - \text{g})$. But we do not have to settle for merely hoping that ExcessEY is a good proxy for ExcessCapRate. Our model predicts how movements in ExcessCapRate will manifest as changes in ExcessEY—i.e., the variable we can compute in the data.

Proposition 3.5 (Mapping To Observables). *A growth stock will have a negative excess earnings yield equal to its excess cap rate,* $\text{ExcessEY} = \text{ExcessCapRate} < 0\%$*; whereas, a value stock will have a positive excess earnings yield that is strictly larger than its excess cap rate,* $\text{ExcessEY} > \text{ExcessCapRate} > 0\%$*:*

$$\text{ExcessEY} - \text{ExcessCapRate} \begin{cases} = 0\% & \textit{if}\ \text{EY}(0) < \text{rf} \\ > 0\% & \textit{if}\ \text{EY}(0) > \text{rf} \end{cases} \tag{25}$$

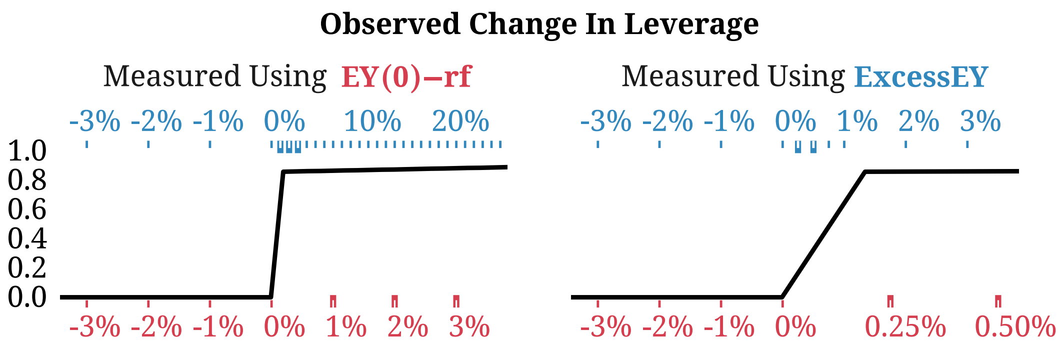

Figure 6. The thick black lines show the EPS-maximizing leverage, $\ell_\star$, as firm transitions from growth to value. Simulation parameters are $\mathbb{E}[\text{NOI}] = \$5.00$, $u = 27\%$, $d = 18\%$, $\text{r} = 10\%$, $\text{g} = 5\%$, and $\text{p}_u = 40\%$. Top x-axis shows the firm's observed excess earnings yield, **ExcessEY = EY($\ell_\star$) − rf**. The bottom x-axis shows the firm's excess cap rate, **EY(0) − rf**. (Left Panel) How the change in EPS-maximizing leverage looks when using **EY(0) − rf** to measure distance from the growth-vs-value dividing line. Tick marks on the bottom x-axis remain equally spaced, but the top x-axis gets compressed for value stocks. (Right Panel) How the exact same data look when using **ExcessEY**. Now, the top x-axis remains constant while the bottom x-axis gets stretched out for value stocks.

Proposition 3.5 says that there is no difference between using ExcessEY and ExcessCapRate for growth stocks. But what does it mean for value stocks to have ExcessEY > ExcessCapRate? First, it tells us that using data on a firm's excess earnings yields will not cause us to incorrectly classify it. If a company would be a growth stock when using ExcessCapRate, then it will also be a growth stock when using ExcessEY. The same goes for value stocks.

But because ExcessEY > ExcessCapRate for value stocks, using ExcessEY will tend to stretch out the sharp change in firm behavior at ExcessCapRate = 0%. The moment a firm's unlevered earnings yield exceeds the riskfree rate, an EPS-maximizing manager will lever up. And when she does this, it will further increase her firm's earnings yield, $\text{EY}(\ell_\star) > \text{EY}(0)$. Hence, when we measure things using ExcessEY, it will make value stocks seem even farther above the growth-vs-value dividing line than they actually are, as shown in Figure 6. Both panels in this figure show the same data. The only difference between the two panels is whether the data are measured using ExcessCapRate or ExcessEY.

While our model predicts a sharp change in financing policies at a threshold, which is defined in terms of a firms unlevered earnings yield, ExcessCapRate $\stackrel{\text{def}}{=}$ $\text{EY}(0) - \text{rf} = 0\%$. By contrast, in the data we can only see a firm's levered earnings yield, ExcessEY $\stackrel{\text{def}}{=}$ $\text{EY}(\ell_\star) - \text{rf}$. Nevertheless, we are able to theoretically characterize how this difference will affect our econometric results. Given the data we have access to, our model predicts that we will see "S" curves in Figure 2 rather than machine-tolerance step functions. This empirical regularity is not evidence against our model. It represents strong support for our theory.

3.6 Share Repurchases

Our max EPS framework also explains subsequent repurchase decisions. Nothing new needs to be added to the model. All we need to do is shift our perspective slightly. Previously, the manager had a hypothetical plan for how much leverage to use when she eventually created her firm. Now, suppose that she has already acted on this plan. The manager created her firm by taking out a loan worth $\text{LoanAmt}(\ell_0) = \ell_0 \cdot \text{CostOfAssets}$, which was the EPS-maximizing choice at the time. Since then market conditions have changed a little bit. How should she adjust her leverage in response?

Proposition 3.6 (Share Repurchases). *Let ℓ_0 denote the EPS-maximizing leverage when the manager created her firm prior to the change in market conditions.* $\text{EY}(\ell_0)$ *is her new earnings yield after market conditions have changed, and* $\text{i}(\ell_0) \cdot [1 + \delta(\ell_0)]$ *is her new marginal interest rate. If the manager were to borrow another* \$1 *and buy back a share, the her firm's EPS would change by*

$$\text{EPS}'(\ell_0) \propto \text{EY}(\ell_0) - \text{i}(\ell_0) \cdot [1 + \delta(\ell_0)] \tag{26}$$

We want to emphasize that the logic of Proposition 3.6 is identical to the logic in Proposition 3.2. The only thing that changes is the timing. If the manager borrows an additional \$1 now that market conditions have changed, she will be able to repurchase a share. But she will also have to pay interest on this \$1 next year. These two effects work in opposite directions. Fewer shares outstanding

$\Rightarrow$ higher EPS. Higher interest expense $\Rightarrow$ lower EPS. Share repurchases are EPS accretive when the first effect dominates.

Stock buybacks boomed during the decade following the global financial crisis in 2008. There has been a lot of debate among academics and policymakers about how best to explain this pattern and the phenomenon of debt-financed share repurchases more generally (Dittmar, 2000; Grullon and Michaely, 2004; Jenter, 2005; Hribar, Jenkins, and Johnson, 2006; Skinner, 2008; Babenko, 2009; Almeida, Fos, and Kronlund, 2016; Gutierrez and Philippon, 2017; Kahle and Stulz, 2021; Farre-Mensa, Michaely, and Schmalz, 2024). But there is not much to explain if managers are EPS maximizers.

Market participants clearly understand that repurchases can boost a firm's EPS. A 2020 Washington Post article explains how "when a company has, say, 2 million shares and earns a $10 million profit, its per-share earnings are $5… Now suppose the company buys back lots of its own stock, earns only $6 million but has just 1 million shares. That would give it earnings of $6 per share."[2]

Our model shows how to think about the cost. The manager in this example can repurchase 1m shares by taking out a loan with a $4m interest payment next year. If she can borrow an additional $4m at $\mathrm{i} \cdot [1 + \delta] = 5\%$, then she will see repurchases as accretive at any price below $80/sh. This valuation would give her an earnings yield of $\mathrm{EY} = \frac{\$4/\mathrm{sh}}{\$80/\mathrm{sh}} = 5\%$. If the firm instead has a price of $200/sh, its earnings yield would be just $\mathrm{EY} = \frac{\$4/\mathrm{sh}}{\$200/\mathrm{sh}} = 2\%$. If the lender was still quoting $\mathrm{i} \cdot [1 + \delta] = 5\%$, then buy backs would be dilutive.

Equity issuance is just the flip side of the repurchase decision. When you ask managers why they do not issue more shares, they often express concerns about diluting their EPS (Graham and Harvey, 2001). All else equal, when a company's share price increases, Proposition 3.6 tells us that an EPS-maximizing manager will find it more attractive to issue shares. In the example above, debt markets are only willing to lend the manager $80 in exchange for each $4 in annual earnings she gives up, $\$80 = \$4 \times \left(\frac{1}{5\%}\right)$. So, if the manager can issue new equity at a price of $81/sh or higher, then she is better off doing that.

[2]Allan Sloan "The real reason US airlines and Boeing went for a combined $73.7 billion in buybacks." *The Washington Post.* Apr 15, 2020.

This discussion has a similar flavor to the market-timing story for equity issuance in Baker and Wurgler (2000, 2002). Our two mechanisms are not mutually exclusive. Both are likely at work in real-world asset markets. But they are two separate mechanisms. For one thing, there are no arbitrage opportunities in our model. An EPS-maximizing manager does not need to know why her earnings yield is higher or lower than her marginal interest rate. She simply takes these prices as given and adjusts her capital accordingly. Whatever the reason, the recipe for increasing her EPS is the same.

3.7 Cash Accumulation

Some companies have large cash reserves. When cash appears on their balance sheet, it tends to stay there. Bates, Kahle, and Stulz (2009) documents that "the average cash-to-assets ratio for US industrial firms more than [doubled] from 1980 to 2006." Since then, the pattern has flattened out for large public companies in the US (Faulkender, Hankins, and Petersen, 2019). Why were these firms not spending cash, and what changed in the mid 2000s? How could cash not always be the cheapest financing option?

Suppose an EPS-maximizing manager has just bought the assets to create her firm. With the paperwork done, she decides to go on a tour of her newly acquired factories. While on this tour, she sees single \$1 bill lying on the floor. Since this cash "windfall" did not get factored into the original sale price, the manager did not have to finance its cost. If she were to invest this \$1, she could use the resulting riskfree interest payment to boost her earnings by $\text{rf} \times \$1$. Hence, after finding \$1 of cash, the manager's new EPS must be at least

$$\frac{\{\mathbb{E}[\text{NOI}] - \text{i} \cdot \text{LoanAmt}\} \;+\; \text{rf} \cdot \$1}{\#\text{Shares}} \tag{27}$$

But is this the best way to make use of the newfound \$1 of cash?

