

PORTFOLIO  
MANAGEMENT  
RESEARCH

with. Intelligence

*the journal of*  
**PORTFOLIO**  
*management*

*pm-research.com*

volume **51** number **1**

NOVEMBER **2024**

**50<sup>th</sup>**  
year anniversary



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Hypothesis**

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RequestID: 391312

# The Less-Efficient-Market Hypothesis

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### KEY FINDINGS

- A relatively efficient stock market is important for society.
- The author believes the stock market has gotten less efficient over his (now quite long) career.
- If so, this means disciplined, value-based stock picking is both riskier and likely more rewarding in the long term.

### ABSTRACT

Market efficiency is a central issue in asset pricing and investment management, but while the level of efficiency is often debated, changes in that level are relatively absent from the discussion. The author argues that over the past 30+ years markets have become less informationally efficient in the relative pricing of common stocks, particularly over medium horizons. He offers three hypotheses for why this has occurred, arguing that technologies such as social media are likely the biggest culprit. Looking ahead, investors willing to take the other side of these inefficiencies should rationally be rewarded with higher expected returns, but also greater risks. He concludes with some ideas to make rational, diversifying strategies easier to stick with amid a less-efficient market.

Stock prices should accurately reflect reality. That's important, not just to investors and those who make their living from markets, but to society at large. A well-functioning free enterprise system needs a well-functioning capital market. Why? Because the prices accorded to enterprises, be they very high or very low, provide direct incentives for how society allocates its resources. Enterprises raising capital from and then distributing capital back to investors, and at what prices this occurs, is the circulatory system of the economy. The more efficiently that system operates, the more efficiently the economy functions, allocating resources to their best uses. Hence, if those prices don't reflect reality, there are real consequences to long-term productivity and growth. Paraphrasing what Churchill said about democracy, I believe our market system is the worst way to carry this out, excepting for all others that have ever been conceived of or tried. That is, I'm a fan, but not a Panglossian one. Furthermore, over the span of my career—almost 35 years<sup>1</sup>—I believe markets have gotten less effective at this central task of accurate pricing, and I think it matters.

<sup>1</sup> I pick this as the data in my dissertation ended in 1990. When I wrote it, I had 27 years of data (1963–1990). You know you've been around a while when you have more out-of-sample data than you originally had in-sample data.

The efficient market hypothesis, or EMH, is at the core of the debate over how well-functioning is the stock market. EMH has always resisted easy testing. Its basic formation is “prices reflect all information,” which is pretty intuitive. But the rub comes in the next step: How do you test that? Here, we run smack dab into the joint hypothesis problem. “Reflecting all information” is intuitively what an efficient, or simply well-functioning, market should do. But to determine if it’s occurring, one also needs a model, formal or informal, of what and how information *should* be incorporated into prices. Then you can only test whether the “joint hypothesis”—prices reflect all information *and* abide by your model of what and how information should be incorporated—holds. If that hypothesis is rejected by the data, you generally don’t know which one, or both, were at fault.

But all is not lost. For instance, I, along with coauthors, have occasionally tried to inject some nontechnical common sense into the discussion. In *Institutional Investor*, John Liew and I made the modest proposal to inject the word “reasonable” into the process.<sup>2</sup> Just as in law a reasonable man standard is common, so it should be in what models are reasonable to pair with EMH. Yes, it is subjective. But if your finding is that companies with blue logos strongly statistically outperform all others, and your model for how prices and expected returns are set is “people hate blue logos so those companies trade cheap and then outperform” you, in our view, are not being reasonable. Barring some other nuance, we’d call such a finding an inefficiency. More realistically, if your reason some stocks underperform is “people like to talk about these kinds of stocks at cocktail parties, so they overpay for them,” then yes, in some grand meta sense it’s “rational” considering the enjoyment they get from their party chatter.<sup>3</sup> But I’d argue if that’s what you mean by an efficient market you, again, ain’t being reasonable or useful. While it may be true that “*de gustibus non est disputandum*,” at some point we have to call some tastes irrational, or the word irrational has no meaning.<sup>4</sup>

Similarly, I have argued that bubbles, the mortal enemy of EMH, are rare and the word is used far too promiscuously.<sup>5</sup> But rare does not mean never. I argued the standard should be very high. It shouldn’t be “this small stock is expensive, so it’s in a bubble,” as you often see in market commentary; but rather, “I have tried hard, and I cannot come up with any reasonable set of expectations about the future that justifies the price today under any *reasonable* model.” Furthermore, to be a bubble it should affect a large swath of the market (I think one stock, even if you think it grossly overvalued, doesn’t constitute a bubble of one). I have only seen a few instances that I believe qualify. I think Japanese stock prices in the late 1980s were a bubble. I think US stock prices in general, and the difference in prices between high-multiple and low-multiple stocks, were a bubble in 1999–2000 and again for high-versus low-multiple stocks in 2019–2020. I don’t see many other clear ones.<sup>6,7</sup>

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<sup>2</sup> Asness and Liew (2014).

<sup>3</sup> Actually, I think these cocktail party investors also think, usually mistakenly, that they will outperform, but the example in the text works better.

<sup>4</sup> Fama and French (2007) formalize this notion and its impact on stock prices, showing that investor tastes for things other than risk and return will affect prices and expected returns going forward, except in the highly unlikely case where they exactly offset.

<sup>5</sup> Asness (2014).

<sup>6</sup> I’m less sure about real estate going into the Global Financial Crisis of 2008 (subsequent prices have gone way higher), though pockets of the marketplace like securitized mortgage-backed securities probably fit and were probably big enough to overcome my “it has to be broad” criterion. Similarly, I am unwilling to call today’s AI boom a bubble. I can tell you the stocks look very expensive based on many typical measures, but I certainly can come up with assumptions about the future that justify these prices and are at least in the realm of reasonable possibility (not that I’m saying they look good!).

<sup>7</sup> Some are cynical there are any bubbles, as it’s very hard to make money from them because many get driven out of the trade before it’s profitable. That has always struck me as odd. That’s saying



In Gene Fama's finance class in the 1980s (and presumably before and after as he taught it for a while!), somewhere in the first few weeks after introducing the basic idea of EMH, he shocks the class by announcing that "markets are almost assuredly *not* perfectly efficient." He elicits a mild gasp from the class.<sup>8</sup> Of course, only in Gene Fama's class at the University of Chicago would this elicit a gasp! To most of the world the idea that markets aren't perfect would seem rather obvious. But Gene's point is a simple and obvious one—and Gene is nothing if not intellectually honest about such things—perfect efficiency is an extreme and unrealistic hypothesis.<sup>9</sup>

Accepting that markets are not perfect leads to some obvious questions and possibilities. Once the market is not perfectly efficient, the question of *how* efficient it actually is becomes legitimate to ask. Furthermore, the notion that this level of efficiency is constant through time becomes unlikely. Why would it be? Thus "how efficient?" and "has this changed through time?" become legitimate questions.

It is, again, my contention that, for the relative pricing of different common stocks,<sup>10</sup> the market has gotten less efficient over my career.

