Cliff's Perspective

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Is Value Just an Interest Rate Bet?

Spoiler Alert: Not Even Close

August 11, 2022

It seems obvious to so many that interest rates drive the value trade.[1] After all, growth stocks[2] have <u>much</u> longer-dated cash flows than value stocks and thus should be a "longer duration" asset and move more with longer-term interest rates, right?[3] "Growth (or often just 'tech') stocks soar on plunging interest rates" (or vice versa) has become a common wise-sounding observation in the last few years. In fact, this is all taken as an axiomatic given in countless pundit and press observations. However it's not nearly that simple, and mostly it's just not true.[4]

My colleagues actually demonstrate that this relationship is more ambiguous and complicated than the above logic suggests. I'm going to take this on too, but in a simpler fashion, perhaps due to the wisdom of age, but also perhaps due to the atrophy of mathematical ability that comes with age.

Let's first just look at some empirics. Below is the rolling five-year monthly correlation of the Fama-French value factor (HML) returns[5] for the U.S. with the contemporaneous change in the U.S. 10-Year Treasury yield.

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[1] I refer, not surprisingly, to quantitative long-cheap,/ short expensive strategies. Though I think most of this discussion would apply to more traditional ideas of value versus growth.
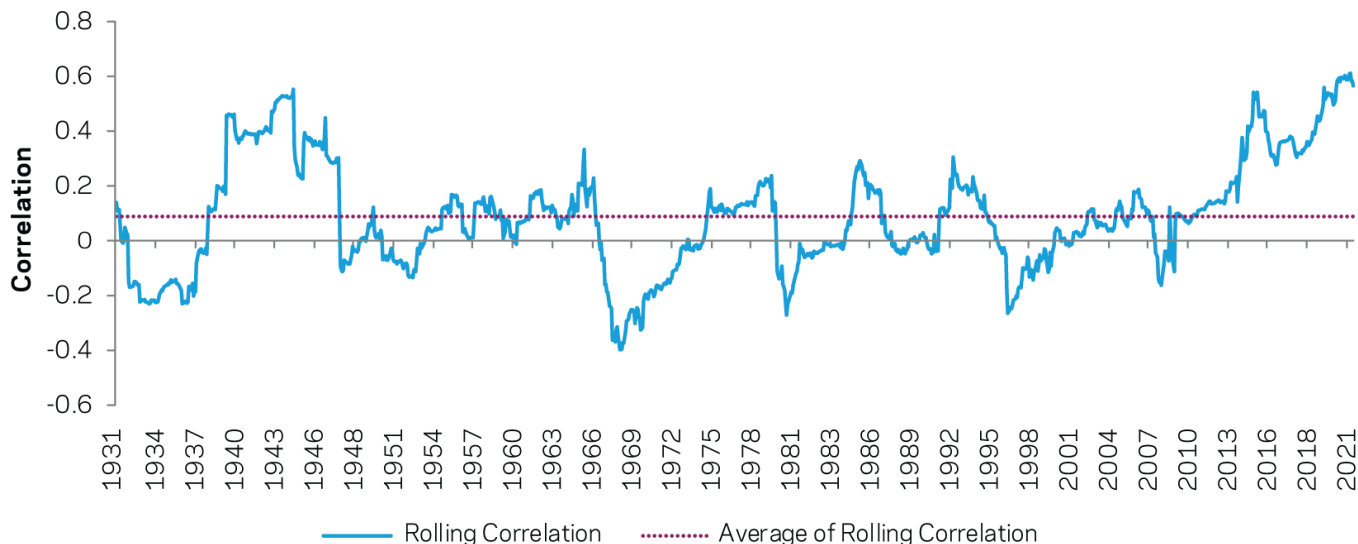
[2] I prefer to call them expensive and cheap stocks as opposed to growth and value stocks as the expensive do not always outgrow the cheap, but "growth" works better here, as that's how most others talk about it. I will use both interchangeably though. Sorry.

[3] What specific interest rate is an open question even if this were true. In the graph below I look at monthly changes in 10-year rates. Other interest rates (and other forms like real bond yields or the slope of the curve) give similar results.

