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Interest Rates and the Effect on Technology Stocks

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This year has seen much attention paid to the prospects of higher inflation and, along with it, higher interest rates. The stock market has generally responded negatively to this risk. Interest rates have a big effect on stock price levels, and those of technology stocks in particular. The reason why is easily seen when we examine the Discounted Cash Flow (DCF) formula for valuing stocks. DCF modeling aims to estimate the current worth of a stock by determining the present value of each future cash flow. Due to the influences of inflation and the idiosyncratic risk that the cash flows may not actually be realized, the further we move into the future, the less valuable the cash flow. In finance, the "discount rate" is how we systematically reduce the value of future cash flows. As the discount rate rises, it has the effect of decreasing the Discounted Cash Flow value. More importantly, though, is the exponential effect on the farther out cash flows.

$$DCF = \frac{CF_1}{(1+r)^1} + \frac{CF_2}{(1+r)^2} + \frac{CF_3}{(1+r)^3} + \dots \frac{CF_n}{(1+r)^n}$$

Where:

CF = Cash Flow
R = Discount Rate

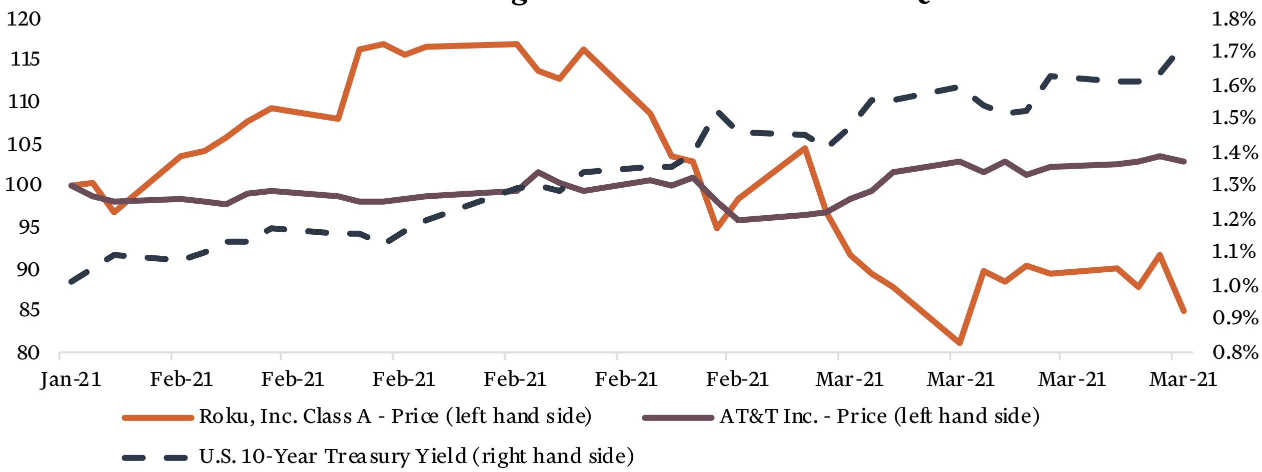
The term "Cash Flow" is used synonymously with earnings in this analysis. The reason why technology and newly public stocks have been hard hit by this year's rise in interest rates is because many technology stocks have aspirational earnings that are low in the near-term years but projected to grow rapidly in the out-years. For instance, compare recent Initial Public Offering (IPO) stock ROKU to mature AT&T. Both are in the telecommunications sector, and both participate in the creation and distribution of media content. Here are the profiles for their earnings over the next few years:

	2021	2022	2023	2024	2025
AT&T	$3.16	$3.15	$3.19	$3.14	$3.42
Roku	$0.31	$1.01	$2.74	$4.90	$11.02

Source: FactSet

One can see that the bulk of Roku's earnings are projected to occur four years in the future and beyond. The $11.02 of estimated 2025 earnings gets discounted back by the 4th power of (1 + the discount rate). The slightest rise in the discount rate, such as in response to a rise in the 10-year treasury rate, will have an outsized effect on these 2025 earnings, which represent the bulk of Roku's value. By comparison, AT&T's earnings, while lacking in growth, derive much of the shares' value from their current and nearby years' earnings. Thus, AT&T is not as affected as Roku as interest rates rise. As the 10-year treasury rate rose from 1.01% on January 27th to 1.73% on March 18th of this year, here is how these two stocks responded. AT&T barely budged while Roku dropped meaningfully.