If the manager has just created a value stock, $\text{EY}^V(0) > \text{rf}$, then the answer is "No." In that case, the manager would have already exhausted her riskfree borrowing capacity before discovering the extra cash while touring her facilities,

$\ell_\star^V \geq \ell_{\max \mathrm{rf}}$. For the sake of argument, suppose she exceeded her riskfree borrowing limit by exactly one dollar, $\ell_\star^V = \frac{\mathrm{LoanAmt}(\ell_{\max \mathrm{rf}})+\$1}{\mathrm{CostOfAssets}}$. This would require the manager to pay a slight risk premium on her existing debt, $\mathrm{i}^V(\ell_\star^V) > \mathrm{rf}$. Hence, now that she has a \$1 in cash, it makes no sense for her to continue paying this risk premium. The manager could increase her EPS by $\{\mathrm{i}^V(\ell_\star^V) - \mathrm{rf}\} \times \$1$ via a cash-financed debt repurchase.

Things are different if the manager has just created a growth stock, $\mathrm{EY}^G(0) < \mathrm{rf}$. Spending the \$1 of cash is like retiring a riskfree \$1 loan. So, if it is not accretive to borrow \$1 riskfree, it cannot be accretive to spend a \$1 of cash. In fact, cash is like negative debt (Acharya, Almeida, and Campello, 2007), and negative debt sounds like a great idea to an EPS-maximizing manager running a growth stock. Such a manager chose to be unlevered to begin with, $\ell_\star^G = 0$. But, if it had been an option, she would have preferred to use negative leverage. The \$1 of cash she just discovered pushes her a little bit in that direction.

Proposition 3.7 (Cash Accumulation)**.** *Value stocks use cash to pay down risky debt whenever possible,* $\mathrm{EY}^V(\ell_\star^V) = \mathrm{i}^V(\ell_\star^V)\cdot[1+\delta^V(\ell_\star^V)] > \mathrm{rf}$, *so their cash holdings hover around zero. By contrast, growth stocks prefer to finance themselves by issuing equity even when cash is present,* $\mathrm{EY}^G(0) < \mathrm{i}^G(0) \cdot [1 + \delta^G(0)] = \mathrm{rf}$, *so their cash holdings go unused and tend to increase rapidly.*

To explain this pattern using an NPV-maximizing framework, a researcher must introduce new ingredients, such as borrowing constraints or tax differentials (Almeida, Campello, and Weisbach, 2004; Moyen, 2004; Faulkender and Wang, 2006; Harford, Mansi, and Maxwell, 2008; Denis and Sibilkov, 2010; Farre-Mensa and Ljungqvist, 2016; Begenau and Palazzo, 2021). By contrast, our simple max EPS model naturally predicts that growth stocks will accumulate cash while value stocks should use it to pay down risky debt obligations. Other than the cash itself, nothing needs to be added to our existing framework.

4 Empirical Evidence

The people running large public corporations spend much of their time talking about EPS growth, and we have just seen that the simplest possible max EPS model generates a number of sharp testable predictions. The EPS-maximizing manager of a growth stock (ExcessEY $<$ 0%; EY $<$ rf; PE $>$ 1/rf) should view equity as the cheapest source of financing even when cash is available, use little leverage, and never repurchase shares. If you put the same manager in charge of a value stock (ExcessEY $>$ 0%; EY $>$ rf; PE $<$ 1/rf), she would lean toward debt financing, repurchasing shares any time her earnings yield increased, and use cash to pay down risky debt whenever possible. This section documents strong empirical support for each of these predictions.

4.1 Data Description

We create an annual dataset of firm characteristics by merging variables from WRDS' Ratios Suite onto annual Compustat data. We use daily price data from CRSP. We use data from the IBES unadjusted summary file to calculate each firm's earnings yield and EPS. We also retrieve data from several other sources. In our main specifications, the riskfree rate is the 10-year Treasury yield. Our data on new issuance comes from SDC. We download simulated pre-interest marginal tax rates from John Graham's website (`https://people.duke.edu/~jgraham/taxform.html`).

To be included in our sample, a company must be public and traded on NYSE, Nasdaq, or AmEx. It must have a share code of 10 or 11, and a share price over $5. We exclude firms below the 30th percentile of the NYSE market capitalization in the month of their fiscal year-end. Following the existing literature, we also remove firms in the financial and utility industries (SIC codes 4900-4999 and 6000-6999). All variables are winsorized at the 1st and 99th percentiles within each year. Each firm in year t has at least one analyst who made a next-twelve-month EPS forecast (end of year $t+1$) at some point during the period from 11 months to 13 months prior to the end of the next fiscal year (year $t+1$).

Our final dataset contains 45,115 firm-year observations over the period from 1976 to 2023. Since we use the PERMNO of a company's primary issuance as a unique identifier for that firm, we will talk about "firm" and "PERMNO" interchangeably. We report summary statistics at the firm-year level in Table 1. We double-cluster all standard errors by both firm and year.

To illustrate the structure and timing of our data, it is helpful to look at a concrete example. IBM's 2005 fiscal year ended in December 2005. Our model predicts that IBM's excess earnings yield should be correlated with its current capital structure (end of FY2005) and its corporate policies over the next twelve months (FY2006). We calculate IBM's forward earnings yield by dividing analysts' consensus next-twelve-month EPS forecast for IBM in December 2005 by the company's final price in December 2005. To get to IBM's excess earnings yield, we then subtract off the 10-year Treasury yield in December 2005. We use this estimate for IBM's ExcessEY to predict the company's leverage (e.g., Total Debt/Assets, Financial Leverage > 10%) at the end of FY2005 (December 2005). Whereas, we measure changes in IBM's corporate policies (e.g., Will Repurchase Shares, Will Issue Debt, Will Issue Equity, ΔCash/Assets) using data from FY2006. See Appendix IA.3 for further details on variable construction.

4.2 Quantification

Figure 2 shows that there are large qualitative differences between the capital-structure decisions made by growth and value stocks. We now quantify the size of these differences and verify that the effects are not explained by obvious confounding factors.

Leverage. Proposition 3.4 predicts that there should be a large difference between the amount of leverage used by growth and value stocks. To maximize its EPS, a growth firm should finance itself using mostly equity. Whereas, the EPS-maximizing manager of a value stock should, at the very least, use up all her riskfree borrowing capacity. We assess the size of the growth-vs-value leverage

	# Obs	Avg	Sd	Min	Max
ExcessEY	45,115	1.2%	4.2%	−24.9%	24.3%
Is Value Stock	45,115	63.2%			
Total Debt/Assets	44,961	51.7%	21.8%	3.2%	153.3%
Financial Leverage > 10%	45,062	72.6%			
Will Repurchase Shares	37,896	30.1%			
Will Issue Debt	45,115	17.1%			
Will Issue Equity	45,115	8.1%			
ΔCash/Assets	32,930	1.9%	9.9%	−29.5%	142.5%
$\log_2$(Market Cap)	45,021	31.0	2.2	25.4	38.5
Profitability	45,071	14.9%	10.8%	−54.9%	53.2%
Book To Market (B/M)	43,912	48.4%	36.0%	1.0%	332.4%
Tangibility	45,071	29.6%	22.6%	0.2%	93.2%
Marginal Tax Rate	27,582	33.7%	9.0%	0.0%	46.0%

	Was Value → Is Growth		Was Growth → Is Value	
	Avg	Sd	Avg	Sd
ΔExcessEY	−3.4%	3.1%	3.1%	2.5%
# Obs	3,008		3,455	

Table 1. Firm-year observations from 1976 to 2023. ExcessEY: Next-twelve-month earnings yield minus the 10-year Treasury rate. Is Value Stock: Observation has ExcessEY > 0%. Total Debt/Assets: Total liabilities as a percent of total assets. Financial Leverage > 10%: Percent of firm-year observations that have long-term financial debt worth at least 10% of their assets. Will Repurchase Shares: Percent of observations where the firm repurchases ≥ 1% of its current market cap over the next year. Will Issue Debt: Percent of observations where the firm issues new debt next year. Will Issue Equity: Percent of observations where the firm issues new equity next year. ΔCash/Assets: Change in cash and cash equivalents over the next year as a percent of total assets in the current year. $\log_2$(Market Cap): Base-2 log of market cap. Profitability: Operating income before depreciation as a percent of total assets. Book To Market: Book value of equity as a percent of market capitalization. Tangibility: Net PP&E spending as a percent of total assets. Marginal Tax Rate: Graham (1996) pre-interest marginal tax rate. Was Value → Is Growth: Firm-year observations where $\text{ExcessEY}_{n,t-1} > 0\%$ but $\text{ExcessEY}_{n,t} < 0\%$. Was Growth → Is Value: $\text{ExcessEY}_{n,t-1} < 0\%$ and $\text{ExcessEY}_{n,t} > 0\%$.

Dep Variable:	Total Debt/Assets				
	(1)	(2)	(3)	(4)	(5)
Is Value Stock ExcessEY > 0%	10.25*** (0.88)	10.10*** (0.79)	4.17*** (0.60)	12.50*** (0.72)	10.99*** (0.78)
$\log_2$(Mkt Cap)				1.91*** (0.19)	2.07*** (0.20)
Profitability				−0.38*** (0.06)	−0.73*** (0.06)
Book to Market				−0.03** (0.02)	−0.06*** (0.02)
Tangibility				0.17*** (0.01)	0.17*** (0.02)
Marg Tax Rate					0.29*** (0.05)
Year FE	*N*	*Y*	*N*	*Y*	*Y*
Firm FE	*N*	*N*	*Y*	*N*	*N*
# Obs	44,961	44,961	44,061	43,815	27,000
Adj. R^2	5.1%	7.1%	65.5%	15.4%	19.5%

Table 2. Total Debt/Assets: Total liabilities as percent of a firm's total assets in year t. Is Value Stock: 1 if a firm has a positive excess earnings yield in year t, $\text{ExcessEY}_{n,t} > 0\%$. Numbers in parentheses are standard errors double-clustered by firm and year. *, **, and *** denote statistical significance at the 10%, 5%, and 1% levels. We do not report the intercept or fixed-effect coefficients.

gap by running regressions of the form below

$$\text{Total Debt/Assets}_{n,t} = \hat{\alpha} + \hat{\beta} \cdot \text{Is Value Stock}_{n,t} + \cdots + \hat{\varepsilon}_{n,t} \tag{28}$$

Total Debt/Assets$_{n,t}$ is the nth firm's total liabilities as a percent of its total asset value in year t, and Is Value Stock$_{n,t} \overset{\text{def}}{=} 1_{\{\text{ExcessEY}_{n,t} > 0\%\}}$ indicates whether the nth firm had a positive excess earnings yield in year t.