[4] See here and here for a similar take on the duration of value versus growth, and here for an earlier examination of the persistence of growth rate differentials (there ain't much!).

[5] I only graph the Fama-French style HML factor (using the AQR "devil" version). Other forms of value (e.g., the multi-factor industry-neutral version we prefer and others) show a similar pattern, and I'll shift the discussion there later. Long-term there is simply very little average correlation between changes in the 10-year (or other rates) and long-cheap, short-expensive stock portfolios, however they are constructed.

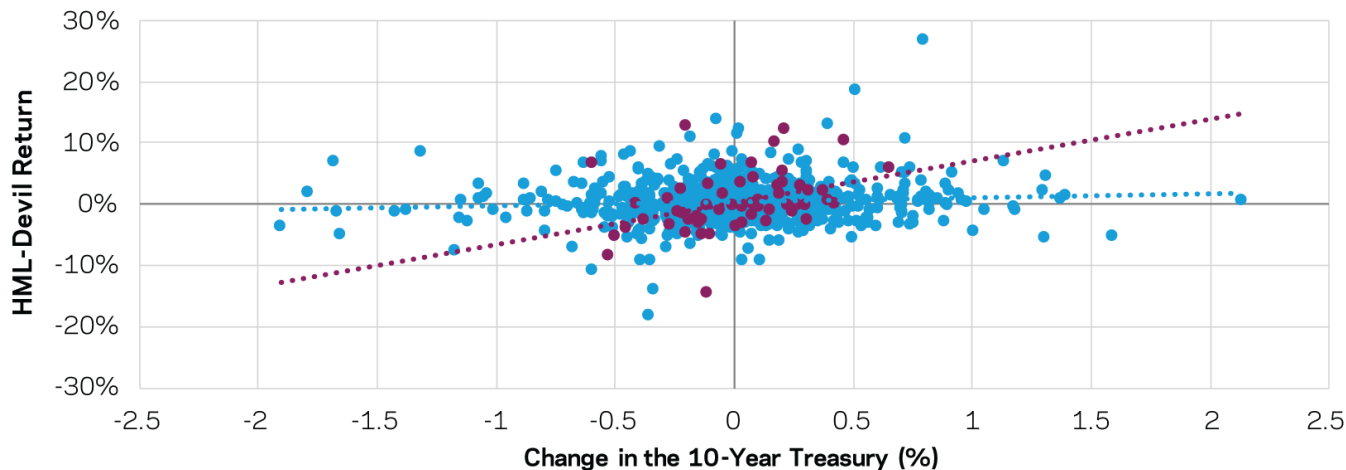**Rolling 60-Month Correlation of HML-Devil with the Change in the 10-Yr Treasury Yield**

The average correlation is quite trivial (around 0.10), although (like every time series ever[6]) rolling subperiods vary. In particular the most recent five years has seen quite high correlations between the value factor and interest rates, bouncing around the highest ever observed and economically significant. Of course this recent[7] trend greatly influences pundit comments, as many implicitly see their job as explaining to you why what has been happening will now happen forever and was actually really quite obvious before it happened.

For those who prefer scatterplots, the below plots the monthly return to HML-Devil (y-axis) versus the monthly change in the 10-year Treasury yield (x-axis) from 1950-2022.[8] The blue dots are 1950-2017, while the red dots are the last five years (with trend lines for both added). The song remains the same.

HML-Devil vs. Changes in the 10-Year Treasury Yield
1950-2022

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[6] Yeah, yeah a constant is still a time series. I mean a time series with ANY variation.

[7] If we go much higher frequency / shorter period then we see that based on daily correlations, they have actually already come down in 2022 versus the last five or ten years. I don't think this really changes anything much (short-term changes are hard to know what to make of), but I wanted to note it. Perhaps the world is wising up to what will be the conclusion of this note?
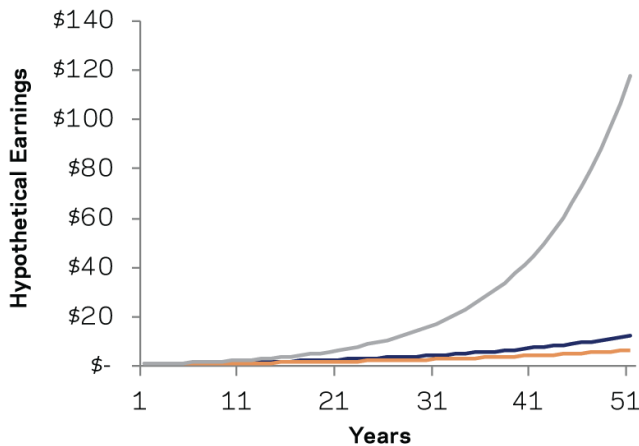
[8] I don't go back to the 1930s for this scatterplot, as there were some really insane months in the Great Depression that I don't think are very informative. This choice doesn't change the arguments here at all.