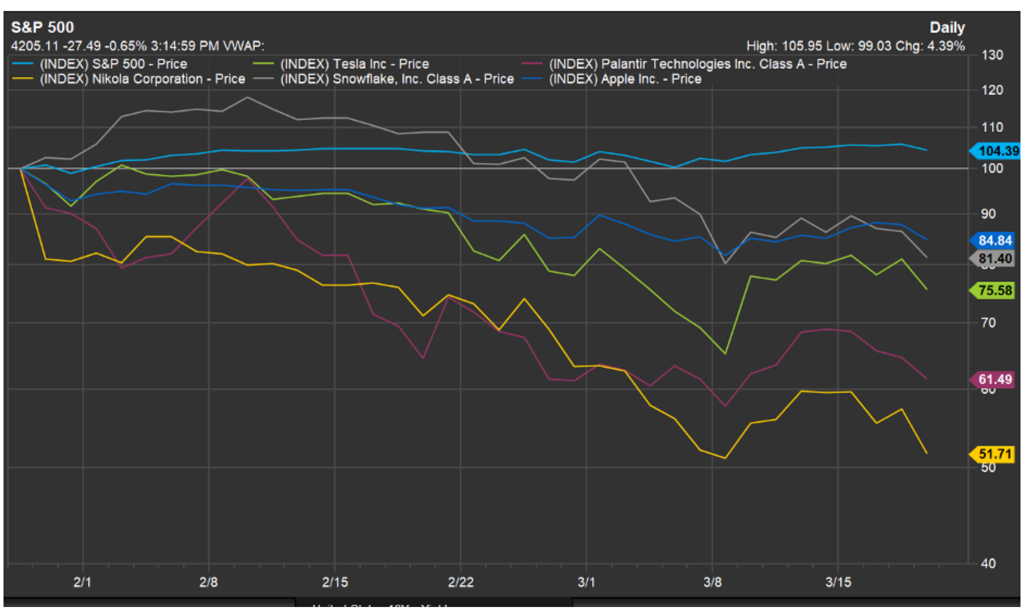
The Effect of Rising Interest Rates on Stocks in 1Q 2021



To show here the detailed calculation of the effect of this interest rate rise on these two stocks would cover most of this page. However, we can summarize by saying that the price decline of Roku should be approximately 50% greater than that of AT&T (the fact that the graphs do not show this exactly reflects other factors at play, such as AT&T's lower beta and higher dividend yield, both stabilizing its share price). This calculation covers only the five cash flows above and uses the 10-year treasury rates on January 27th and March 18th as discount rates. These are both gross assumptions that are nonetheless useful in illustrating the point of the graph above.

The term "long-duration" has been applied to stocks like ROKU, because much like their long-duration bond brethren, they are highly sensitive to changes in discount/interest rates. These include recently IPO'ed stocks, special purpose acquisition companies (SPAC's), and young technology stocks. Duration is a bond term describing the sensitivity of the price to a change in interest rates. Long duration bonds are more sensitive to changes in interest rates.

And so too for ROKU, along with the entire class of stocks whose largest earnings are in the distant future. We call these long duration stocks, and as we have seen, the DCF methodology explains why these stocks were hit so hard earlier this year as interest rates rose. Here is a sample of how various tech, IPO, and SPAC companies did during the 1st quarter's bout with rising interest rates.



Source: FactSet

Discounted Cash Flow is a popular method for valuing stocks. The focus on higher inflation and interest rates is likely to continue for the coming months. The negative effect on stock valuations via DCF is therefore an important topic for investors to consider.

It should be recognized that interest rate moves and their effects on stock prices are transient. Enduring share price movements come from the size, stability, and endurance of company earnings. While this paper has focused on technology stocks and the outsized effects of interest rate movements on their share prices, these are often the same companies that are building lasting earnings power through disruptive, novel technologies. Understanding the effects of interest rates on share prices via the Discounted Cash Flow model can give comfort during periods of market volatility. The ultimate decision to buy, sell, or hold individual stocks is more appropriately weighed considering a company's long-term earnings power.

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