Column (1) in Table 2 shows that the typical value stock had a leverage level that was 10.25%pt higher than the typical growth stock. When we add year fixed effects in column (2), the effect size hardly changes. Companies do not usually adjust their capital structure very much from year to year (Leary and Roberts, 2005; Lemmon, Roberts, and Zender, 2008; DeAngelo and Roll, 2015).

For the most part, growth stocks tend to remain growth stocks. A value stock in 1994 is likely to be a value stock in 1995. Hence, it is not surprising that, when we include firm fixed effects in column (3), the effect size drops to $\hat{\beta} = 4.17$%pt. This is not a knock on our theory. It is exactly what our model would predict in a world where leverage is persistent.

Columns (4) and (5) show that the 10.25%pt difference documented in column (1) cannot be attributed to other observable differences between growth and value stocks as we define them. These columns control for a firm's size, its profitability, its book-to-market ratio, the tangibility of the firm's assets, and the firm's marginal tax rate. While many of these variables are statistically significant, the effects are economically tiny. Moreover, the coefficient on a firm's book-to-market ratio has the wrong sign. We include the marginal tax rate in a separate column because adding this particular variable meaningfully reduces our sample size.

Strebulaev and Yang (2013) found that 22% of all US public companies had almost-zero financial leverage ($<$ 10%). It would be surprising to find so many firms at this corner solution in a world where managers were maximizing NPV subject to a long laundry list of constraints. However, this outcome makes perfect sense when viewed through an EPS-maximizing lens. According to this way of thinking, growth stocks should be unlevered. Column (1) in Table 3 shows that growth stocks are 19.78%pt more likely to have almost zero financial leverage. Our simple max EPS model accounts for nearly all the effect.

Issuance And Repurchases. Firms can lever up without actually issuing corporate bonds. In fact, Welch (2011) finds that only around half of total leverage is due to long-term "financial" debt. The other half comes from non-financial liabilities, such as accounts payable, accrued expenses, tax liabilities, etc. Our max EPS model predicts that value stocks should have high leverage because they issue more bonds, not because they have more money sitting in accounts payable. Consistent with this story, Table 4 shows that value stocks are more likely to issue debt and less likely to issue equity. The −6.22%pt estimate in column (4) is economically massive. The summary statistics in Table 1 show

Dep Variable:	Financial Leverage > 10%				
	(1)	(2)	(3)	(4)	(5)
Is Value Stock ExcessEY > 0%	19.78*** (1.79)	21.95*** (1.42)	8.65*** (1.10)	20.73*** (1.25)	16.74*** (1.42)
$\log_2$(Mkt Cap)				3.82*** (0.36)	3.62*** (0.41)
Profitability				−0.61*** (0.11)	−1.34*** (0.11)
Book to Market				0.12*** (0.02)	0.05* (0.03)
Tangibility				0.47*** (0.03)	0.46*** (0.04)
Marg Tax Rate					0.52*** (0.05)
Year FE	*N*	*Y*	*N*	*Y*	*Y*
Firm FE	*N*	*N*	*Y*	*N*	*N*
# Obs	45,062	45,062	44,162	43,910	27,041
Adj. R^2	4.6%	6.4%	50.2%	16.7%	16.6%

Table 3. Financial Leverage >10%: 100 if a firm has long-term debt in year t worth at least 10% of its assets. Is Value Stock: 1 if a firm has a positive excess earnings yield in year t, $\text{ExcessEY}_{n,t} > 0\%$. Numbers in parentheses are standard errors double-clustered by firm and year. *, **, and *** denote significance at 10%, 5%, and 1% levels. We do not report the intercept or fixed effects.

that seasoned equity offerings (SEOs) are relatively rare, occurring in just 8.1% of all firm-year observations.

Proposition 3.6 predicts that, in a world populated by EPS-maximizing managers, share repurchases should mainly be done by value stocks. We test whether this is what our world looks like by estimating regressions of the form

$$\text{Will Repurchase Shares}_{n,t} = \hat{\alpha} + \hat{\beta} \cdot \text{Is Value Stock}_{n,t} + \cdots + \hat{\varepsilon}_{n,t} \qquad (29)$$

$\text{Will Repurchase Shares}_{n,t}$ is an indicator variable that is 100 if the nth firm repurchases $\geq$ 1% of its current market cap in year t over the next twelve months in year $(t+1)$. We use 0/100 rather than 0/1 so that the estimated $\hat{\beta}$ can be interpreted as a percentage-point change.

Dep Variable:	Will Issue Debt			Will Issue Equity		
	(1)	(2)	(3)	(4)	(5)	(6)
Is Value Stock ExcessEY > 0%	9.62*** (0.99)	10.37*** (0.89)	8.13*** (0.67)	−6.22*** (0.76)	−6.38*** (0.87)	−3.13*** (0.59)
$\log_2$(Mkt Cap)			7.54*** (0.35)			−0.48*** (0.15)
Profitability			−0.20*** (0.03)			−0.40*** (0.04)
Book To Market			0.10*** (0.01)			−0.06*** (0.01)
Tangibility			0.19*** (0.02)			0.08*** (0.01)
Year FE	*N*	*Y*	*Y*	*N*	*Y*	*Y*
# Obs	45,115	45,115	43,912	45,115	45,115	43,912
Adj. R^2	1.5%	3.2%	17.4%	1.2%	2.3%	4.3%

Table 4. Will Issue Debt: 100 in year t if a firm issues new debt in year $(t+1)$. Will Issue Equity: 100 in year t if a firm issues new equity in year $(t+1)$. Is Value Stock: 1 if a firm has a positive excess earnings yield in year t, $\text{ExcessEY}_{n,t} > 0\%$. Numbers in parentheses are standard errors double-clustered by firm and year. *, **, and *** denote significance at 10%, 5%, and 1% levels. We do not report the intercept or fixed-effect coefficients.

Column (1) in Table 5 shows that a stock with a positive excess earnings yield is $\hat{\beta}$ = 20.91%pt more likely to repurchase shares over the next twelve months. Columns (2) and (3) show that the result is not attenuated by including year and firm fixed effects. Column (4) controls for firm size, profitability, book-to-market, and asset tangibility. Adding these variables reduces our estimate for $\hat{\beta}$ by about 1/3, from 20.91%pt to 12.30%pt. However, the sample average repurchase rate is 30.1%. So, economically speaking, this is still a large effect. The same is true when we account for a firm's marginal tax rate in column (5). Our findings are not driven by the usual suspects.

Cash Accumulation. Proposition 3.7 says that growth stocks should rapidly accumulate cash. Since an EPS maximizer would always view equity as the cheapest source of financing, any cash that shows up on a growth stock's balance

Dep Variable:	Will Repurchase Shares				
	(1)	(2)	(3)	(4)	(5)
Is Value Stock ExcessEY > 0%	20.91*** (2.27)	16.62*** (1.88)	17.59*** (1.71)	12.30*** (1.24)	10.37*** (1.35)
$\log_2$(Mkt Cap)				2.97*** (0.36)	2.68*** (0.39)
Profitability				0.82*** (0.05)	0.86*** (0.09)
Book to Market				0.06*** (0.01)	0.05** (0.02)
Tangibility				−0.17*** (0.03)	−0.16*** (0.03)
Marg Tax Rate					0.08 (0.07)
Year FE	*N*	*Y*	*N*	*Y*	*Y*
Firm FE	*N*	*N*	*Y*	*N*	*N*
# Obs	37,896	37,896	37,271	37,034	23,859
Adj. R^2	4.7%	12.1%	21.6%	16.1%	15.2%

Table 5. Will Repurchase Shares: 100 if a firm repurchases ≥ 1% of its market cap at the end of year t during the following year $(t+1)$. Is Value Stock: 1 if a firm has a positive excess earnings yield in year t, $\text{ExcessEY}_{n,t} > 0\%$. Numbers in parentheses are standard errors double-clustered by firm and year. *, **, and *** denote statistical significance at 10%, 5%, and 1%. We do not report the intercept or fixed-effect coefficients.

sheet should remain there as dry powder. By contrast, if cash were to appear on a value stock's balance sheet, its EPS-maximizing manager would see this money as her cheapest source of financing and use it to pay down any outstanding risky debt.

We assess the size of this predicted difference in the data by estimating regressions of the form below

$$\Delta\text{Cash/Assets}_{n,t} = \hat{\alpha} + \hat{\beta} \cdot \text{Is Value Stock}_{n,t} + \cdots + \hat{\varepsilon}_{n,t} \tag{30}$$

$\Delta\text{Cash/Assets}_{n,t}$ is the change cash and cash equivalents for the nth stock over the next twelve months as a percent of its total assets in year t.

Dep Variable:	ΔCash/Assets				
	(1)	(2)	(3)	(4)	(5)
Is Value Stock ExcessEY > 0%	−2.38*** (0.46)	−2.90*** (0.45)	−1.21*** (0.28)	−2.19*** (0.29)	−1.51*** (0.24)
$\log_2$(Mkt Cap)				1.91*** (0.19)	2.07*** (0.20)
Profitability				−0.38*** (0.06)	−0.73*** (0.06)
Book to Market				−0.03** (0.01)	−0.06*** (0.02)
Tangibility				0.17*** (0.01)	0.17*** (0.02)
Marg Tax Rate					0.29*** (0.05)
Year FE	*N*	*Y*	*N*	*Y*	*Y*
Firm FE	*N*	*N*	*Y*	*N*	*N*
# Obs	32,930	32,930	32,461	32,223	21,961
Adj. R^2	1.3%	3.9%	8.8%	5.0%	4.5%

Table 6. ΔCash/Assets: Change in a firm's cash and cash equivalents from year t to year $(t+1)$ as a percent of the company's total assets in year t. Is Value Stock: 1 if a firm has a positive excess earnings yield in year t, $\text{ExcessEY}_{n,t} > 0\%$. Numbers in parentheses are standard errors double-clustered by firm and year. *, **, and *** denote statistical significance at 10%, 5%, and 1%. We do not report the intercept or fixed-effect coefficients.

