NEUBERGER BERMAN

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PRIVATE EQUITY AND RATES: PART ONE

The Theoretical Framework

In 2022 and 2023, following a long period of low interest rates, the U.S. Federal Reserve (Fed) fought the post-pandemic inflation shock with one of the most rapid rate-hiking cycles in history.

As that inflation normalizes and the Fed starts to cut rates, we explore, in two articles, the relationship between interest rates and private equity performance. Our second article will consider what has happened *empirically*, over the past 40 years, to private equity returns, distributions and manager performance dispersion as rates have fluctuated. In this first article we address the theory: How would we *expect* changes in interest rates to affect private equity?

We believe that, overall, private equity investments should be expected to perform better in a low-rate environment, but that, contrary to common assumptions, the valuations of lower-growth companies appear to be more sensitive to changes in rates than those of higher-growth companies.

Executive Summary

- This paper investigates the impact of interest rate changes on the enterprise and equity values of privately owned companies. Utilizing a discounted cash flow (DCF) model, the analysis focuses on two companies that are identical except for differing assumed EBITDA growth rates of 8% and 16%.
- Our findings indicate that, all else being equal, a reduction in base rates enhances the enterprise value for companies with either growth rate. Notably, companies with lower growth rates tend to exhibit greater sensitivity to interest rate changes, resulting in a more pronounced increase in enterprise value as rates decrease. However, this conclusion is dependent on the leverage ratio assumed.
- The equity value of lower-growth companies demonstrates longer duration compared to higher-growth companies across nearly all base rate levels. Unlike with enterprise value, this holds true even when leverage ratios are significantly reduced.

Our simplified model of the private equity universe has two companies. Both make the same amount of earnings, have the same amount of debt at the same leverage ratio and the same cost, and do the same amount of capital expenditure. The only difference is that one company subsequently grows its earnings by 8% per year and the other grows by 16%.[1]

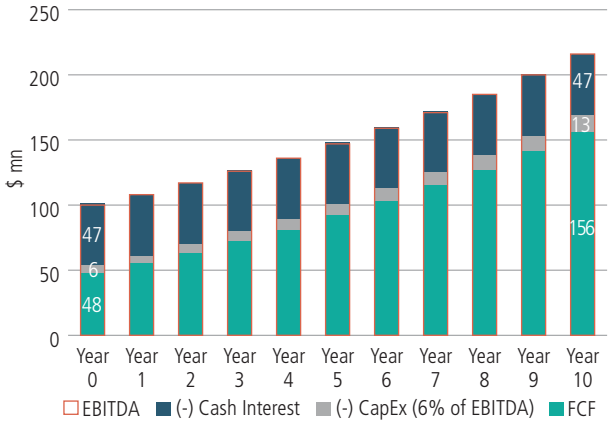
We will subject these two companies to discounted cash flow (DCF) analyses with changing interest rates. Figure 1 shows the parameters for the DCF analyses and an illustrative cash flow projection for the company growing at 8% per year. Our base interest rate is SOFR and our discount rate is SOFR plus a spread of 500 basis points and a 3% equity risk premium. We assume a terminal or horizon earnings growth rate of 3% after year 10.

FIGURE 1. DCF MODEL PARAMETERS FOR TWO HYPOTHETICAL PRIVATE EQUITY COMPANIES

Model parameters

Beginning EBITDA	$100 mn
Leverage Ratio	5X
Debt Amount	$500 mn
Borrowing Spread	500bps
CapEx	6% of EBITDA
Debt Amortization	$0 mn
EBITDA Growth	8% and 16%, respectively, for 10 years 3% after year 10
Discount Rate (Weighted Average Cost of Capital)	Base rate (SOFR) + spread + 3%

Modeled free cash flows of the company with an EBITDA growth rate of 8% per year, at 4.3% SOFR