Finally, I should mention that I am aware this may all be the harrumphing of an old man! Tests of the EMH have always been both difficult and controversial in their interpretation. Tests of how much it's changed are only going to be harder. Thus, it's fair to say that, old man whinging or not, this piece is as much an op-ed as it is quantitative research. I just think it's an accurate op-ed!

## SPEED VS. ACCURACY

You'd be forgiven if, like me, your initial whiggish assumption is that markets would get more efficient over time. After all, over the past 20–40 years, the ubiquity and speed of available information has continuously grown, and at the same time, trading costs have come rapidly down.<sup>11</sup>

But like me initially, you'd be mistaking speed for accuracy. It's hard to imagine new information doesn't impact stock prices faster than in the past, and that is a kind of "efficiency." But speed doesn't imply the level of prices before or after the new information was particularly accurate or not.<sup>12</sup> Aside from the higher-frequency traders out there, speed has never been the issue. For instance, the basic value and momentum strategies we started trading in 1994, and their far more involved (many more factors, much better measurement of factors, innovative ideas such as alternative data strategies combined with machine learning) descendants today, have always had turnover that makes nanosecond-like speed

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"things can get so crazy only a few can hang on" as a way to say things are not crazy? Frankly, I see the question of whether one can practically profit from bubbles as really a different one from the question of whether there are bubbles.

<sup>8</sup>I should remember correctly as I attended the full two-class series three years in a row, the first as student, the next two as a teaching assistant terrified to miss anything I needed to remember.

<sup>9</sup>The Grossman–Stiglitz (1980) paradox is a formal proof of this impossibility.

<sup>10</sup>The absolute pricing of the whole market (e.g., is the S&P 500 Index or similar way too expensive?) is a related but different issue from what I will mostly focus on here (e.g., are high multiple, and perhaps low-quality, stocks selling for way too much versus low-multiple and perhaps higher-quality stocks?).

<sup>11</sup>They have come down but still aren't "free"—a mistake retail investors often make when they aren't charged upfront for trading because someone is "paying for their order flow." The person paying is probably, in my humble opinion (IMHO), offering a better deal on trading costs than investors got in the past, but they aren't doing it for eleemosynary reasons.

<sup>12</sup>This idea isn't brand new; see, for instance, Dickson (1998).

irrelevant.<sup>13</sup> In fact, if you take most medium-term holding period backtests and lag their trading a full week from when the decision to trade was made, there is only a modest deterioration.<sup>14</sup> You'd expect some drop—I mean, why would you wait after making a decision if you didn't have to? But you also wouldn't expect a big drop. Why should a strategy that usually holds stocks for about 9–12 months fall apart if you impose a week delay? If that were the case, you really have a one-week strategy, not a one-year one, no?

The bottom line is speed of information has consequences and can make the market more efficient in one sense, but it is largely irrelevant to the medium-term hypothesis I'm arguing here.<sup>15</sup>

## EVIDENCE

Tests of market efficiency have always been difficult and controversial. Tests of how it has changed over one's career will be even more challenging. For this, I will rely on something we introduced in 1999–2000, and now calculated in different ways by many others, during the famous dot-com bubble, the “value spread.”<sup>16</sup> This is the ratio of the valuation (using whatever measure you favor) of expensive stocks to cheap stocks. When it is high, investors are paying a lot for their favorite stocks versus those they dislike, and vice versa.<sup>17</sup>

I look at two versions of the value spread. One from Ken French's website using the classic price-to-book ratio, and the other using something closer to AQR's and many other quants' approach (multiple measures of value, taking out as much of the industry bet as we can), but only available over a shorter sample period.

In Exhibit 1, I graph the price-to-book of the expensive 30% of stocks divided by that of the cheap 30% of stocks only among large caps (using French's  $3 \times 2$  sort on  $P/B \times$  market equity).<sup>18</sup>

For 50ish years, 1950 almost through 2000,<sup>19</sup> it was a well-behaved series varying from about 6x to just over 3x. Then it exploded in 1999–2000 to heights unimagined beforehand. Returns to value strategies, whether simple price multiple–based strategies like this one (e.g., forming portfolios on ratios of price to some fundamental such as book, sales, earnings, cashflow, etc.) or more “holistic” strategies that use not just such multiples but also, say, measures of “quality,”<sup>20</sup> were crushed at never-seen-before

<sup>13</sup> Seriously, the move from minutes-old information to nanoseconds-old information in the past 30 years is the height of irrelevancy for low-turnover strategies.

<sup>14</sup> Now if you'd heard about the Battle of Waterloo three days earlier than the rest of the London stock market you probably made a bit of money! But a systematic, reasonably low-turnover strategy is not, on average, greatly impacted by even the modern equivalent of carrier pigeons.

<sup>15</sup> Some seem to blame short-term traders and, in particular, short-term “quants” (short-term is not what I do!) for markets perhaps being less efficient than in the past (see Griffin 2024). I don't. This is a medium- to long-term issue and short-term traders really just can't affect that very much. With that said, I tend to agree with these same people that markets have gotten less rational, just for some different reasons.

<sup>16</sup> Asness et al. (2000).

<sup>17</sup> Of course they are *always* paying more for the expensive versus the cheap given you sorted them on your definition of expensive and cheap. But how much more or less than normal is the point.

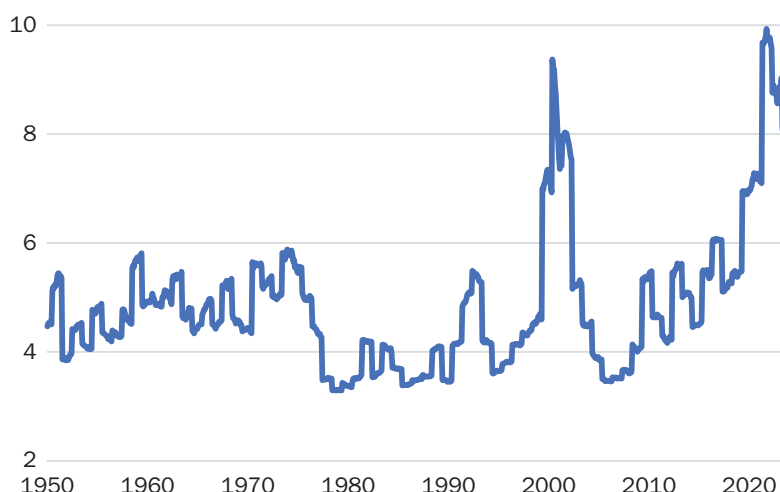
<sup>18</sup> Other measures yield similar results. For instance, the same exercise using price-to-cashflow from the same website produces a graph with essentially the same pattern (though in that case, the dot-com bubble peak just edges out the COVID peak). Also, adding small stocks to the mix changes little. Additionally, the examples I use here are just from the United States (partly so I could go back to 1950); global versions yield highly similar results.

<sup>19</sup> Going back much further than 1950, the series is quite unstable.

<sup>20</sup> Asness, Frazzini, and Pedersen (2018).