Column (1) in Table 6 shows that, among all stocks in year t, the ones with a positive excess earnings yield (a.k.a., value stocks) reduced their cash reserves by $\hat{\beta} = 2.38\%$ of their total assets each year. Column (2) shows that the effect is not driven by year-specific considerations. In column (3), we see that around 1/2 of the effect can be soaked up by firm fixed effects. Again, this does not constitute evidence against our model. It is exactly what one would expect if growth- and value-stock labels were persistent.

In columns (4) and (5), we include controls for firm size, profitability, book-to-market, asset tangibility, and marginal tax rates. Adding these variables to our regression reduces the estimate of $\hat{\beta}$ slightly, but the value is still statistically significant and economically large.

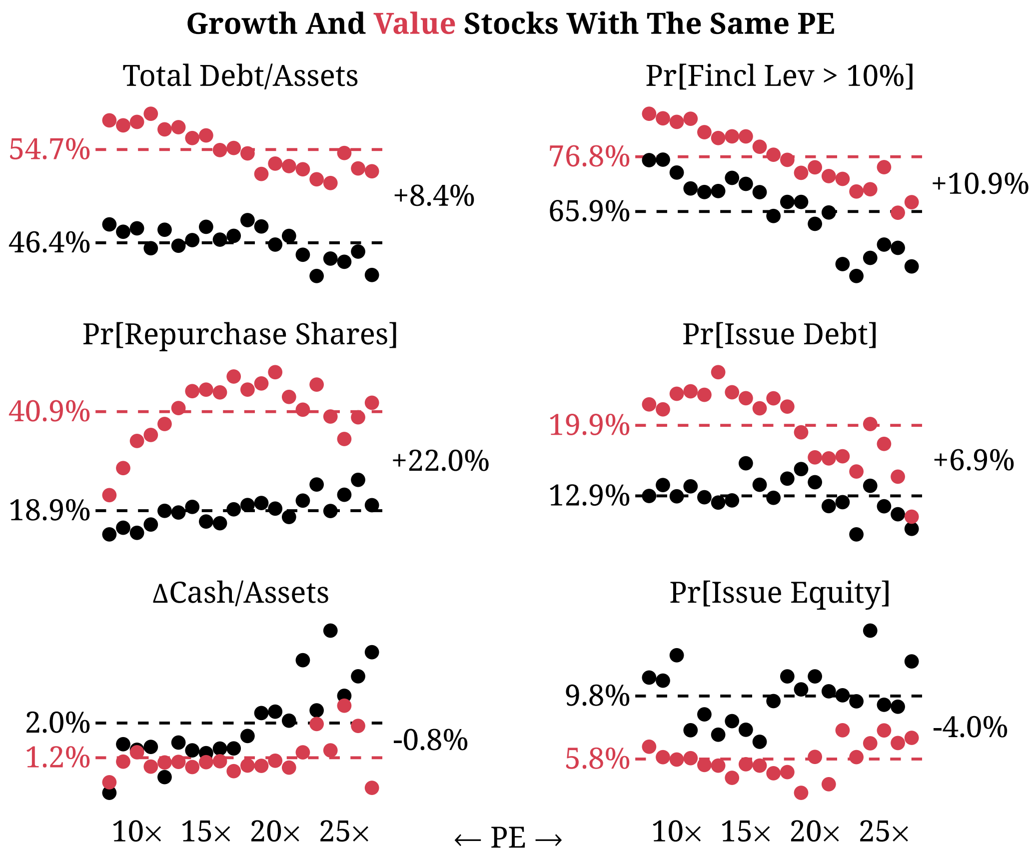

Figure 7. Black dots represent the average outcome for growth stocks with a given PE ratio (EY < rf; ExcessEY < 0%; PE > 1/rf). Red dots show the average for value stocks (EY > rf; ExcessEY > 0%; PE < 1/rf). The x-axis represents a firm's forward PE ratio in 1× bins. Horizontal dashed lines and numbers on the left y-axis report averages for growth and value stocks. The number on the right is the difference between the two sample means.

4.3 Identification

Anything that just has the broad flavor of more repurchases among value stocks and more share issuance among growth stocks does not really cut it. Such findings could be consistent with a wide range of other stories. We now rule out these competing narratives by focusing on the specific way in which the principle of EPS maximization defines "value" and "growth".

Controlling For The PE Ratio. The growth and value stocks in our paper are not exactly the same as the growth and value stocks in the existing literature. While there is no consensus definition, existing approaches are based on sorting stocks by some measure of fundamental value to price. For example, in the past researchers have often ranked stocks by their PE ratio, labeling those in the highest 30% as a "growth stock" and those in the bottom 30% as a "value stock".

Instead of comparing a company's PE to the median PE ratio, the principle of EPS maximization says to compare a firm's earnings yield to the prevailing riskfree rate, $\text{EY} \overset{?}{\lesseqgtr} \text{rf}$. A "value stock" is a company with a positive excess earnings yield: $\text{ExcessEY} \overset{\text{def}}{=} \text{EY} - \text{rf} > 0\%$; $\text{EY} > \text{rf}$; $\text{PE} < 1/\text{rf}$. A "growth stock" is a firm with a negative excess earnings yield: $\text{ExcessEY} < 0\%$; $\text{EY} < \text{rf}$; $\text{PE} > 1/\text{rf}$. A company with a 20× PE has an earnings yield of $\text{EY} = \left(\frac{1}{20}\right) = 5\%$, making it a growth stock when the 10-year Treasury rate is 6%, $\text{ExcessEY} = 5\% - 6\% = -1\%\text{pt}$, but a value stock when $\text{rf} = 4\%$, $\text{ExcessEY} = 5\% - 4\% = +1\%\text{pt}$.

To emphasize how different this new value-vs-growth classification scheme is, Figure 7 reports average outcomes for value and growth stocks that both have the same PE ratio. During the 23 years when the 10-year Treasury rate was below 5%, a company with a 20× PE was a value stock. The top left panel shows that in this interest-rate regime the leverage ratio of the typical 20× PE firm was 53.5%. By contrast, a 20× PE company was a growth stock during the 25 years when rf was above 5%, and in this regime the average 20× PE firm had a leverage ratio that was 7.3%pt lower, 46.2%. We find similar patterns in all six of our main outcome variables. Moreover, the effect sizes are similar to our baseline results found in Tables 2-6.

We formalize this observation in Table 7 by rerunning these regressions with PE-ratio fixed effects, which takes out a level effect for each 1× PE bin. We find that the coefficient on $\text{Is Value Stock}_{n,t} \overset{\text{def}}{=} 1_{\{\text{ExcessEY}_{n,t} > 0\%\}}$ remains statistically significant and economically large in every case. It is not just about PE ratios, either. We get the same results when using other common sorting variables used in defining "value" and "growth". Recall that the right-most columns in Tables 2-6 already control for a firm's book-to-market (B/M) ratio.

Dep Var:	$\frac{\text{Total Debt}}{\text{Assets}}$ (1)	Fincl Lev>10% (2)	Will Repurchase (3)	Will Issue Debt (4)	Will Issue Equity (5)	$\frac{\Delta\text{Cash}}{\text{Assets}}$ (6)
Is Value Stock ExcessEY > 0%	$8.50^{\star\star\star}$ (0.97)	$11.39^{\star\star\star}$ (1.92)	$22.09^{\star\star\star}$ (1.74)	$7.06^{\star\star\star}$ (1.15)	$-3.73^{\star\star\star}$ (0.73)	$-0.98^{\star\star}$ (0.39)
PE-ratio FE	Y	Y	Y	Y	Y	Y
# Obs	44,451	45,451	37,450	44,603	44,603	32,547
Adj. R^2	6.4%	7.1%	7.1%	1.5%	3.0%	5.9%

Table 7. This table reproduces the main results from Tables 2-6 when including PE-ratio fixed effects. Is Value Stock: 1 if a firm's excess earnings yield is positive in year t, $\text{ExcessEY}_{n,t} > 0\%$. The PE-ratio fixed effects involve estimating a separate coefficient for $\hat{\mu}_{\{10\times<\text{PE}\leq 11\times\}}$, $\hat{\mu}_{\{11\times<\text{PE}\leq 12\times\}}$, $\hat{\mu}_{\{12\times<\text{PE}\leq 13\times\}}$, etc. Numbers in parentheses are standard errors double-clustered by firm and year. *, **, and *** denote significance at 10%, 5%, and 1%. We do not report the intercept.

Changes In Market Composition. Under our classification scheme, a value stock is not just a stock with a low PE ratio. It is a stock whose PE ratio is below a specific cutoff—namely, 1/rf. Figure 8 shows that the share of value stocks in the market, $\Pr[\text{Is Value Stock}_{n,t}] = \Pr[\text{ExcessEY}_{n,t} > 0\%]$, has fluctuated widely over the past 50 years. In 2000 during the DotCom Bubble, stock prices were so high that 9 out of 10 companies were growth stocks. Things then changed dramatically over the next few years. The start of the Great Financial Crisis in 2007 kicked off a 20-year run where most companies were value stocks.

When defining value and growth with a cross-sectional sorting rule, these two collections of stocks are hard-coded to be the same size every period. According to Fama and French (1993), value stocks always constitute 30% of the market. Nevertheless, we can still compute the value-weighted average book-to-market (B/M) ratio across all stocks, $\text{Avg}[\text{Book To Market}_{n,t}]$. The red dashed line in Figure 8 shows that, by this measure, the market has been "growthy" for a long time. The market's B/M has been below 50% since the late 1980s.