Basically, there's grist for both sides' mills here. Long-term there is very little evidence that the return of the value factor is anything other than trivially correlated to changes in interest rates. But, in more recent[9] times the correlation has been strong and in the direction hypothesized: when rates go up, value tends to do better and vice versa. Now we have to ask whether this correlation makes sense.
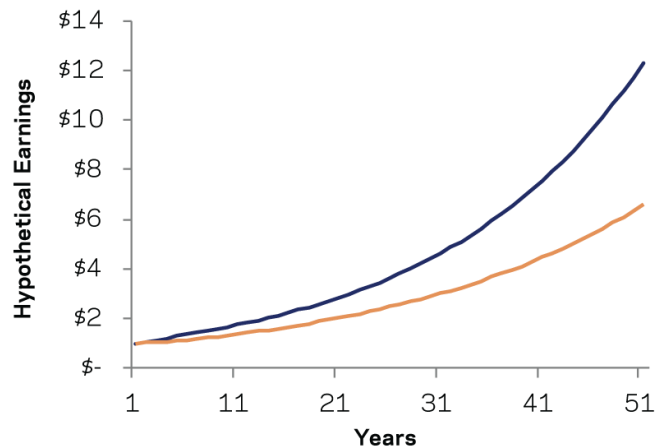
Well, in a word, no. A lot of it comes down to growth assumptions. By definition, growth stock investors believe their portfolio (or individual stocks or even *stonks*, whatever the h**l those are) will outgrow value stocks. And they're right. On average, using our very diversified global value factor to sort stocks, the expensive ones outgrow the cheap ones by about 4% a year over the next five years.[10] Actually most of that comes in the first two years where the majority of any predictability seems to reside. After five years it's certainly a push (no steady excess growth in year six onwards).[11]

But that doesn't seem to be what most growth investors are hoping for.[12] It seems, particularly if you, like me, think we're in a bubble,[13] that growth investors are all trying for unicorns. That is the gray line in the graph below on the left. That's 10% growth per year for 50 years.[14] What growth investors, if they're buying a very diversified portfolio of the expensive stocks, actually historically get is excess growth like the graph on the right (4% a year faster for growth than value for the next five years, then equal thereafter). You have to look at the scales of the y-axes to really appreciate the juxtaposition.

Growth Investors Think They're Buying

Growth Investors Are Actually Buying

Growth Stocks — Value Stocks — Unicorn

Source: AQR. Hypothetical data has inherent limitations, some of which are listed in the Disclosures. For illustrative purposes only and not representative of any portfolio that AQR currently manages. Please read the Disclosures for important information.

I'm not going to address the possibility of growth investors ex ante identifying something like the gray line. That's not my field. Rather, I focus on value versus growth portfolios that investors like us (and many other systematic investors) actually implement. The value factor we've used throughout my many blogs on this topic, and which the

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[9] I'm sorry to those who think YTD or last week is "very recent," rather than five years. Five years is very recent for examining this type of relationship if you hope to get anything reliable out of that examination.

[10] Here I'm switching to discussing data we have on AQR's value factor (recall it's multiple measures, not just book-to-price like HML-DEVIL, and attempts to be balanced within each industry). The story would be the same (small changes in some numbers) for any reasonable value factor construction. Compliance note: Please read the Disclosures for important information.