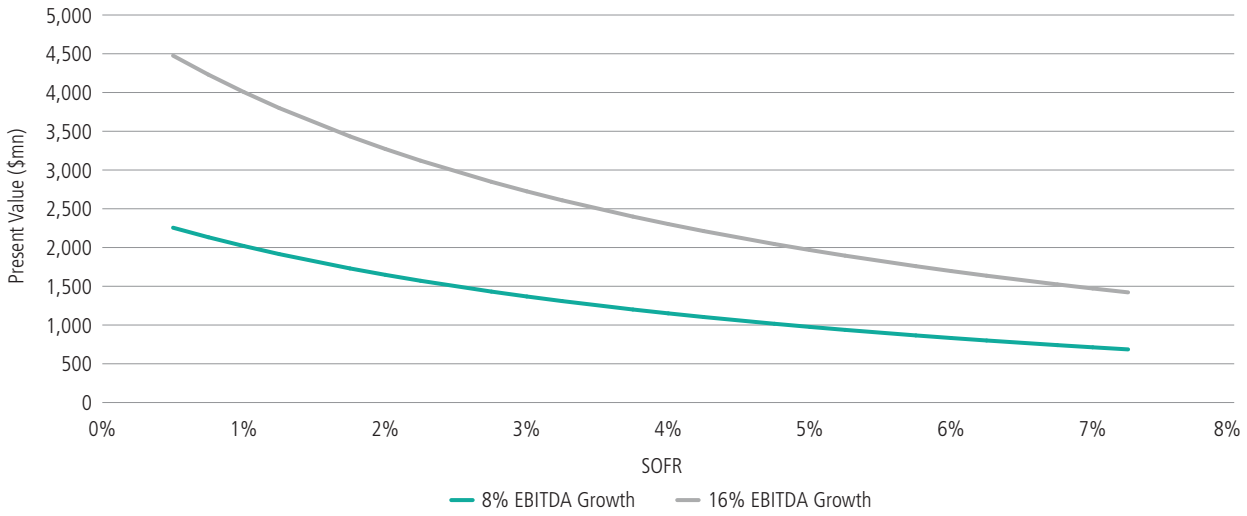
Source: Neuberger Berman. For illustrative purposes only.

[1] To be clear, the higher growing company is by no means comparable to a venture capital investment. Our 6% capex assumption is more characteristic of a growth stage company that generates free cash flow each year.

Lower Rates Mean Higher Enterprise Value

First, we calculate the enterprise values of our two companies—the discounted free cashflow for the next 10 years, plus the discounted terminal value assuming a 3% horizon growth rate—given a range of base interest rate levels (figure 2). As expected, lower interest rates mean higher enterprise values; this is because lower rates mean a lower interest burden and higher free cash flow (a larger numerator in the DCF formula) and because that higher level of free cash flow is subjected to a lower discount rate (a smaller denominator in the formula).

FIGURE 2: LOWER RATES MEAN HIGHER ENTERPRISE VALUE



Source: Neuberger Berman. For illustrative purposes only.

Do Faster-Growing Companies Exhibit Longer Duration?