We began Subsection 3.7 by asking why the average publicly traded firm in the US stopped accumulating cash in the mid-2000s. The answer is clear when using our measure of value: The market switched from being 90% growth to 90% value. By contrast, there is no corresponding change in the average B/M.

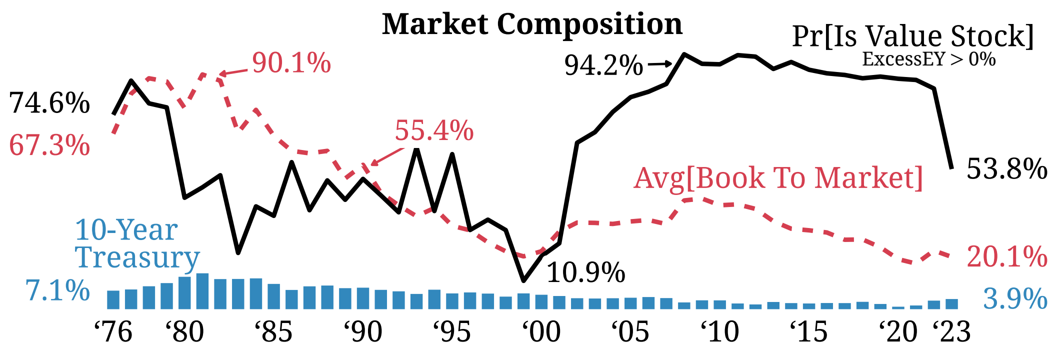

Figure 8. 10-Year Treasury: Average of the 10-year Treasury rate in year *t*. Pr[Is Value Stock]: Percent of firms with a positive excess earnings yield in year *t*, $\text{ExcessEY}_{n,t} > 0\%$. Avg[Book To Market]: Value-weighted average book-to-market ratio for firms in year *t*.

The different trajectories of these two lines also explains why the coefficient on B/M has the wrong sign in Table 2. In Appendix IA.4, we show that we get similar results when using Moody's Aaa corporate bond yield as rf.

Figure 8 shows that 2023 was the first time since that growth stocks made up half the market. This shift had a big effect on how firms financed themselves. When rates go up, it discourages EPS-maximizing managers from borrowing. "'Companies always gravitate towards the place where capital is cheapest, and for years public equity markets were not a good place to source capital,' said Citi's chief global equity strategist. [...] For the first time in over two decades, it's cheaper for blue-chip companies in the US to sell shares than to borrow."[3]

Ben-David and Chinco (2025c) points out that many market participants use similar logic when reasoning about level of the stock market. They ask themselves: "Would a CEO think it was cheap to issue equity right now?" Instead of calculating an excess return, investors often calculate an "equity risk premium" that reflects the difference between the S&P 500's forward earnings yield and the 10 year Treasury rate. This approach makes little sense from a present-value perspective (Asness, 2000, 2003; Campbell and Vuolteenaho, 2004). However, it precisely corresponds to the key variable in our model, $\text{ExcessEY} \stackrel{\text{def}}{=} \text{EY} - \text{rf}$.

[3] Sujata Rao and Bailey Lipschultz "Debt-Addicted Companies Look to Equity as Interest Costs Skyrocket." *Bloomberg News.* Feb 26, 2024.

Controlling For A Linear Trend. According to our theory, growth stocks should not gradually behave more and more like value stocks as ExcessEY increases. Instead, we should see a large qualitative change in financing choices when a firm's excess earnings yield flips sign. Theory says that…

Growth stocks should choose one set of EPS-maximizing policies $\begin{pmatrix} \text{EY} < \text{rf} \\ \text{ExcessEY} < 0\% \\ \text{PE} > 1/\text{rf} \end{pmatrix}$	whereas	Value stocks maximize their EPS using a very different set of policies $\begin{pmatrix} \text{EY} > \text{rf} \\ \text{ExcessEY} > 0\% \\ \text{PE} < 1/\text{rf} \end{pmatrix}$

We see evidence of this shift at ExcessEY = 0% in every panel of Figure 2.

Moreover, while real-world corporate executives talk a lot about whether EY $\lessgtr$ rf, this was not a comparison that played any role in existing corporate-finance theory. It was not clear a priori that firms would consistently make different financing decisions on either side of ExcessEY = 0%. We did not write down our simple max EPS model with this empirical pattern in mind.

It is important to emphasize that, while our model predicts a sharp change at ExcessCapRate $\overset{\text{def}}{=}$ EY(0) − rf = 0%, we only observe a firm's levered earnings yield, ExcessEY $\overset{\text{def}}{=}$ EY($\ell_\star$) − rf. But, we are not merely hoping that ExcessEY is a good proxy for ExcessCapRate. In Subsection 3.5, we theoretically characterize the relationship between these two variables. We show that the difference explains why we see "S" curves rather than step functions in Figure 2.

Table 8 provides direct evidence of a non-linear change at ExcessEY = 0% for each of the six outcome variables we have looked at so far. We do this by including ExcessEY as a control variable in regressions of the form below

$$\text{Outcome}_{n,t} = \hat{\alpha} + \hat{\beta} \cdot \text{Is Value Stock}_{n,t} + \hat{\gamma} \cdot \text{ExcessEY}_{n,t} + \cdots + \hat{\varepsilon}_{n,t} \tag{31}$$

Suppose we were measuring ExcessCapRate not ExcessEY. Then, in a world where CEOs only considered EPS accretion when making financing choices, we would find $\hat{\gamma} = 0$ and $\hat{\beta}$ would be the same as in column (1) of Tables 2-6.

Dep Var:	Total Debt / Assets (1)	Fincl Lev>10% (2)	Will Repurchase (3)	Will Issue Debt (4)	Will Issue Equity (5)	ΔCash / Assets (6)
Is Value Stock ExcessEY > 0%	4.03*** (0.66)	10.70*** (1.53)	8.41*** (1.79)	4.09*** (0.95)	−2.24*** (0.73)	−1.77*** (0.33)
ExcessEY	1.04*** (0.13)	1.93*** (0.21)	1.51*** (0.29)	1.07*** (0.15)	−0.71*** (0.12)	−1.04*** (0.14)
Year FE	Y	Y	Y	Y	Y	Y
# Obs	44,961	45,062	37,896	45,115	45,115	32,930
Adj. R^2	8.8%	7.8%	12.8%	3.8%	2.8%	4.2%

Table 8. This table reproduces the main results from Tables 2-6 when controlling for the level of ExcessEY. Total Debt/Assets: Total liabilities as percent of a firm's total assets in year t. Financial Leverage >10%: 100 if a firm has long-term debt in year t worth at least 10% of its assets. Will Issue Debt: 100 in year t if a firm issues new debt in year $(t+1)$. Will Issue Equity: 100 in year t if a firm issues new equity in year $(t+1)$. Will Repurchase Shares: 100 if a firm repurchases ≥ 1% of its market cap at the end of year t during the following year $(t+1)$. ΔCash/Assets: Percent change in a firm's cash and cash equivalents from year t to year $(t+1)$ as a percent of the company's total assets in year t. ExcessEY: Level of a firm's excess earnings yield in year t. Is Value Stock: 1 if a firm has a positive excess earnings yield in year t, $\text{ExcessEY}_{n,t} > 0\%$. Numbers in parentheses are standard errors double-clustered by firm and year. *, **, and *** denote significance at 10%, 5%, and 1%. We do not report the intercept.

In practice, we know that EPS growth is not the only thing on a CEO's mind. Moreover, theory suggests that the change of variables from ExcessCapRate to ExcessEY will make the distance from zero to matter. Still, if our model is correct, we should find a statistically significant coefficient on Is Value Stock $\overset{\text{def}}{=}$ $1_{\{\text{ExcessEY}>0\%\}}$ even when controlling for ExcessEY.

This is precisely what the data show. For example, column (1) in Table 2 says that the typical value stock (ExcessEY $>$ 0%) has a leverage ratio that is $\hat{\beta}$ = 10.25%pt higher than that of the typical growth stock (ExcessEY $<$ 0%). Column (1) in Table 8 indicates that, while controlling for ExcessEY cuts this point estimate in half, the resulting $\hat{\beta}$ = 4.03%pt is still economically large and statistically significant.

It is also important to point out that our SDC data on new equity issuance only includes shares issued through the formal SEO process. It may not reflect all shares issued for employee compensation purposes in a given year. Sammon and Shim (2025) finds that S&P 500 companies with negative excess earnings yields are more likely to pay their employees in stock, knowing that large passive investors will immediately purchase these shares. The $\hat{\beta} = -2.24\%\text{pt}$ value in column (5) of Table 8 is likely a lower bound for the full effect.

Changes In The Riskfree Rate. A firm's earnings yield is not randomly assigned. When one firm is trading at 16.5× its forward earnings and another is trading at 12.5×, there is usually a good reason for the difference in multiples. However, our model says that an EPS maximizer cares about her firm's excess earnings yield, not its PE ratio. What matters is the difference between her firm's forward earnings yield and the current riskfree rate, $\text{ExcessEY} \overset{\text{def}}{=} \text{EY} - \text{rf}$.

We see clear evidence of this logic in the data. Figure 3 shows that the non-linear change in firms' financing choices takes place at ExcessEY = 0%, regardless of the prevailing riskfree rate at the time. Each panel reports results for a separate outcome variable. A single dot represents the average value of that outcome among firms in a particular 1%pt earnings yield bin (y-axis) in a particular year (x-axis). Red dots denote bins with high averages; whereas, blue dots denote bins with a low average value.

The black line shows the 10-year Treasury rate. Dots below the line are growth stocks. Dots above the line are value stocks. Think about all the ways that markets have changed since 1976. In spite of all these changes, the top four panels are predominantly red above the black dots and blue below them. The pattern in the bottom two panels is reversed: blue on the top and red on the bottom. Reality is complicated. The red/blue switch does not always occur precisely at ExcessEY = EY − rf = 0%, but the inflection point is reliably close.