[11] This might seem counter-intuitive to people, perhaps as they have individual growth stock success stories as a mental model (Amazon anyone?). But even if growth is forecastable (and it seems to be, as again cheap stocks do undergrow for a few years going forward), the notion that after a few years you're able to confidently say that the extra growth will continue from that future point, is an odd one. It's an odd one for single stocks (again, pick Amazon and never rebalance and you're great, but getting that right ain't easy, to say the very least), and it's a super-odd conjecture for a very diversified industry-balanced global long-short portfolio.

[12] For instance, historically it's not enough to cause growth to lose to value. Remember, it's not the growth you get that matters; it's the growth that's priced into the stock versus what you get. Whether for irrational or rational reasons, the fact that value on average wins but undergrows means the price was on average even lower for value than the price that would cause equal returns (or a growth victory).

[13] Yes I'm using a word whose overuse made it to #2 on my list of pet peeves.

[14] I didn't use a log scale because straight lines are boring and a little fascist. Also, by the way, 10% a year for 50 years is insane. I'm exaggerating for effect.

4% per annum extra growth for expensive versus cheap over the next five years[15] is based on, is long and short about 750 stocks a side around the world attempting to match industries (so it's really a separate long/short strategy for each industry).[16] To expect the gray line from such a portfolio, or anything like it, is cray-cray.

So why is this relevant to interest rate sensitivity? Well, we can calculate the "duration," which is bond math for how much the value of the investment changes for every 100 basis point move in rates.[17] A duration of 10 years means that a 100 basis point fall in rates would, to a linear approximation,[18] lead to a 10% increase in market value.[19]

If all three investments are assumed to have equal long-term expected returns (IRRs here as we're doing bond math) the "duration" of the growth portfolio (blue line) is 0.4 years longer than the duration of the value portfolio.[20] If you think that's trivial, you are correct.[21]

Now, under these same assumptions, the duration of our unicorn portfolio is about 10 years longer than either value or growth (which, as just said above, have nearly the same duration). That's still not as large as many might think, but it's starting to matter. Again, that's not the case we're discussing here. Very diversified industry-matched long-short value strategies ain't gonna look like a unicorn.

So why is the duration difference so small between value and growth, when we are assuming 4% per annum faster growth on expensive stocks for five years leading to more than a 20% total growth advantage over the whole five years? Well, quite simply, near-term growth, if it's going to level off, hardly moves duration. Imagine that you expected 1,000% extra growth over the next year for expensive versus cheap stocks, but then equal growth thereafter. Well, you'd certainly pay a premium for that growth (a different issue than interest rate sensitivity), but it would hardly change the duration at all. Think about right after the giant one-year growth. The time-weighted average present value of future cash flows at that point is the same for the cheap and expensive portfolio, as they are going to grow the same going forward. The expensive one just started from a higher base. It is not the level of earnings that affects duration, it is the time shape, and the only way to really affect the time shape enough to seriously move duration is to make assumptions of large and extremely long-lasting (way more than 5+ years out) growth differentials that historically do not exist.[22,23]

While not a proof, I'd point to the near non-existence of a correlation between value versus growth and interest rates over the long term as at least evidence very consistent with my math showing the durations of the two portfolios are simply not that different. In other words, when the empirical results line up with the math and

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[15] 4% per annum is the historical average over 1990-2022 (this looks over longer periods and finds similar, perhaps less optimistic for growth, stuff). In separate work we have shown that if from here you get the highest ever (so not the average, but the maximum ever over this period) five-year growth advantage, it's half of what you need to justify current value spreads. And that's if you absolutely nail the maximum to the day, and it only makes value and growth expected returns comparable, not better for growth.

[16] Though sometimes, as in the first two graphs above, I use academic factors like HML-Devil largely to get a longer time series.

[17] The literature on equity duration is confused/confusing because some studies focus on the sensitivity of equity returns to Treasury yield changes, while others focus on their sensitivity to equities' own discount rate changes (which is mostly about the risk premium of the stock). The former may be short and even flip sign with the stock-bond correlation, while the latter can be decades long (especially so for growth stocks with distant expected cash flows, the story goes; though to nobody's surprise I think that story is way overdone – kind of my point).

[18] I'm ignoring things like "convexity" here.

[19] Again, I'm also ignoring my colleagues' work showing that assuming simple fixed cash flows and straightforward duration calculations is a serious over-simplification that itself likely overstates the effect of interest rate changes on value versus growth.