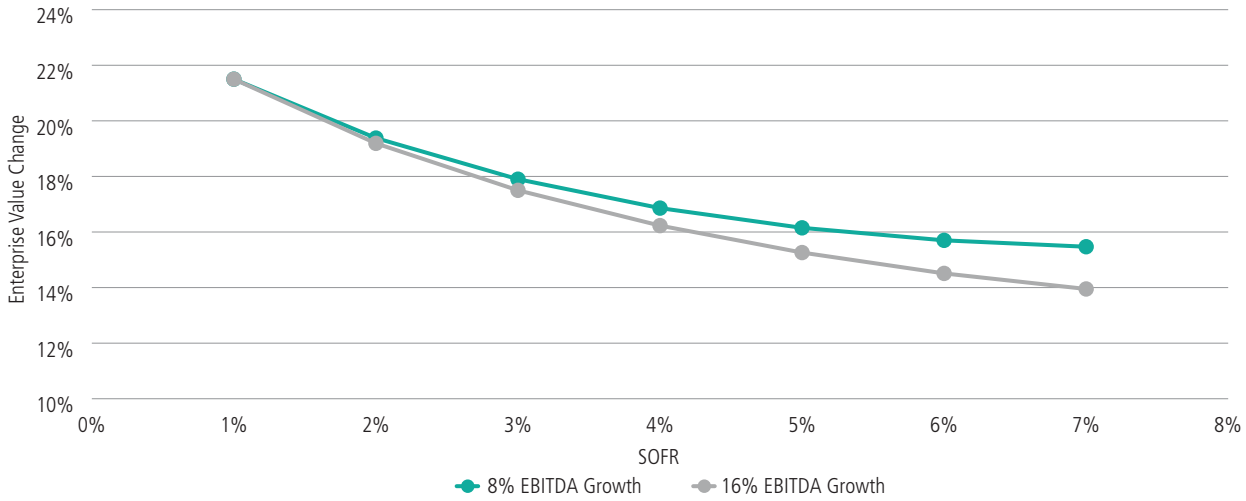
Now let us consider how big the change in enterprise value is for a given change in interest rates—what one might call the "duration" of these companies.

A glance at figure 2 suggests that the sensitivity of enterprise valuations to changes in rates declines as rates go up (given the positive convexity of both curves). It is difficult to tell which company is the more sensitive to changes in rates, however.

To determine this, we look more closely at the duration and convexity of our two companies in figure 3. Here, we show the change in enterprise value that would result from a move of one percentage point in rates, in either direction, from a given starting interest rate. For example, if the interest rate moves from 3% to 4%, the enterprise value of the company with an 8% growth rate would decline by 17.9%; and if the rate moved from 3% to 2%, its enterprise value would rise by a similar amount.

FIGURE 3: "DURATION" AND "CONVEXITY" OF ENTERPRISE VALUES AT 5X LEVERAGE

Change in enterprise value given a one percentage point change in SOFR and a 5X debt-to-EBITDA ratio



Source: Neuberger Berman. For illustrative purposes only.

The results confirm that enterprise value exhibits positive convexity: for both companies, the change in valuation declines as the starting rate of interest goes up.

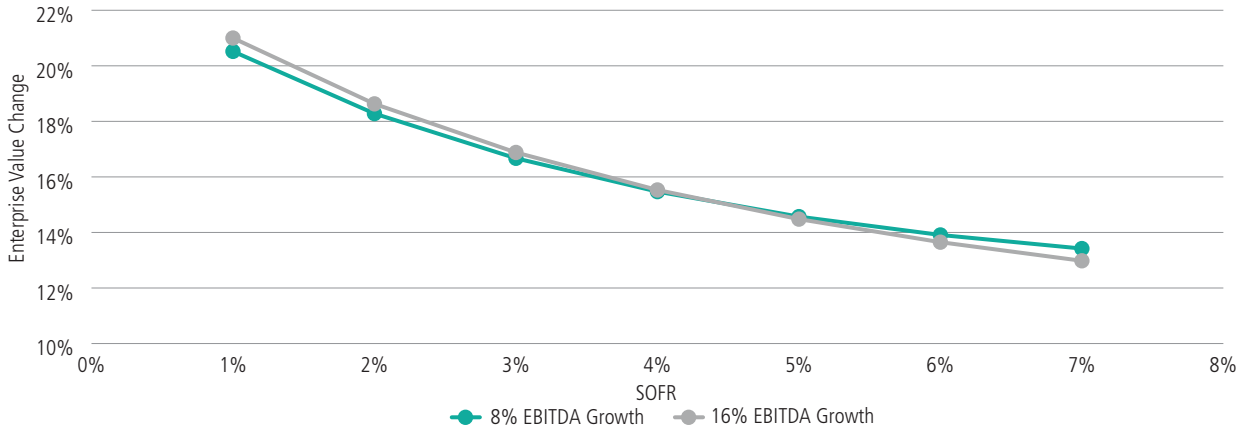
Perhaps more surprising is that the faster-growing company exhibits shorter duration (and more positive convexity) than the slower-growing company. That contradicts the assumption that "growth companies" exhibit longer duration because a greater share of their cash flow is projected to materialize further into the future.