## EXHIBIT 1

### Value Spread from Fama and French (1993)



SOURCE: Ken French's data library.

levels as the prices of already expensive stocks soared versus those of cheap stocks. They then made more than all of that back in the years after the peak.<sup>21,22</sup>

Before going further, I should mention an important caveat: This article focuses on value strategies, narrowly defined as low versus high multiples, or more broadly defined as richer quant models and G&D managers do. Please keep in mind that beyond taking a more holistic view of “value” (e.g., multiples in context of things like profitability, safety, etc.), full-on richer quant models usually also include other

<sup>21</sup>One of the unheralded aspects of the two bubbles (1999–2000 and 2019–2020) is while simple multiple-based value strategies were destroyed, quality strategies were also a huge disappointment (very negative in 1999–2000, and failing to seriously help, despite quality and value being negatively correlated, in 2019–2020). These weren't just a quant “value as simple multiples” crash, they were a full-on Graham and Dodd (G&D) more holistic idea of value crash (holistic here means value in context of quality, including things like profitability and safety whether done by quants or more traditional stock pickers). It wasn't just quants that hated these periods. Traditional G&D-type managers were in hell also. It was not a crushing of just a narrow quant “cigar butt buying” value strategy based only on low versus high multiples. Rather, it was a crash of rational investing in general.

<sup>22</sup>Let's expand on this idea of “quant” or “academic” value versus a more holistic type of value practiced by old school G&D managers. The initial (like 1980s) academic findings that low-multiple stocks beat high-multiple stocks over the long term should, IMHO, never have been called “value.” When the G&D managers get annoyed, and they do, that quants and academics call their multiple-based factors “value” frankly, they are right. A high multiple itself doesn't mean something is expensive if its other qualities make it worth it (and vice versa). In fact, you can see the evolution of the publicly known quant/academic “factors” (we do some things that aren't so public!) as moving the whole quant effort closer and closer to something much more in line with G&D. Factors like profitability, low beta versus high beta, favoring conservative versus aggressive investing, preferring management that reduces rather than increases share count, all push in this direction. I think the problem between quants and traditional managers is largely one of communication. The quant multiple factor has been called the “value” factor for 40 years now. If I could go back in time, I'd rename it something more cumbersome but more accurate like the “low-multiple factor” or similar (actually, if I had a time machine that's probably not super high on my list of things to change in the world!). But today, when a G&D manager gets annoyed at the quants calling their low- versus high-multiple factor “value” (as they often do) shouting “that ain't value, it's just price!” I think we all must keep perspective. Despite the labels, many non-high-frequency quant processes taken as a whole look a lot more like the holistic version of value that G&D favor. The names we quants use are just a little dumb.

diversifying investment themes.<sup>23</sup> Related to this is many quants (not just at AQR!) continue to add sources of alpha that aren't "value" by broad or narrow definition (e.g., machine learning for fundamental momentum, alternative data sources, etc.).

Exhibit 1 used simple P/B for large caps *à la* Fama and French. In Exhibit 2, I graph a similar value spread, necessarily over a shorter period, for a process closer (not all the way as we wouldn't disclose that!) to what we think many or most real-life quants use. It uses five measures of value,<sup>24</sup> calculating again the ratio of the expensive to the cheap, where each is "intra-industry,"<sup>25</sup> and reports the standardized average of the standard deviations of each of the five series.

This and all other reasonable versions I've seen show a very similar pattern to the Fama–French data.<sup>26</sup> It's safe to say that 1999–2000 was unprecedented, and 2019–2020 either matched or blew past that on a very robust set of value measures.<sup>27</sup>

That brings us to an interesting issue. If you asked me in, say, 2002, after we survived the dot-com bubble (and prospered round-trip), whether in my career I'd ever see disparities in pricing that large again, well I hope I'd be smart enough not to offer guarantees (a stupid thing to do in our volatile business), but I'd probably have said "I *really* don't think so." After all, 1999–2000 was the most extreme thing we had seen in 50 years, and 20 years later seems like a short time for even imperfect markets to forget (for instance, people like me who lived through it and prospered from it would still be around!). And yet it happened. It took COVID to push the spread past 1999–2000 (and all those COVID-era predictions that *super* expensive stocks would all be worth it, and cheap stocks would go out of business—ex ante silly to many of us—ex post did turn out to be wrong). But even before COVID, spreads were getting close to the 1999–2000 peak, something that indeed shocked out of me whatever vestige of pure EMH worship I still had!

Now, while I think the value spread is informative, it is certainly not all you can look at. We, and others doing similar work, didn't just assume a very wide value spread was crazy. We kept an open mind to all sorts of explanations, from the fanciful to the reasonable,<sup>28</sup> for why perhaps this time was truly different.<sup>29</sup> It wasn't. We looked at whether these very wide value spreads were only a function of technology stocks, in which case perhaps (perhaps!) you might argue for a special case. They weren't. We looked at whether the famous critique of "value doesn't account for intangibles" was driving things. It only (barely) mattered at the margins. We looked at whether a handful of super-expensive, super-mega-cap stocks were the problem (first the "FANGs," today likely the "Magnificent Seven"). Nope. We looked at whether value was "more short"

<sup>23</sup>For instance, in Asness (2022a) I show that live returns on a quantitative long–short equity strategy since 1998 have only been about 0.2 correlated with the pure quant multiple-driven "value" strategy (the most famous one being Fama and French's HML, but more robust, multiple-driven strategies show similar results). But in the two bubbles I examine here, 1999–2000 and 2019–2020, the correlation was locally much higher (and, at other times, it was actually *negative* for some long periods). In other words, real-life, rich quantitative models have far more going on than pure multiple-driven valuation models, but they have looked like them in bubbles. That is, when the world goes mad, it seems any form of rational investing hates it (and loves the aftermath, a pattern that's actually good for your portfolio, as the bubble makes most everything else you do scream up, making the "rational rebound" much more needed during the bubble bursting).

<sup>24</sup>1) Book-to-price, 2) cashflow-to-price, 3) trailing earnings-to-price, 4) forecasted earnings-to-price, and 5) sales-to-enterprise value.

<sup>25</sup>Asness, Porter, and Stevens (2000).

<sup>26</sup>For another version, see Hanauer (2024).

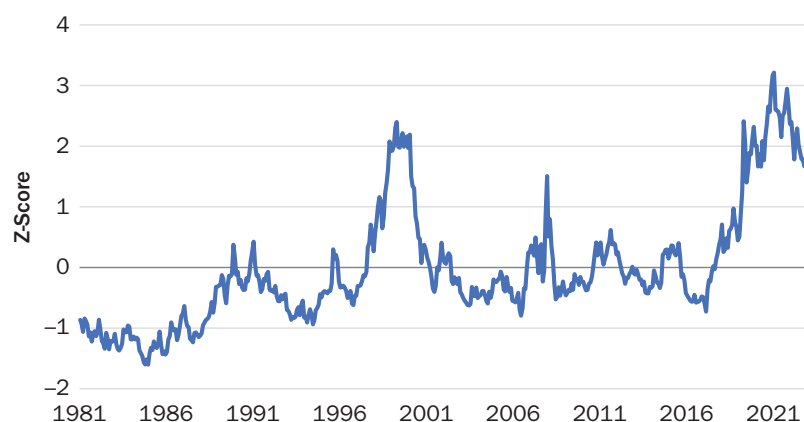
<sup>27</sup>This spread has come in more than the Fama–French version discussed here, but that is likely because it uses more timely data (as described in Asness and Frazzini 2013).