A firm with a $\left(\frac{1}{16.5}\right) = 6\%$ earnings yield will not always prefer equity financing. A firm with $\text{EY} = \left(\frac{1}{12.5}\right) = 8\%$ will not always lean on bond markets. This is how the two firms behave in a world where the 10-year Treasury rate was sitting at rf = 7%. However, when the Treasury yield falls to rf = 5%, both firms start behaving like value stocks and finance themselves mostly with debt. In a rf = 9% environment, the pair of firms both act like growth stocks and rely on equity capital. EPS-maximizing managers make context-dependent choices.

Think about the literature that uses shareholder proxy votes to identify the causal effect of corporate-policy changes (Yermack, 2010). These studies compare firms that barely voted in favor of making a change (51% "yes") to those that barely voted against (49% "yes"). The identification would be even cleaner if the threshold was not always 50%. Imagine that winning a proxy vote by +1%pt had the same effect regardless of whether that meant getting 41%, 51%, or 61% of the vote. In this scenario, you could be very confident about the underlying cause, and it is directly analogous to our empirical setting.

The shaded dots in the center-left panel of Figure 3 spotlight an important market episode which are simple max EPS model does not capture. Prior to 1983, courts viewed buy backs as a form of insider trading. This is why the shaded dots are all blue. We do not argue that our model can capture every little bump and jiggle in the data. But it does explain a lot. More importantly, it reflects the primary objective of many real-world corporate executives. As such, it is a starting point than the traditional max NPV framework.

Response To Classification Changes. Tables 9(a)-9(c) document meaningful changes in behavior the very first year after crossing the ExcessEY = 0% threshold. Each column shows a separate regression of the form

$$\begin{aligned}\text{Outcome}_{n,t} = \hat{\alpha} + \hat{\beta} \cdot \text{Was Value}_{n,t-1} & \\ + \hat{\gamma} \cdot \{\text{Was Value}_{n,t-1} \longrightarrow \text{Is Growth}_{n,t}\} & \\ + \hat{\delta} \cdot \{\text{Was Growth}_{n,t-1} \longrightarrow \text{Is Value}_{n,t}\} & \\ + \cdots + \hat{\varepsilon}_{n,t} &\end{aligned} \tag{32}$$

$\text{Outcome}_{n,t}$ is a placeholder for one of six dependent variables. $\text{Was Value}_{n,t-1} \overset{\text{def}}{=} 1_{\{\text{ExcessEY}_{n,t-1} > 0\%\}}$ is an indicator that flags firms-year observations that had a positive excess earnings yield in the previous year. This coefficient on this variable roughly corresponds to the values of $\hat{\beta}$ in the top row of Tables 2-6.

What we really care about is the coefficients on the two transition variables. $\{\text{Was Value}_{n,t-1} \rightarrow \text{Is Growth}_{n,t}\}$ flags newly minted growth stocks, which moved from a positive excess earnings yield in the previous year to a negative number in the current year. Likewise, $\{\text{Was Growth}_{n,t-1} \rightarrow \text{Is Value}_{n,t}\}$ flags newly minted value stocks, which switched from being growth last year to value this year. The results in the top rows of Tables 9(a)-9(c) tell us that, in the very first year after exiting the fraternity of value stocks, a newly minted growth stock is already halfway to looking like a prototypical growth stock. The second row says the opposite is true for newly minted value stocks.

These are economically large changes, and the pattern is consistent across all outcomes that we examine. Moreover, it cannot be explained by simultaneous changes in a firm's market capitalization, profitability, book-to-market, or asset tangibility. The coefficients on the two transition variables are largely unchanged when we add these additional controls in columns (2) and (4). We also note that all specifications include year fixed effects, so the finding cannot be attributed to market-wide fluctuations, like shifts in the riskfree rate.

Obviously, in practice, it takes time to reconfigure how a large company finances itself (Hennessy and Whited, 2005; Flannery and Rangan, 2006; Strebulaev, 2007; Huang and Ritter, 2009). It would be unreasonable to expect a newly minted value stock to fully assimilate the very first year it has a positive excess earnings yield. We are not modeling these dynamics. Nevertheless, we still document strong empirical support for our model's main predictions. If it were essential for us to model the dynamics, then our empirical findings would be muted. They are not. We are able to capture important patterns in the data even before introducing such considerations.

Regression Discontinuity Design. Our model predicts that there are two different routes to maximizing a firm's EPS. If a company's unlevered earnings yield is below the riskfree rate, $\text{EY}(0) < \text{rf}$, an EPS-maximizing manager will take one path up the mountain. We call these companies "growth stocks". Whereas, firms with unlevered earnings yields that are above the riskfree rate, $\text{EY}(0) > \text{rf}$, are "value stocks" and pursue a different path.

Dependent Variable:	Total Debt / Assets (1)	Total Debt / Assets (2)	Financial Leverage >10% (3)	Financial Leverage >10% (4)
Was Value ⟶ Is Growth $\text{ExcessEY}_{t-1} > 0\%$ $\text{ExcessEY}_t < 0\%$	$-5.49^{\star\star\star}$ (0.69)	$-5.74^{\star\star\star}$ (0.68)	$-11.02^{\star\star\star}$ (1.22)	$-11.41^{\star\star\star}$ (1.30)
Was Growth ⟶ Is Value $\text{ExcessEY}_{t-1} < 0\%$ $\text{ExcessEY}_t > 0\%$	$4.51^{\star\star\star}$ (0.67)	$4.50^{\star\star\star}$ (0.77)	$10.36^{\star\star\star}$ (1.45)	$10.26^{\star\star\star}$ (1.57)
Was Value Stock $\text{ExcessEY}_{t-1} > 0\%$	$11.03^{\star\star\star}$ (0.92)	$11.20^{\star\star\star}$ (0.93)	$23.87^{\star\star\star}$ (1.63)	$24.14^{\star\star\star}$ (1.77)
$\Delta \log_2$(Mkt Cap)		$-4.25^{\star\star\star}$ (0.62)		$-5.49^{\star\star}$ (1.17)
ΔProfitability		0.05 (0.04)		−0.03 (0.05)
ΔBook To Market		$-0.14^{\star\star\star}$ (0.02)		$-0.16^{\star\star\star}$ (0.03)
ΔTangibility		$-0.23^{\star\star\star}$ (0.04)		$-0.37^{\star\star\star}$ (0.08)
Year FE	*Y*	*Y*	*Y*	*Y*
# Obs	37,779	36,695	37,870	36,784
Adj. R^2	7.3%	9.0%	5.9%	6.5%

Table 9(a). Total Debt/Assets: Total liabilities as a percent of a firm's total assets in year t. Financial Leverage >10%: 100 if a firm has long-term debt in year t worth at least 10% of its assets. Was Value ⟶ Is Growth: 1 if a firm transitioned from being a value stock in year $(t-1)$ to being a growth stock in year t. Was Growth ⟶ Is Value: 1 if a firm was a growth stock in year $(t-1)$ and is a value stock in year t. Was Value Stock: 1 if a firm had a positive excess earnings yield in year $(t-1)$. ΔControl Variable: Realization in the current year minus the realization in the previous year. Numbers in parentheses are standard errors double-clustered by firm and year. $\star$, $\star\star$, and $\star\star\star$ denote statistical significance at 10%, 5%, and 1% levels. We do not report the intercept or fixed-effect coefficients.

Dependent Variable:	Will Repurchase Shares		Will Issue Debt	
	(1)	(2)	(3)	(4)
Was Value → Is Growth $\text{ExcessEY}_{t-1} > 0\%$ $\text{ExcessEY}_{t} < 0\%$	-13.38^{***} (2.04)	-12.00^{***} (1.89)	-6.18^{***} (0.97)	-6.19^{***} (0.98)
Was Growth → Is Value $\text{ExcessEY}_{t-1} < 0\%$ $\text{ExcessEY}_{t} > 0\%$	10.08^{***} (1.51)	7.93^{***} (1.59)	5.50^{***} (1.37)	5.42^{***} (1.39)
Was Value Stock $\text{ExcessEY}_{t-1} > 0\%$	17.70^{***} (2.15)	16.47^{***} (2.08)	12.92^{***} (1.08)	12.91^{***} (1.07)
$\Delta \log_2$(Mkt Cap)		-7.76^{***} (1.21)		-1.34^{*} (0.75)
ΔProfitability		0.49^{***} (0.07)		0.02 (0.04)
ΔBook To Market		-0.18^{***} (0.04)		-0.05^{**} (0.02)
ΔTangibility		-0.39^{***} (0.06)		0.00 (0.05)
Year FE	*Y*	*Y*	*Y*	*Y*
# Obs	32,957	32,094	37,896	36,785
Adj. R^2	12.2%	12.7%	3.3%	3.3%

Table 9(b). Will Repurchase Shares: 100 if a firm repurchases ≥ 1% of its market cap in year t during the next year $(t+1)$. Will Issue Debt: 100 if a firm issues new debt in year $(t+1)$. Was Value → Is Growth: 1 if a firm transitioned from being a value stock in year $(t-1)$ to being a growth stock in year t. Was Growth → Is Value: 1 if a firm was a growth stock in year $(t-1)$ and is a value stock in year t. Was Value Stock: 1 if a firm had a positive excess earnings yield in year $(t-1)$. ΔControl Variable: Realization in the current year minus the realization in the previous year. Numbers in parentheses are standard errors double-clustered by firm and year. *, **, and *** denote significance at 10%, 5%, and 1% levels. We do not report the intercept or fixed-effect coefficients.