The reason for this finding is that, as we mentioned earlier, both the numerator and the denominator of the DCF formula are affected by changes in rates. The effect of rates on a company's interest burden, which in turn affects the cash-flow numerator, can overwhelm the effect of the discount rate denominator. Given that our model does not assume any amortization of debt, as time passes, interest costs consume a greater proportion of the cash flows of the slower-growing company than of the faster-growing company, and this dampens and eventually overwhelms the benefit it gets from its relatively near-weighted cash flows when rates go up.

We can visualize this by reducing the leverage ratio of our two companies from five to four times EBITDA, as shown in figure 4. Reduce the effect of the change in the interest rate burden in this way, and we see that the slower-growth company exhibits shorter duration, thanks to its nearer-weighted cash flows, until rates move past 4%.

FIGURE 4: "DURATION" AND "CONVEXITY" OF ENTERPRISE VALUES AT 4X LEVERAGE

Change in enterprise value given a one percentage point change in SOFR and a 4X debt-to-EBITDA ratio



Source: Neuberger Berman. For illustrative purposes only.

We think this is an important finding, as it challenges the common belief that faster-growing companies as a general matter exhibit longer duration. The model indicates that this outcome is contingent upon the level of leverage the company is carrying.

Interest Rates and Equity Valuation

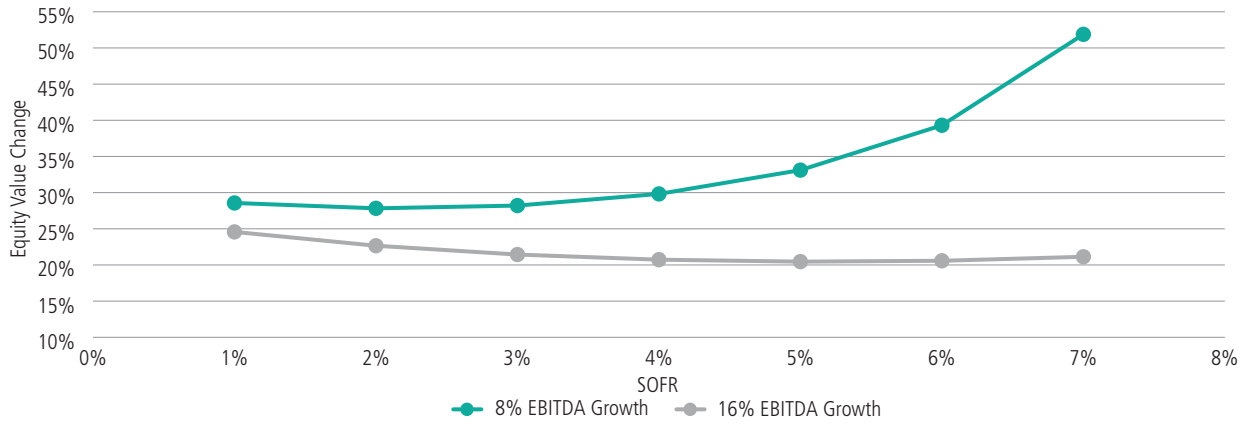
A company's enterprise value is the sum of its equity and debt. For obvious reasons relating to bankruptcy and reorganization, both equity and debt investors tend to focus on equity value rather than enterprise value.

Our simplified assumptions have both companies carrying $500mn of debt with no amortization, which means that their equity values at a range of different interest rates are simply the enterprise values shown in figure 2 minus $500mn.

We see notable results when we show the change in equity value that would result from a move of one percentage point in rates, in either direction, from a given starting interest rate, in figure 5.