<sup>28</sup>The investing world is incredibly adept at explaining to you why whatever has been happening for a while is now going to happen forever.

<sup>29</sup>For examples of all the tests in this paragraph, see, for instance, Asness (2020), Aked (2020), and Israel, Laurensen, and Richardson (2021).

## EXHIBIT 2

“Real Life” Value Spread (intra-industry, five measures)



SOURCE: AQR.

attractive factors like gross profitability and return on assets (ROA), possibly indicating that while value spreads were wider, they were somehow more rationally wide this time. They weren't. We looked, and so did others, at the very common assertion that the excruciating pain of value investing and the very wide value spreads were rational because of the low interest rates prevailing at the time.<sup>30</sup> Nope. Paraphrasing Sherlock Holmes, when you've eliminated all the impossible cases, the improbable must be true; in this case, the improbable was a bubble.

Another aspect of the wild ride in value spreads recently and at the turn of the last century is interesting. Real life experience has taught me that the severity of tough times isn't all that matters. The duration of tough times is equally as important. In Exhibit 3, I graph the five-year moving average of the Fama–French value spread from above (other versions are very similar).

When spreads went up, they stayed up for a long while. Viewing this another way, I calculate the median value spread beginning in 1960 over an expanding window starting in 1950. During the dot-com bubble (1999–2000), we saw value spreads go and remain over the past median for five years before eventually returning to median. This was not out of line with the prior record for time over median spread set in 1976 at six years, although the 1976 results were much more modest in terms of magnitude (just lurking over median for a long time, whereas 1999–2000 was something much more severe). However, as of now, it's been 10 years with spreads above median and, for much of it, at great magnitudes. If these very wide value spreads represent market inefficiencies, they aren't just more extreme than in the past, but they are lasting longer when extreme.<sup>31</sup>

Why does how long it lasts matter so much? Well, because we're all human! You can have the best story in the world for why you are right and your strategy will recover from a painful period and even round-trip thrive. But when you're coming back with the same, however valid, story in year three of pain after you told it in years one and two, you start to get eye-rolling and investors start quitting on you.<sup>32</sup>

<sup>30</sup>Maloney and Moskowitz (2021) and Blitz, Hanauer, and Schneider (2022).

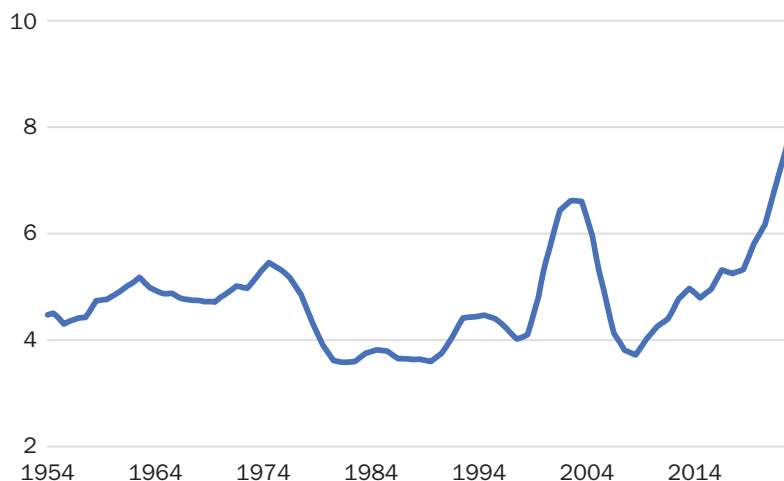
<sup>31</sup>Of course, similar (though in-sample, not rolling out-of-sample as the time series is too short) analysis on the more “real-world quant” version of value shows a very similar pattern (though these subtle forms of value have outperformed simple B/P over recent times).

<sup>32</sup>I am, depending on mood, either absolutely shocked anyone was able to stick with value investing (narrowly defined as just based on multiples or more holistically defined considering things like “quality”



## EXHIBIT 3

## Five-Year Moving Average of Value Spread from Fama–French



SOURCE: Ken French's data library.

The bottom line, while again admittedly this is hard stuff to prove (there could certainly still be something we've missed in our many attempts to see if the super-wide value spreads made sense), is I am convinced that 1999–2000 was then the biggest bubble for at least 50 years within the stock market, and a mere 20 years later, 2019–2020 was a comparable one.<sup>33,34,35</sup>

So, let's assume, as I usually do in any context, that you agree with me. Markets have gotten more disconnected from reality over time.<sup>36</sup> The obvious next question

and other factors) through such extended and severe pain, or absolutely shocked anyone would have left value for other investments given the overwhelming evidence (IMHO) that spreads were super wide, there was little justification for it, all would turn out well for value investing, and we had seen almost this exact movie before.

<sup>33</sup>Most versions of the value spread I've calculated show it wider, even considerably wider, in 2019–2020, so if that was the end of the story, I might make a stronger assertion and say it was non-trivially worse in 2019–2020 than 1999–2000. But while things like gross profitability and ROA failed to explain the 2019–2020 value spreads, meaning high-multiple stocks weren't abnormally better than low-multiple ones on these measures, in 1999–2000 they actually went the wrong way (the expensive stocks were substantially lower quality versus the cheap stocks than usual—think Pets.com). Thus, in a “cigar butt” type value strategy, looking only at multiples, 2019–2020 does look more extreme. But in a more holistic Graham and Dodd type value strategy, it's a much closer comparison (with both looking nuts).

<sup>34</sup>In very recent unpublished work, we tried a new exercise. Every month we regress (cross-sectionally across stocks) the next five years of earnings growth on starting valuation. Historically, on average, more-expensive stocks do grow more going forward (this coefficient is usually positive and certainly strongly averages so). This doesn't make expensive stocks a good deal. They are supposed to grow more, and value's long-term success shows that high-multiple stocks are usually priced to need even more excess growth than they deliver. Put simply, this relationship seems very steady over time. We do not see a strengthening of this relationship where over time higher-priced stocks consistently deliver even more excess earnings growth than in the past. If we did see that we'd have to consider whether that was another way today's value spread might be more “rational” than in the past, even at wider levels. But it didn't happen.

<sup>35</sup>“Within” is an important qualifier. It means comparing expensive to cheap stocks within the stock market, often called a “cross-sectional comparison.” In 1999–2000, the absolute level of stock prices was also record high (a Shiller CAPE on the S&P 500 of about 45) and, to me, also a bubble. However, the 2019–2020 overall stock market, while quite expensive versus history, was not near that level. I may have mentioned these things at the time and occasionally afterward (Asness 2000 and Asness 2005).

<sup>36</sup>I stress again that “getting less efficient over time” does *not* mean there are better alternatives than markets to allocating capital.

is why? What hypotheses seem reasonable for why the market might have gotten less price efficient over time? The second most obvious question is what are the implications for one pursuing a rational (defined as identifying a holistic idea of value and betting the cheap will outperform the expensive whether quantitatively or traditionally managed) investment strategy? The third question is, if investors agree with me, what are they doing about it? And the fourth question is, assuming what they are doing is not what I think they should be doing, what *should* they be doing? The next four sections will address each of these questions in turn.