Dependent Variable:	Will Issue Equity		$\frac{\Delta \text{Cash}}{\text{Assets}}$	
	(1)	(2)	(3)	(4)
Was Value → Is Growth $\text{ExcessEY}_{t-1} > 0\%$ $\text{ExcessEY}_{t} < 0\%$	4.33*** (1.24)	3.40*** (1.17)	1.31*** (0.29)	1.07*** (0.30)
Was Growth → Is Value $\text{ExcessEY}_{t-1} < 0\%$ $\text{ExcessEY}_{t} > 0\%$	−3.41*** (0.67)	−1.97*** (0.62)	−2.64*** (0.48)	−1.99*** (0.39)
Was Value Stock $\text{ExcessEY}_{t-1} > 0\%$	−4.35*** (0.77)	−3.86*** (0.77)	−3.66*** (0.56)	−3.23*** (0.47)
$\Delta \log_2$(Mkt Cap)		4.18*** (0.63)		2.58*** (0.53)
ΔProfitability		−0.13** (0.06)		0.06** (0.02)
ΔBook To Market		0.02 (0.03)		0.03*** (0.01)
ΔTangibility		0.17*** (0.04)		0.16*** (0.03)
Year FE	*Y*	*Y*	*Y*	*Y*
# Obs	37,896	36,785	32,930	32,069
Adj. R^2	1.8%	2.5%	4.2%	5.7%

Table 9(c). Will Issue Equity: 100 if a firm issues new equity in year $(t+1)$. ΔCash/Assets: Change in cash and cash equivalents during year $(t+1)$ as a percent of total assets in year t. Was Value → Is Growth: 1 if a firm transitioned from being a value stock in year $(t-1)$ to being a growth stock in year t. Was Growth → Is Value: 1 if a firm was a growth stock in year $(t-1)$ and is a value stock in year t. Was Value Stock: 1 if a firm had a positive excess earnings yield in year $(t-1)$. ΔControl Variable: Realization in the current year minus the realization in the previous year. Numbers in parentheses are standard errors double-clustered by firm and year. *, **, and *** denote significance at 10%, 5%, and 1% levels. We do not report the intercept or fixed-effect coefficients.

If we had data on each company's unlevered earnings yield, $\mathrm{EY}(0)$, then we could compute a firm's excess cap rate, $\mathrm{ExcessCapRate} \stackrel{\text{def}}{=} \mathrm{EY}(0) - \mathrm{rf}$. In that scenario, the right thing to do would be to formally test for a discontinuity in financing decisions at $\mathrm{ExcessCapRate} = 0\%$. Is the probability of repurchasing shares much higher for firms that have a barely positive excess cap rate, $\mathrm{ExcessCapRate} = +\epsilon/2\%$, than for those with a barely negative excess cap rate, $\mathrm{ExcessCapRate} = -\epsilon/2\%$, for small values of $\epsilon > 0$?

While we report the results of fuzzy regression discontinuity (RD) design in Appendix IA.5, our theoretical analysis suggests that this may not be the best approach. The issue is that we only observe a firm's levered earnings yield in the data, $\mathrm{EY}(\ell_\star)$. Our empirical analysis revolves around $\mathrm{ExcessEY} \stackrel{\text{def}}{=} \mathrm{EY}(\ell_\star) - \mathrm{rf}$, not ExcessCapRate.

Proposition 3.5 shows the same stocks get tagged as "value" and "growth" regardless of whether we use ExcessEY or ExcessCapRate. However, if a marginal growth stock were to turn into a marginal value stock due to a tiny change in its excess cap rate, $\Delta\mathrm{ExcessCapRate} = +\epsilon\%$, the change would manifest as a much larger move in the firm's excess earnings yield, $\Delta\mathrm{ExcessEY} \gg +\epsilon\%$.

When we look at stocks that switch between value and growth in the data, the typical ΔExcessEY is relatively large. Table 1 shows that the average move is ~3%pt in magnitude. Thus, when we use a fuzzy RD design to compare observationally similar firms in a narrow close-cropped window on either side of $\mathrm{ExcessEY} = 0\%$, theory suggests that we are study two groups of firms which likely differ on unobservable dimensions.

5 Conclusion

Academic researchers have spent decades trying to convince the people running large public corporations to stop focusing so much on EPS growth (May, 1968; Stern, 1974). Stewart Stern even created an entire consulting company to popularize an alternative to EPS called "economic value added (EVA)" (Stern, Stewart, and Chew, 1995). And yet "firms [still] view earnings, especially EPS, as the key metric for an external audience. (Graham et al., 2005)"

EPS growth might be a second-best proxy for value creation, or maybe it is just a mistake. Either way, CEOs talk about EPS growth enough that it makes sense to ask: "What would a world populated by EPS-maximizing manager look like?" In this paper, we show that the simplest possible max EPS model is able to answer key questions about how firms finance themselves, such as "How much leverage will a firm use?" and "Will the firm repurchase shares?" More importantly, it reflects the primary objective of many real-world CEOs. As such, it is a better starting point than the traditional max NPV framework.

The economics of EPS maximization is surprisingly rich. While modern researchers view EPS as a nonstandard objective, it was utterly mainstream prior to Modigliani and Miller (1958). See Berle and Means (1933), Graham and Dodd (1934), Gordon (1962), and Solomon (1963). We also know that managers care deeply about earnings surprises and beating EPS expectations (Johnson, Kim, and So, 2020). Finally, although this paper focuses on capital structure, our findings have important implications for real investment (Ben-David and Chinco, 2025a) and asset prices (Ben-David and Chinco, 2025b,c).

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A Proofs And Derivations

Proof. **(Equation 7)** *The no-arbitrage state prices,* q_u *and* q_d*, come from solving the following system of two equations and two unknowns*

$$\$1/(1+\mathrm{rf}) = \mathrm{q}_u \cdot 1 + \mathrm{q}_d \cdot 1 \tag{33a}$$

$$\mathrm{CostOfAssets} = \mathrm{q}_u \cdot \mathrm{ValueOfFirm}_u + \mathrm{q}_d \cdot \mathrm{ValueOfFirm}_d \tag{33b}$$

Equation (33a) *demands that a riskfree bond is priced correctly. Equation* (33b) *demands that the company's assets are priced correctly.* □

Proof. **(Equation 9)** *For a loan to be riskfree, it must be preferable to make the promised loan payment in the down state at the riskfree rate*

$$\mathrm{ValueOfFirm}_d \geq (1+\mathrm{rf}) \times \mathrm{LoanAmt}(\ell) \tag{34a}$$

$$= (1+\mathrm{rf}) \times \ell \cdot \mathrm{CostOfAssets} \tag{34b}$$

Solving for ℓ *yields an expression for the maximum riskfree leverage level.* □

Proof. **(Equation 10)** *If the manager exceeds her riskfree borrowing capacity,* $\ell > \ell_{\mathrm{max\,rf}}$*, then her lender correctly anticipates that she will default in the down state at time* $t = 1$*. Hence, the lender must charge a higher interest rate to compensate for the fact that he will only get the value of the firm when* $\ell > \ell_{\mathrm{max\,rf}}$ *and not the entire promised payment in the down state*

$$\mathrm{LoanAmt}(\ell) = \mathrm{q}_u \times (1+\mathrm{i}) \cdot \mathrm{LoanAmt}(\ell) + \mathrm{q}_d \times \mathrm{ValueOfFirm}_d \tag{35}$$

Solving for i *yields the desired expression.* □

Proof. **(Proposition 2.2)** *The fair interest rate* $\mathrm{i}(\ell)$ *equates the present value of the manager's debt payments in year* $t = 1$ *to the initial loan amount*

$$\mathbb{PV}[\mathrm{DebtPayouts}(\ell)] = \mathrm{LoanAmt}(\ell) \qquad \textit{for all } \ell \in [0,1) \tag{36}$$

The manager finances the remainder of the purchase price of her company's assets, $\mathrm{MarketCap}(\ell) = \mathrm{CostOfAssets} - \mathrm{LoanAmt}(\ell)$*, by issuing* #Shares *each worth* Price = \$1/sh*. These equity holders get all remaining firm value in year* $t = 1$ *after paying off the debt. Hence we have*

$$\mathbb{PV}[\mathrm{EquityPayouts}(\ell)] = \mathrm{MarketCap}(\ell) \qquad \textit{for all } \ell \in [0,1) \tag{37}$$

□

Proof. **(Proposition 3.1)** *Under the normalization that* Price = \$1/sh, *we have* MarketCap = #Shares · \$1/sh *and thus*

$$\mathrm{NPVratio} - \mathrm{EPS} = \frac{\mathbb{PV}[\mathrm{EquityPayouts}]}{\mathrm{MarketCap}} - \frac{\mathbb{E}[\mathrm{Earnings}]}{\#\mathrm{Shares}} \tag{38a}$$

$$\propto \mathbb{PV}[\mathrm{EquityPayouts}] - \mathbb{E}[\mathrm{Earnings}] \tag{38b}$$

Equation (13) *gives* $\mathbb{PV}[\mathrm{EquityPayouts}]$ *as a risk-neutral expectation. We can write out* $\mathbb{E}[\mathrm{Earnings}]$ *as a physical expectation*

$$\begin{aligned}\mathbb{E}[\mathrm{Earnings}] = {} & \mathrm{p}_u \cdot (\mathrm{NOI}_u - \mathrm{i} \cdot \mathrm{LoanAmt}) \\ & + \mathrm{p}_d \cdot (\mathrm{NOI}_d - \mathrm{i} \cdot \mathrm{LoanAmt})\end{aligned} \tag{39}$$

The difference between $\mathbb{PV}[\mathrm{EquityPayouts}]$ *and* $\mathbb{E}[\mathrm{Earnings}]$ *is given by*

$$\begin{aligned}\mathbb{PV}[\mathrm{EquityPayouts}] - \mathbb{E}[\mathrm{Earnings}] \\ = (\mathrm{q}_u - \mathrm{p}_u) \cdot (\mathrm{NOI}_u - \mathrm{i} \cdot \mathrm{LoanAmt}) \\ + (\mathrm{q}_d - \mathrm{p}_d) \cdot (\mathrm{NOI}_d - \mathrm{i} \cdot \mathrm{LoanAmt}) \\ + \mathrm{q}_u \cdot (\mathrm{ValueOfAssets}_u - \mathrm{LoanAmt}) \\ + \mathrm{q}_d \cdot (\mathrm{ValueOfAssets}_d - \mathrm{LoanAmt}) \\ - \mathrm{q}_d \cdot \mathrm{DefaultSavings}_d\end{aligned} \tag{40}$$

where $\mathrm{DefaultSavings}_d = \max\{(1+\mathrm{i}) \cdot \mathrm{LoanAmt} - \mathrm{ValueOfFirm}_d, \$0\}$ *is the manager's savings from being able to default in the down state. To get the final expression, recall that* $\mathbb{PV}[X] = \mathrm{q}_u \cdot X_u + \mathrm{q}_d \cdot X_d$ *and* $\mathbb{E}[X] = \mathrm{p}_u \cdot X_u + \mathrm{p}_d \cdot X_d$. □