[20] Of course some other assumptions are needed. In particular, I assume that all three portfolios are priced to a long-term expected return of 8% notional (everything here is notional but it doesn't really matter for our comparisons).

[21] If value is assumed to have, say, a 3% per annum expected return advantage over growth, then its duration does indeed shorten. All else equal, higher expected return shortens duration as future cash flows are worth proportionately less, so more of the asset's value comes from relatively near-term (short-duration) cash flows. That would get you to about a 5 year shorter duration for value versus growth, which is still not a huge difference and doesn't come close to justifying the value spreads we see today. Also, ironically, value would only be less sensitive to falling interest rates because it is a superior long-term asset (higher expected return!) – not because it's cash flows are actually much further out. That is certainly not the story growth fans are telling.

[22] By the way, rates near zero greatly increases the duration (in this simplistic framework) of all three assets we are studying (value, growth, and unicorn). But, it doesn't change that the (now longer) durations of value and growth are still very very similar. This is not a phenomenon of near zero rates.

[23] If we're wrong about post-five-year growth, and even after five years the expensive stocks continue to outgrow the cheap by 1% a year for the next 45 years (so years 6 through 50), you still only get to < 2 years extra duration for growth versus value. And 1% a year ad infinitum ain't happening. To ballpark what it would take to get a significant duration differential, if we assume the 4% a year growth advantage is expected to persist *in perpetuity* (i.e., the next 50 years), which is bat**** insane and has no support whatsoever in the data or common sense, we get to a 6.5 year extra duration for growth versus value. While this is a more meaningful duration difference, it is still less than half of what would be required to explain the recent correlation of value versus growth and changes in interest rates. To justify the roughly 0.6 correlation that has persisted over the recent period requires an extra duration for growth versus value of more than 13 years (based on past five-year volatility of HML-DEVIL and 10-year Treasury yield changes).

concept, it's likely you are on to something (or, in this case, on to disproving something) and any short-term changes, especially if unmet by changes in the math or assumptions, are therefore likely chance.

Frankly, the assumption of so many pundits who state, when value versus growth has been trading correlated to interest rates and they desperately need something to say, that it makes perfect sense as growth cash flows are much longer dated, is just wrong. They should stop repeating this easy, facile, mistaken and misleading observation. I predict as much success in my effort to change the dialogue here as I normally achieve![24]

So, why has value versus growth been trading the way it has in recent times? Put simply, I don't know. Correlation, like fertilizer, happens. But that won't stop me from taking a guess.

If we're in a bubble, then many must be assuming their growth portfolio is more like the unicorn example above than what real life has ever delivered. If they believe that, it then follows they also believe growth stocks are considerably longer duration than normal relative to value stocks (recall that the unicorn was the only way to get any decent duration difference, though even there it's less dramatic than many assume). Thus, if we are in a bubble, the very same bubble driving price differentials could rationally (rationally in the sense of consistent logic only after very irrational assumptions about growth) be expected to cause value to trade more correlated to interest rates than usual. Thus, a duration effect could arise from investors' (temporarily exaggerated) belief in long-term growth differentials, even if only near-term growth differentials are likely to materialize. In other words, the very high (tech bubble level) prices being awarded to growth versus value stocks, and the realized correlation of value versus growth and interest rates, could easily be the same bubble showing up in different ways.[25] That, or random chance – everyone's least favorite explanation, but often the right one.

Now, if something is trading a certain way, then on average it will continue for a while. Thus, while there are no guarantees, I expect this correlation to be around for a bit.[26] But given that it's likely either random or based on the same bubble reasons driving super wide value spreads, this all means that upcoming rate moves can affect the path of when (assuming I'm right about value spreads and the future!) value wins, but not whether it will win.

One last thought. I do not find that low interest rates justify super cheap value versus growth prices (it actually doesn't seem to be a particularly close call). But I don't argue with the idea that a forty-year bond rally (particularly in real rates) has raised equity prices. It just shouldn't change relative equity prices (diversified value versus diversified growth) more than a tiny bit, if at all.