## HYPOTHESES?

I have three hypotheses for why markets have gotten less efficient for pricing the cross section of stocks in the last 30+ years, with the third being my best guess of the biggest effect. None are proofs, and others may add ideas I've missed.

### Hypothesis #1—Indexing Has Ruined the Market

People get a little hysterical about indexing and sometimes need to be taken to the woodshed.<sup>37</sup> But there is no denying that the growth of indexing has coincided with the 30+ years I'm discussing here—though as always, correlation is not proof of causality.<sup>38</sup>

When finance PhD students are in their cups late at night,<sup>39</sup> there's a frequently discussed koan: "what if everyone invested only in the capitalization-weighted index?" Nobody has a great answer to this. It's kind of the finance equivalent of a singularity. How can prices be set if nobody is actually looking at anything? This question is purely theoretical; indexing has grown a lot over the last 30+ years but is nowhere near 100% of the market. So, the more practical question is "how much of the market can index and still lead to reasonable prices/outcomes?"<sup>40</sup> Unfortunately we don't know the answer to this one either.

I tend to come down in the same direction as Owen Lamont that blaming indexing for harming the market is overdone.<sup>41</sup> But it's not impossible. While still contentious, there is evidence and a reasonable argument that the rise of indexing has made stock prices more inelastic—meaning prices have to move more in response to changes in desired quantities (a trade moves prices more).<sup>42</sup> However, direction and magnitude are two separate things. This is a vibrant area of research, and direct links to the value spread I study here are not there yet. But from the small set of results I've seen, it's difficult to envision this explaining a large fraction of the very wide and long-lasting value spreads we've seen twice in the past 20 years—though not explaining a "large fraction" doesn't mean zero. The ubiquitous call for "more research" is appropriate here.

<sup>37</sup> An example of the former is described in Kawa (2016), and an example of the latter is Asness (2016).

<sup>38</sup> By "indexing" I mean investing in very broad cap-weighted indexes. Sometimes people confuse things by calling any rules-based strategy an index even if high turnover and uncorrelated with the stock market! That ain't indexing.

<sup>39</sup> Two wine coolers at 9:30 PM (which they oddly add ice to?).

<sup>40</sup> I once did a podcast hosting Jack Bogle (I'm doing this from memory) and asked him this question: how much of the market can be cap-weighted indexed before things break down? Jack absolutely acknowledged it can't be the entire market (he obviously loved indexing but was very intellectually honest). I pushed him for a number, and he said something like "75%." I said "that's interesting Jack, where did you get that number from?" He said "I made it up." God I miss that man.

<sup>41</sup> Lamont (2024).

<sup>42</sup> See, for example, Haddad, Huebner, and Loualiche (2021).

Let's conduct a very simplistic, and somewhat obnoxious, thought experiment. First, Bill Sharpe was obviously right: the average can't beat the average.<sup>43</sup> Imagine some fraction of the market passively holds the index,<sup>44</sup> and the rest are active traders/investors trying to outperform. Now divide this active group in two (this is the obnoxious part). One group are sharks, the other minnows. Minnows make bad decisions based on emotion, story, tastes that are not relevant for risk and return, and behavioral biases. Sharks outperform by taking the other side of the minnows' misguided positions.<sup>45</sup> Well, if indexing has grown, whether this has made markets more or less efficient comes down to whether more sharks or more minnows moved to indexing. If more sharks have moved, the remaining sharks should have an easier time making money over the long term as there is less competition in betting against the minnows, but the minnows have more influence than they used to at the short to medium term. Prices are a dollar-weighted average of opinions, and if a larger fraction of this is misguided, so will be prices.<sup>46</sup> Given that indexing is by definition smart for the average investor to do,<sup>47</sup> and given the celebrated "death of value investing" and concomitant shrinking of value investors' assets and influence, I find it very easy to believe more sharks have moved to indexing than minnows,<sup>48</sup> making the market more subject to the wild valuation spreads we've documented here. But it ain't close to a proof (sorry, there won't be any of those).

### Hypothesis #2—Very Low Interest Rates for a Very Long Period

To start, let's be honest and say if this explanation applies, then it only applies to the 2019–2020 episode when interest rates were very low and not the 1999–2000 dot-com bubble when interest rates were not particularly low (going one for two is an immediate big blow to any hypothesis!).

There's a lot of sentiment out there that super-low interest rates (like the entire post-2007–2009 Global Financial Crisis period until 2022) make markets go mad. I don't think this should be true, but I have some sympathy for the idea that it is in actuality somewhat true.

I have argued that it makes no mathematical sense for rational value (narrow or holistic) investing to move very closely with interest rates, and in fact, it has not over the long term.<sup>49</sup> In a different sense, not my focus here, regarding overall market valuation (like how expensive is the S&P 500), I have argued nominal interest rates should have little effect on overall market valuation.<sup>50</sup> But, in the same work, I also noted that empirically they seem to have a big influence over 100+ years (it turns out not everything I believe should be true actually is true).

How do I reconcile what's going on? Well, perhaps super-low interest rates for a long time make investors go cray-cray. Yes, I know cray-cray is not covered in the

<sup>43</sup> Sharpe (1991). For what it's worth, Jack Bogle always rejected the idea that indexing's superiority was based on the efficient market hypothesis, always stating that it was based just on this simple arithmetic.

<sup>44</sup> Let's leave out the fights about what index, what fraction of the market, free float vs. total market value, etc., and just assume it's a cap-weighted index of everything. It's just a thought experiment.

<sup>45</sup> Minnows are very close to what the finance literature would call "noise traders."

<sup>46</sup> Taking the other side of errors might be a positive expected return trade, but it is not an arbitrage. It is risky (sometimes the minnows are right by luck). Closing the first half of a mispricing might be attractive, closing the last half less so (a smaller gain in expected return for the same risk). Thus, how many dollars are on each side counts!

<sup>47</sup> I have no problem being a believer in both the type of active stock picking I'm discussing in this piece and in this truism.

<sup>48</sup> The sharks don't literally have to index themselves; they just have to have fewer dollars than they used to.

<sup>49</sup> Asness (2022b).

<sup>50</sup> Asness (2003).

standard CFA exam and rarely the result of formal analysis, but it seems at least possible to me. I don't think super-low rates are a necessary or certainly sufficient condition for relative value within the stock market to go mad (after all, again, this explanation went one for two, getting 1999–2000 wrong but 2019–2020 right). But it certainly feels like it could be a serious contributing factor among other conditions in making investors lose their minds (a more colloquial definition of a bubble). Sorry I can't be more formal/specific here, but I'm going to stick with "very low, even negative, real rates over long periods might drive investors to do batty things." That's my story and I'm sticking to it.

### Hypothesis #3—We Have the Effect of Technology Backward

Earlier, I dismissed the notion that technological advances should make the market more efficient in all but the short-term sense. Here, I argue it likely goes the other way at longer horizons. And, IMHO, this is the best of my three hypotheses.