Proof. **(Proposition 3.2)** *If the manager borrows a bit more* $\ell \to \ell_\epsilon = (\ell + \epsilon)$ *and issues* $\epsilon \cdot \mathrm{CostOfAssets}$ *fewer shares, her new EPS would be*

$$\mathrm{EPS}(\ell_\epsilon) = \frac{\mathbb{E}[\mathrm{Earnings}(\ell_\epsilon)]}{\#\mathrm{Shares}(\ell_\epsilon)} \tag{41a}$$

$$= \frac{\mathbb{E}[\mathrm{NOI}] - \mathrm{i}(\ell_\epsilon) \cdot \mathrm{LoanAmt}(\ell_\epsilon)}{\mathbb{PV}[\mathrm{EquityPayouts}(\ell_\epsilon)]/(\$1/sh)} \tag{41b}$$

$$\propto \frac{\mathbb{E}[\mathrm{NOI}] - \mathrm{i}(\ell + \epsilon) \cdot [(\ell + \epsilon) \cdot \mathrm{CostOfAssets}]}{\mathbb{PV}[\mathrm{EquityPayouts}(\ell)] - \epsilon \cdot \mathrm{CostOfAssets}} \tag{41c}$$

$$\approx \frac{\mathbb{E}[\mathrm{NOI}] - [\mathrm{i}(\ell) + \mathrm{i}'(\ell) \cdot \epsilon] \cdot [(\ell + \epsilon) \cdot \mathrm{CostOfAssets}]}{\mathbb{PV}[\mathrm{EquityPayouts}(\ell)] - \epsilon \cdot \mathrm{CostOfAssets}} \tag{41d}$$

$$\approx \frac{\mathbb{E}[\mathrm{Earnings}] - \mathrm{i}(\ell) \cdot [1 + \delta(\ell)] \cdot \mathrm{CostOfAssets} \times \epsilon}{\mathbb{PV}[\mathrm{EquityPayouts}(\ell)] - \mathrm{CostOfAssets} \times \epsilon} \tag{41e}$$

Equation (41c) takes out the \$1/sh proportionality constant. Equation (41d) uses the Taylor approximation $\mathrm{i}(\ell_\epsilon) \approx \mathrm{i}(\ell) + \mathrm{i}'(\ell) \cdot \epsilon$. *Equation (41e) omits the* ϵ^2 *terms and uses* $\delta(\ell) = \ell \cdot [\mathrm{i}'(\ell)/\mathrm{i}(\ell)]$ *as the elasticity of interest rates to leverage. Taking the derivative* $\frac{\mathrm{d}}{\mathrm{d}\epsilon}\big[\mathrm{EPS}(\ell+\epsilon)\big]_{\epsilon=0}$ *then yields*

$$\begin{aligned}
\mathrm{EPS}'(\ell) &= \frac{\mathbb{E}[\mathrm{Earnings}(\ell)] \cdot \mathrm{CostOfAssets}}{\mathbb{PV}[\mathrm{EquityPayouts}(\ell)]^2} \\
&\qquad - \frac{[\mathrm{i}'(\ell) \cdot \ell_0 + \mathrm{i}(\ell)] \cdot \mathrm{CostOfAssets}}{\mathbb{PV}[\mathrm{EquityPayouts}(\ell)]} && \text{(42a)} \\
&= \frac{1}{1-\ell} \cdot \left(\frac{\mathbb{E}[\mathrm{Earnings}(\ell)] \cdot \mathbb{PV}[\mathrm{EquityPayouts}(\ell)]}{\mathbb{PV}[\mathrm{EquityPayouts}(\ell)]^2} \right. \\
&\qquad \left. - \frac{\mathrm{i}(\ell) \cdot [1+\delta(\ell)] \cdot \mathbb{PV}[\mathrm{EquityPayouts}(\ell)]^2}{\mathbb{PV}[\mathrm{EquityPayouts}(\ell)]^2} \right) && \text{(42b)} \\
&= \frac{1}{1-\ell} \cdot \left(\frac{\mathbb{E}[\mathrm{Earnings}(\ell)]}{\mathbb{PV}[\mathrm{EquityPayouts}(\ell)]} - \mathrm{i}(\ell) \cdot [1+\delta(\ell)] \right) && \text{(42c)} \\
&= \frac{1}{1-\ell} \cdot \big\{ \mathrm{EY}(\ell) - \mathrm{i}(\ell) \cdot [1+\delta(\ell)] \big\} && \text{(42d)}
\end{aligned}$$

The final expression can be written as a proportional relationship involving just the terms in the curly brackets since $1/(1-\ell) > 0$ *for all* $\ell \in [0,1)$. □

Proof. **(Proposition 3.3)**

Case #1. *Suppose the manager is buying assets to create a company where* $\mathrm{EY}(0) < \mathrm{rf}$. *In this case, the first-order condition in Equation (20) is negative,* $\mathrm{EPS}'(0) < 0$, *meaning that the firm's EPS will peak at* $\ell_\star = 0$.

Case #2. *Suppose the manager is buying assets to create a company where,* $\mathrm{EY}(0) > \mathrm{rf}$. *Now, the first-order condition in Equation (20) will change sign exactly once, being positive when leverage is low and negative when it is high*

$$\mathrm{EPS}'(\ell) \begin{cases} > 0 & \textit{if } \ell < \frac{1}{1+\mathrm{rf}} \cdot \left(\frac{\mathrm{ValueOfFirm}_d}{\mathrm{CostOfAssets}}\right) \\ < 0 & \textit{if } \ell > \frac{1}{1+\mathrm{rf}} \cdot \left(\frac{\mathrm{ValueOfFirm}_d}{\mathrm{CostOfAssets}}\right) \end{cases} \tag{43}$$

Hence, there will be a single interior $\ell_\star \in (0,1)$ *that maximizes EPS.* □

Proof. **(Proposition 3.4)**

Case #1. *Suppose the manager is buying assets to create a growth stock,* $\mathrm{EY}^G(0) < \mathrm{rf}$. *Proposition 3.3 implies that the firm's EPS is highest at* $\ell_\star^G = 0$.

Case #2. *Now suppose the manager is buying assets to create a value stock,* $\mathrm{EY}^V(0) > \mathrm{rf}$. *In this case, the proof of Proposition 3.3 implies that the firm's EPS* *will be maximized at* $\ell_\star^V = \frac{1}{1+\mathrm{rf}} \cdot \left(\frac{\mathrm{ValueOfFirm}_d}{\mathrm{CostOfAssets}}\right)$*. If* $\mathrm{ValueOfFirm}_d > \$0$*, then the manager's riskfree borrowing capacity will be strictly positive. Hence, there will be a non-zero gap between the EPS-maximizing leverage in Cases #1 and #2.* □

Proof. **(Proposition 3.5)** *We can calculate the difference between a company's excess earnings yield and its excess cap rate as*

$$\begin{aligned} \mathrm{ExcessEY} - \mathrm{ExcessCapRate} &= [\mathrm{EY}(\ell_\star) - \mathrm{rf}] - [\mathrm{EY}(0) - \mathrm{rf}] && \text{(44a)} \\ &= \mathrm{EY}(\ell_\star) - \mathrm{EY}(0) && \text{(44b)} \end{aligned}$$

Case #1. *If the manager is buying assets to create a growth stock,* $\mathrm{EY}^G(0) < \mathrm{rf}$*, then* $\ell_\star^G = 0$ *and* $\mathrm{EY}^G(\ell_\star^G) = \mathrm{EY}^G(0)$*.*

Case #2. *If the manager is buying assets to create a value stock with* $\mathrm{EY}^V(0) > \mathrm{rf}$*, then* $\ell_\star^V \geq \ell_{\max \mathrm{rf}}$ *and* $\mathrm{EY}^V(\ell_{\max \mathrm{rf}}^V) = \mathrm{i}^V(\ell_{\max \mathrm{rf}}^V) \cdot [1 + \delta^V(\ell_{\max \mathrm{rf}}^V)] > \mathrm{EY}^V(0)$*. The final inequality is strict because the manager is comparing her current earnings yield to the interest payment she would have to make on the next* $1 *borrowed, which has to contain a risk premium given that she was already at* $\ell_{\max \mathrm{rf}}$*.* □

Proof. **(Proposition 3.6)** *The proof of Proposition 3.2 still applies if the initial leverage represents the EPS-maximizing leverage level at the time the manager purchased the assets to create her firm.* □

Proof. **(Proposition 3.7)** *Suppose that an EPS-maximizing manager discovers* $1 *of cash on her balance sheet immediately after creating her firm.*

Case #1. *From Proposition 3.4, we know that the EPS-maximizing manager of a value stock will have already exhausted her risk-free borrowing capacity,* $\ell_\star^V \geq \ell_{\max \mathrm{rf}}$*. So, it is possible to write the* $\mathrm{rf} \cdot \$1 - \mathrm{i} \cdot \mathrm{LoanAmt}$ *term from the numerator of Equation (27) as*

$$\{\mathrm{rf} - \mathrm{i}\} \cdot \$1 - \mathrm{i} \cdot \{\mathrm{LoanAmt} - \$1\} \leq -\mathrm{i} \cdot \{\mathrm{LoanAmt} - \$1\} \tag{45}$$

This inequality will be strict whenever the manager has exceeded her safe borrowing limit, $\ell_\star^V > \ell_{\max \mathrm{rf}}$*. In such a scenario* $\{\mathrm{rf} - \mathrm{i}\} \cdot \$1 < \$0$*, so the manager can boost her EPS by using the* $1 *of cash to repurchase* $1 *of her risky debt.*

Case #2. *From Proposition 3.4, we know that the EPS-maximizing manager of a growth stock will start out unlevered,* $\ell_\star^G = 0$*. Hence, the same term from the numerator of Equation (27) is just*

$$\mathrm{rf} \cdot \$1 - \mathrm{i} \cdot \$0 = \mathrm{rf} \cdot \$1 > \$0 \tag{46}$$

implying that the manager of a growth stock would not spend the $1 *of cash.* □