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[24] That's self-deprecating, not bragging :). I have noticed, for instance, that I didn't settle the debate over share repurchases.

[25] A blow to my theory, as you can see in the first graph up top, is that we didn't see such a correlation between value versus growth and interest rates during the tech bubble of 1999-2000 (unless we look at industry-neutral value – not shown here – where correlations did rise somewhat, though not as much as today). Oh well, like Tolstoy's unhappy families, maybe all bubbles are somewhat different. And, if the tech bubble's patchy correlation between value versus growth and interest rates is a blow to my current theory, it has to be a much bigger blow to those who argue that value versus growth should always entail a big interest rate bet, as it didn't show up in what was (but is no longer) the biggest growth bubble in U.S. stock history (at least the history we have good data on).

[26] As a pure aside I don't see why, as it often seems, people who think value is negatively correlated to bonds also think this is a terrible thing. If you have a view that bonds are going to soar, then go long a bond – don't short value! In fact, if you're agnostic about the direction of interest rates, I could argue value versus growth being negatively correlated to a large part of most portfolios (bonds) is, all-else-equal, a good thing.

Data Information

HML series, source: AQR, AQR Data Library (*The Devil in HML's Details: Factors, Monthly*):

Pricing and accounting data are from the union of the CRSP tape and the Compustat/XpressFeed Global database. The universe is all available common stocks in the merged CRSP/XpressFeed data.

HML**:** book equity (BE) divided by current total market value of equity (ME). To obtain shareholders' equity we use Stockholders' Equity (SEQ) but if not available, we use the sum of Common Equity (CEQ) and Preferred Stocks (PSTK). If both SEQ and CEQ are unavailable, we proxy shareholders' equity by Total Assets (AT) minus the sum of Total Liability (LT) and Minority Interest (MIB). To obtain book equity (BE), we subtract from shareholders' equity the preferred stock value (PSTKRV, PSTKL or PSTK depending on availability). We assume that accounting variables are known with a minimum 6-month gap and align book price of the firm at the end of the firm's fiscal year ending anywhere in calendar year t-1 to June of calendar year t.

HML Devil: The portfolio construction follows Asness and Frazzini (2013) and Asness Frazzini and Pedersen (2014)

The value factors are constructed using six value-weighted portfolios formed on size and book-to-market

At the end of each calendar month, stocks are assigned to two size-sorted portfolios based on their market capitalization. The size breakpoint is the media NYSE market equity. We use conditional sorts, first sorting on size, then on the second variable and rebalance the portfolio monthly to maintain value weights. Note that this approach is slightly different from Fama and French (1992, 1993 and 1996) who use independent sorts. We prefer conditional sorts to ensure a balanced number of securities in each portfolio.

The value factor HML Devil follows Asness and Frazzini (2013) HML Devil is the average return on the two value portfolios minus the average return on the two growth portfolios. Returns are gross of fees and transaction costs.

HML Devil = ½ (Small Value + Big Value) – ½ (Small Growth + Big Growth

"Devil indicates that to compute book to market ratios we scale book equity (BE) by the currenttotal market value of equity (ME) at the end of each month following Asness and Frazzini (2013). HML Devil portfolios are value eighted. The size and book-to-market breakpoints are refreshed every calendar month, and the portfolios are rebalanced every calendar month to maintain value weights.

Hypothetical AQR Long/Short Value Spread, source: AQR.

Spreads are constructed using a hypothetical AQR value composite that includes five value measures: book-to-price, earnings-to-price, forecast earnings-to-price, sales-to-enterprise value, and cash flow-to-enterprise value. Spreads are measured based on ratios and are adjusted to be dollar-neutral, but not necessarily beta-neutral through time. To construct industry-neutrality, the value spreads are constructed by comparing the value measures within each industry. The all-country universe is based on roughly 85% developed / 15% emerging weights, derived based on proprietary ex-ante risk targets as of 7/31/2022. The developed data starts January 1990, while the emerging universe is included starting December 1994. The risk models used are the Barra Developed Equity Risk Model and Barra Emerging Equity Risk Model. Hypothetical data has inherent limitations, some of which are listed in the Disclosures. For illustrative purposes only and not representative of an actual portfolio AQR currently manages

Disclosures

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