Yes, anyone can have near instantaneous access to a near ubiquitous amount of data these days,<sup>51</sup> and while many can dispute the specifics, the cost of trading is almost assuredly lower today than in the dawn of my career. But again, speed of data availability is not relevant to the type of valuation we study here, and while transaction costs matter, they matter far less for a low-frequency strategy than a high-frequency one. Availability of data has never been what's hardest about investing. It's rational processing of information that is dear. And cheap (mistakenly thought of as "free" by many retail investors who don't get what "pay for order flow" means) trading might be the primrose path that leads many to think they can do things they just cannot.

The idea of the wisdom of crowds is well known.<sup>52</sup> In a real sense, any decently efficient market relies on it. But having a wise crowd in turn relies on the members of the crowd being largely independent of each other. For those of a certain age, think about Regis Philbin and "Who Wants to Be a Millionaire?" Of the lifelines in the game, the best one was always "poll the crowd."<sup>53</sup> You see, the crowd was basically kept in isolation, and even if only a small fraction of them knew the answer, the errors cancelled out and the right answer bubbled up.

But what if the crowd isn't independent, but acts in unison? Well, this has the potential not just to destroy the magical crowd wisdom but to turn it into a negative.<sup>54</sup>

So, has there ever been a better vehicle for turning a wise, independent crowd into a coordinated clueless, even dangerous, mob than social media? Instantaneous, gamified, cheap, 24-hour<sup>55</sup> now including "one-day funds" (Greifeld 2024)<sup>56</sup> on your smartphone after getting all your biases reinforced by exhortations on social media from randos and grifters with vaguely not-safe-for-work (NSFW) pseudonyms filtered and delivered to you by those companies' algorithms that famously push people to further and further extremes.<sup>57</sup> What could possibly go wrong?<sup>58</sup>

<sup>51</sup> A small exaggeration, as "alternative data sources" are a burgeoning area for quants (including at my firm) and these sources ain't cheap!

<sup>52</sup> Surowiecki (2004).

<sup>53</sup> On the other hand, phoning a friend always seemed pretty useless.

<sup>54</sup> Bernstein (2021).

<sup>55</sup> Doherty and Wang (2024).

<sup>56</sup> As Dorothy Parker is supposed to have said, "what fresh hell is this?"

<sup>57</sup> Many of my observations about social media and markets apply in an even more serious way to our politics, but that's a story for another day and hopefully another teller. Let's just say I think the people who assume technological advances must've made the market more efficient are the same people who assume social media must've made us all like each other more!

<sup>58</sup> Horwitz (2023).

While I didn't know the wonderful word "gamification," back when I wrote about the dot-com bubble, I do think this paragraph was a bit prescient and applies even more today.<sup>59</sup>

Finally, let us talk specifically about the on-line trading of one's own account. I do not know if many of you readers have played video poker in Las Vegas (or anywhere). I have, and it is addicting. It is addicting despite the fact that you lose over any reasonable length period (i.e., sit more than an hour or two and 9/10 times you are walking away poorer). Now, imagine video poker where the odds were in your favor. That is, all the little bells and buttons and buzzers were still there providing the instant feedback and fun, but instead of losing you got richer. If Vegas was like this, you would have to pry people out of their seats with the jaws of life. People would bring bedpans so they did not have to give up their seats. This form of video poker would laugh at crack cocaine as the ultimate addiction. In my view, this is precisely what on-line trading has become over the last several years (with perhaps some lessons taught only very recently, and not necessarily learned). This is just my opinion, but I think it is very plausible that these "crackhead" traders might be an important part of a multi-year bidding frenzy taking stock prices well past the rational (and I will not even dwell on the paradoxical fact that this bull market, carried on the back of the long-term argument for equities, has spawned a subculture of high turnover day traders). In sum, it is highly arguable whether technological advances have made the market safer, and it may well be that the opposite has occurred (Asness 2000).

Or, as Warren Buffett succinctly put it,

For whatever reasons, markets now exhibit far more casino-like behavior than they did when I was young. The casino now resides in many homes and daily tempts the occupants (Buffett 2023).

Finally, recall again that markets are never perfectly efficient, as taking the other side of other investors' errors, even if you correctly identify them, is still not risk-less. The more rational investors taking the other side, the more efficient. The more minnows doing crazy things, and the crazier they are, the less so. I think the rise of indexing and the super-low interest rates of the last 10–15 years may have had exactly this effect (more crazy, and crazier, minnows, fewer rational G&D disciples), but I conjecture that's a relatively small part of the story. I'm far more certain that social media, the overconfidence that comes when people think all the world's data are at their fingertips, and gamified, fake-free, instant, 24/7 trading have done so in a significant way.<sup>60</sup>

## WHAT ARE THE IMPLICATIONS OF THIS RISE IN INEFFICIENCY FOR A "RATIONAL" INVESTING STYLE

Cutting to the chase, let's again assume I'm right, that relative valuation among stocks, while never in a state of "perfect efficiency," has gotten less efficient over 1990

<sup>59</sup> Note, in this paragraph I say "the odds are in your favor." By that I meant that equities on average go up. Including all the biases and cray-cray we're discussing here, it probably should be written today as "you mistakenly think the odds are in your favor."

<sup>60</sup> Of course, if all three are true the effect is bigger.



to the present, with valuation bubbles occurring more often, in larger magnitude (even crayer-cray), and lasting longer. What does it mean for the rational value strategy (again, think holistic with, at the very least, quality factors to complement the pure multiple-based value factors)?

Put simply, it should be more lucrative for those who can stick with it over the long-term, but also harder to stick with. More lucrative seems obvious. If the rational active investor makes money from the minnows making errors, then they should make more if those errors are generally bigger. But it also seems obvious that it's harder to actually do. The periods of underperformance will be more severe and last longer. Frankly, I'm not sure anyone cares about my opinion about what is "fair," but this strikes me as fair—more lucrative for those who can do it, but also harder to do; seems pretty fair and logical to me.<sup>61,62</sup>

## WHAT ARE INVESTORS DOING ABOUT THIS DECREASE IN MARKET EFFICIENCY?

Now, assume you agree with me not only that the market has gotten less efficient, but also that value investing (defined generally) will be more lucrative going forward but harder to see through. What are investors doing about it? I distinguish this from the next section, which is what I think they *should* be doing.

Well, as the "death of value investing" crowd notes, they seem to be shunning it! Of course, I find this backward.

What are they doing instead? Well, first they are indeed indexing more. I can't gainsay this. While I'm (obviously) a fan of the kind of rational active investing I've been discussing throughout this piece, I can't criticize someone who says "I'm not playing that game, I'm just going to take the equity risk premium." In particular, if many, implicitly or explicitly, recognize they won't be the ones who can see it through (i.e., the part that got harder), then this strategy makes sense.