FIGURE 5: "DURATION" AND "CONVEXITY" OF EQUITY VALUES AT 5X LEVERAGE

Change in equity value given a one percentage point change in SOFR and a 5X debt-to-EBITDA ratio



Source: Neuberger Berman. For illustrative purposes only.

First, the duration of equity value is considerably higher than the duration of enterprise value: at a starting rate of 1%, a one percentage point move results in a 25 – 30% change in equity value, as opposed to a 22% change in enterprise value. This is intuitive: the $500mn book value of the debt of these companies, which makes up a portion of their enterprise values, is fixed; strip out that fixed amount and the remainder, the equity value, is revealed as the main source of the fluctuation in valuation.

Second, duration is not only higher for the slower-growing company; it exhibits negative convexity beyond a rate of 2%, and extreme negative convexity beyond a rate of 5%. Again, this is a function of its fixed debt amount being always a larger portion of its enterprise value than for the faster-growing company. When looking at enterprise value, that fixed amount of debt dampens the perception of the interest rate sensitivity of the company's equity value. In figure 5, it stands revealed. As equity value approaches zero with increasing interest rates, its duration and convexity reach exceptional levels. Moreover, this relationship between the duration of the two companies persists until leverage ratios are reduced to very low levels.

Again, we think this is an important finding, further challenging assumptions about the relative duration of faster- and slower-growing private-owned companies.

Conclusion and Outlook

Our finding suggests that, when the Federal Reserve is lowering interest rates, both the enterprise and equity values of private companies can be expected to rise. Perhaps more surprisingly, our framework indicates that slower-growing companies will tend to experience a relatively larger boost in valuations than faster-growing ones, especially when it comes to equity valuations. Conversely, in a rising interest rate environment, such as the period between spring 2022 and the end of 2023, we would expect to see the equity valuations of slower-growing companies to be more impacted than those of faster-growing companies.

As a result, we would expect the current shift from high to lower rates to be accompanied by an uptick in deal activity compared to the past two years, as pricing improves, with that in turn leading to potentially increased distributions to the limited partners of private equity funds.

Prospective sellers of private assets tend to hold on to those assets for longer when the pricing of current exit opportunities doesn't align with their own valuation estimates. That can result in "sticky," high asking prices even if economic conditions may have changed, for example due to higher interest rates. On the other hand, prospective acquirers of such assets tend to adjust their bids much faster to prevailing economic and financing conditions. This mismatch widens the bid-ask spread and prevents transactions from taking place, given there is no market clearing price. This dynamic was evident over the past two years as interest rates surged. In contrast, when interest rates decrease, we would expect prospective buyers to raise their offer prices as intrinsic valuations recover. This narrows the bid-ask spread and facilitates more transactions.

Our analysis suggests that this effect from changing rates should be even more pronounced for slower-growing companies. That aligns with anecdotal market evidence which indicates that the majority of transactions that did take place over the past two years of rising and high rates involved the faster-growing segment of the market, where bid-ask spreads remained less pronounced.[2] Conversely, since slower-growing companies would be expected to experience a greater relative uptick in intrinsic valuations from declining interest rates—and considering the pent-up supply of such companies on the sell side—we anticipate a rise in transaction volumes, particularly in this segment of the market, over the coming months. This, in turn, should lead to more distributions to limited partners from asset sales.

It is important to note that this analysis disregards the broader potential economic effects of lower rates. Should lower rates stimulate demand in the economy, for example, the valuations of successful companies could move not only *along* the curves we plot in this paper, but potentially jump from a lower-growth to a higher-growth curve. This would further narrow the bid-ask spreads for such companies and, in theory, amplify the outlook for rising exits and distributions.

In the second paper in this series, we will explore the past 40 years of real-world interest-rate, private equity performance and distribution data to validate these theoretical conclusions.

[2] Source: Neuberger Berman, as of December 31, 2024. For illustrative purposes only. **Past performance is not an indicator of future results.**

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