<sup>61</sup> I have repeatedly heard some similar sentiments to mine but concluding instead that "value investing is dead" or something similar. That's concluding a discipline that is based on others making errors goes away if those errors are too frequent and too big. I think those saying this are obviously focusing on the difficulty of maintaining the strategy (my second point), but the soundbites that come from them are far too pessimistic. If I'm right, rational value investing (quant or traditional) should be *better* long term. Just harder. Again, that's ok. "Better long term" and "easier" are a very rare pairing indeed. My argument echoes the dichotomy highlighted in Barberis and Thaler (2003), namely the separate "price is right" and "no free lunch" elements of the EMH. Even when there are large deviations of "right" or fair price, it can be hard to take advantage of these opportunities. I agree and say we now face larger deviations and a harder time sticking with it.

<sup>62</sup> One related, common question I've gotten as I've made this argument over the last year or so is basically "ok, then why is active management shrinking, and why doesn't the average active manager now outperform if markets are less efficient?" Well, first, the average active manager will always match the index gross of fees and trading costs—and will always trail it net. Nothing I have said here gets around Bill Sharpe's tyrannical arithmetic (OK, Pedersen (2018) may be a very slight out). The interesting question, again, is performance among active managers ("active managers" here means all investors who don't cap-weight index; not just professionals). It can all be random, or there can be some investors that on average underperform (my minnows) and others who on average outperform (my sharks) by taking the other side. Well, the very premise of this article is even if you're on the right side of this divide it will be harder to stick with in this "less efficient" world, as periods of bad performance become more extreme and last longer (though, again, ultimately more lucrative if you can). Thus, active management shrinking is not a surprise, as it's gotten harder and has suffered in recent years! To that last point, please keep in mind that the type of active management I'm advocating for here has faced a severe headwind of valuations getting more and more extreme over time. For pure academic-style value strategies this explains most of their tough performance, and again, never reason by extrapolating from a valuation change (Asness 2021). But given today's still-wide value spreads, unexplained by every hypothesis we've thrown at it, I stand behind my view that the future will be bright (well, not so much for the minnows!) even if more difficult.

Another very big slice is hiding in privates.<sup>63,64</sup> Did I say hiding? Well, yes, I did. Private investing (historically private equity and increasingly recently private credit) has arguably delivered attractive returns over the period we're discussing (I say arguably, as there are lots of issues with figuring out what the average investor really made net of massive fees and compared with the right beta  $\times$  the market).<sup>65</sup> Of course, at the start of this period, it was viewed as a "bug" to have illiquidity, opacity, and valuation that wasn't marked to market. A bug is something you get paid extra for bearing, that is, you get a higher expected or average return.<sup>66</sup> Well, it is very clear that modern investors now mostly view each of these things as a "feature."<sup>67</sup> In a world of volatile markets and crazy ups and downs for rational strategies relative to markets, many investors clearly enjoy being able to say—as many did—in a terrible year like 2022 that their private investments were "flat to slightly down." Of course, that was never true. Privates can be marked-to-market any time private managers want to do so.

Similarly, public liquid strategies that are marked to market could instead be marked like privates—with only a small nod to current market prices and largely at where the manager thinks they are worth.<sup>68</sup> Of course, if a bug turns into a feature, then a feature is something you pay for in terms of accepting a lower expected return. That this is going on is not in doubt, as it pretty much has to be. Whether it has driven the (still debated) net premium for privates below their true market beta or simply toward it is very hard to be precise about. But considering there is great dispute about the historical premium, and fees are enormous (and sometimes hard to figure out), this bug turning to a feature makes it highly likely (IMHO) that privates as a whole today will deliver less than one would get in an (honestly) comparable beta equity index.<sup>69</sup> In other words, what used to be an "illiquidity premium" you got through higher expected returns in illiquid assets is likely now an "illiquidity discount."<sup>70</sup> Basically, hiding from volatility can work when you are one of the few hiding, but when everyone is trying to hide in the same place, you likely pay for it, perhaps dearly. This illiquidity discount going forward is likely the major effect of the gigantic

<sup>63</sup> I'm going to be fairly critical of this massive move to privates based on their growth and popularity, what features are being prized (hint: it's not marking to market), and what the implications of these changes are. But it goes without saying that there are many private equity and credit managers who are simply superb. I'd venture 100% of them know more about how to manage and improve an individual company than I do. And like in all things, if you choose wisely, you can, of course, still do very well. Few headwinds prevent the top quartile from prospering anywhere long term. But no asset class or strategy is immune from the consequences of its own popularity, and private investments are off-the-charts popular for some good reasons, like apparent past success, and some bad reasons (e.g., "volatility laundering," as described in Asness 2023).

<sup>64</sup> A separate vexation of mine is that private equity and credit have come to dominate the category of "alternative investments." Alternative investments *raison d'être* is to be lowly correlated with traditional investments, not ostrich uncorrelated. These privates may or may not be great investments, but they are certainly not "alternative" to anything. They are long-only slightly levered stock picking. This has been the bread and butter of active management forever. Most privates are about as "alternative" as vanilla ice cream with the added feature that they're allowed to ignore the law that makes sellers put the calorie content on the package label.

<sup>65</sup> Much of Phalippou's work tackles these issues head-on; see, for example, Phalippou (2020). For an overview of the issues raised here, see Celarier (2023).

<sup>66</sup> Think David Swensen pioneering such investments and arguing you get a premium return for bearing the *bug* of illiquidity.

<sup>67</sup> I've spent a ton of time with allocators, speaking to investment committees, and being on investment committees; please trust me on this one.

<sup>68</sup> I am fond of noting that using this method, at the depths of value's pain in March of 2000, I could've said "we're only down a tad, the money is safe in what I call 'the bank of short the Nasdaq'."

<sup>69</sup> "As a whole" is doing a lot of work here. Of course, there will be some *ex post* and likely *ex ante* managers who will do much better (and worse, as that's how averages work!).

<sup>70</sup> As described in Asness (2019).

rush to privates over the last few decades. But there is another worry. Ignoring reality only works for so long. Nobody wants to see the United States have a decade like Japan did in the 1990s. I certainly don't forecast it. But assuming it's impossible is folly, even negligence. An event such as that would be very hard to keep out of the marks of privates eventually. If one is investing in privates assuming very low risk (low volatility, low beta),<sup>71</sup> then one is in danger of making precisely this error. Frankly, I'd wager most financial disasters come from some form of the intentional (even well-intentioned) or accidental hiding of volatility.

Frankly, criticizing one's clients is rarely a positive-NPV project, so I hope nobody shoots the messenger, but I have to be a bit harsh here. Too many allocators are protecting their jobs through "volatility laundering" rather than doing their jobs through building the best long-term portfolio and sticking to it.<sup>72</sup> Let the beatings of Cliff by clients and competitors alike commence.<sup>73</sup> But I stand by my comments; and paraphrasing Churchill once more, this time when it comes to privates, "never have so many paid so much to so few for the privilege of being told so little."

I acknowledge the massive psychological difficulties, greatly exacerbated by agency problems,<sup>74</sup> with sticking with an honestly marked-to-market strategy even if it's great long term—it will sometimes suffer short term, and if I'm right, can suffer more for longer than it did in the past. But the difficulty of doing the right thing should not be an excuse to do the wrong thing, especially because doing the right thing—rational investing—is likely a better, not worse, opportunity moving forward. Too many investors hide behind apologetic aphorisms and poisonous platitudes.<sup>75</sup> You know them all. "The market can stay irrational longer than you can stay solvent." "Early is the same thing as wrong." These are clichés for a reason, as they contain a lot of truth and lord knows I have the scars to prove it. But nowadays they are too often shibboleths uttered as an excuse for not doing the right thing. Yes, absolutely, don't do a good strategy if you are guaranteed to abandon it at the worst possible time. But instead of making this excuse and hiding in "volatility laundered" assets, how about working on getting better at actually surviving the tough times?

## WHAT SHOULD INVESTORS BE DOING ABOUT THIS FALL IN EFFICIENCY OVER TIME?

Well, I just made fun of platitudes, and here I will likely delve into some of my own. You see there are, of course, no easy answers for how to create and stick with a real-life marked-to-market volatile portfolio and with managers pursuing rational strategies through some very big ups and downs. And that holds even if you are completely convinced it is the best return for risk (measuring risk for real) you can construct.

The meme stock world—a fever swamp if there ever was one, and if a small subset of the market could prove market inefficiency, which it can't, it would be

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<sup>71</sup>This is clearly true of many investors. I've seen the "efficient frontiers" drawn with privates way to the left of analogous public assets (which is nonsense). But it's also absolutely true that many use privates in very responsible ways, assuming what I'd agree are fair risk numbers and worst cases.

<sup>72</sup>Asness (2023).

<sup>73</sup>Though in the spirit of "if you can't beat them, join them," Asness (2019) suggests a way for liquid strategies to compete in this arena too.

<sup>74</sup>For instance, if you're running a good long-term strategy that is going through a very rough period, you often don't end up talking to the person who hired you and still believes in you—you end up talking to his or her boss, or their boss—and they don't believe in you (and often don't have a clue about what you do!).

<sup>75</sup>And many authors hide behind arrogant alliteration.

“Exhibit A”—gets one thing sort of right. They use an acronym HODL for “hold on for dear life.” Now, they apply it to super-low-quality, near-bankrupt-yet-still-overvalued companies often run by scammers playing to and preying on them, and do so using NSFW language with any who disagree, and various “ape” images as logical argument. So, you know, that’s bad. But if applied to good, intuitive, reasonable strategies you rationally believe in for the long term, HODL is a hell of a motto.

So, how do you get there? Well, you probably can’t. At least not all the way. The goal should not be to become a Vulcan who can stick with anything as long as it’s long-term “logical.” Too unrealistic. The goal should be to get closer. How close will vary by investor and will likely determine who can take advantage of what I argue will be larger opportunities going forward and who should perhaps index (I will not be making a case some should indeed hide in unmarked assets unless they can identify especially good ones).

The first thing is to study, I mean *really study*, history. One thing that’s certain is what I call “statistical time” is not nearly the same thing as what I call “real-life time.” Statistical time is how long it takes, assuming you think the sample is relevant to today (already a hurdle), to have a sense of how probable it is that you are wrong about something.<sup>76</sup> Real-life time is how it feels when it’s not working. Look at your favorite backtest. Mine might be the original backtest of Fama and French’s HML factor.<sup>77</sup> You look at most of the historical drawdowns, in particular the one in 1999–2000, and say “yeah, of course, I would’ve stuck with that.” Well, maybe. But those 18 months of horror and 5 years or so of drawdown weren’t 18 months and 5 years to you.<sup>78</sup> We have long borrowed a term from physics for this effect: time dilation. That 18 months and 5 years for you felt like forever, and many who look at the backtest and think they could’ve taken it, even added to it, really couldn’t have (partly as they are often simultaneously looking at the fact that it ended up fine, something not available real time). Yeah, I know I’m just restating the problem! So, what to do?

One thing I find helpful—yeah, I’m far from immune from these difficulties myself<sup>79</sup>—is again to look at evolving valuations. Time periods when valuations are very different at the start and end of a sample, even for very long periods (sometimes far longer than the five years noted above), can lead you to very misleading conclusions. Essentially, often even the long run is lying to you.<sup>80</sup> As a useful example let’s look at how US stocks have crushed the developed world since about 1990. That’s 10 eternities in “real-life” time.<sup>81</sup> But about 85% of that outperformance has come from the US going from relatively low multiples compared with the rest of the world to quite high multiples versus the rest of the world. Similarly, the equity risk premium is a wonderful thing for long-term investors, but it’s not as good ex ante as it has been from about 1981 to the present. Stocks started out ridiculously cheap, like a CAPE of 7 cheap, and ended above 30. Anyone want to assume it keeps revaluing like that?

So, yes, depressingly, I’m saying you can do the right thing and still be wrong for about 30 years (like diversifying outside the US). I am also saying when it happens (and along the way) you have to ask the next question: why? Is it reasonable to change

<sup>76</sup> Statisticians never say, “we’ve proved this,” rather they say things like, “based on the data there is only a 1% chance we’re wrong.” It’s kind of wimpy and never feels fulfilling, but it’s correct, you can’t say more than that from statistics.

<sup>77</sup> Fama and French (1993). Note that I am *not* arguing this is the best version of quant value investing or that value is all one should do!

<sup>78</sup> Defensive bragging here. Real-life multifactor quant strategies, and even just more subtle value factors, have suffered some ugly drawdowns, but not nearly as long as HML.

<sup>79</sup> I tried to set the record straight in Asness (2009).

<sup>80</sup> Asness (2021).

<sup>81</sup> Luckily, though it didn’t feel this way at the time, the tough periods relevant for the strategies discussed in this article have not been 30+ years but 2–3 years, which still felt like an eternity!

our assumptions and assume the US always outperforms (by the way, the 20 years prior to 1990 were quite bad for the US versus the world)? If so, does that mean international diversification is a terrible idea for US investors but a wonderful one for the rest of the world in perpetuity? Of course not. The questions answer themselves.

Assuming a valuation change will continue to go on forever is obvious folly. Hopefully, you can see that a little time asking why something happened can change your perspective, if not the reality of what occurred, and hopefully help you stick with the plan.

So, pushing yourself (and whoever you report to!) to have the longest time horizon possible is definitely #1 on the list. Quoting myself, “a long-term horizon is the closest thing to an investing superpower.” But there are other specific things you can do beyond just “try to understand what happened and why.” For one thing, try very hard to move your focus from “line items” to the whole portfolio. Line items are just what they sound like—subparts of the portfolio. There are times when your whole portfolio will be disappointing you, and all you can do is fight hard to keep that long-term perspective. But when it comes to parts of the portfolio, they will disappoint you all the time; that kind of comes hand in glove with diversification, something obviously vital in building a great portfolio.<sup>82</sup>

Line items can be asset classes (after a bad period for them, saying why do I bother owning bonds?), geographies (why do I ever invest outside the US when it has done so well?), styles (why do I try to be a rational investor when the world clearly doesn’t care anymore?), and even individual managers. Basically, bad things, with good explanations (like changing valuations) or from pure random shocks, will by definition occur more often and at greater extremes for line items than for a well-constructed diversified portfolio. But because they are line items not the whole portfolio, you should care about them less! For instance, in the two value debacles and recoveries I’ve focused on here, both of the above (bad periods and good explanations) apply. First, it was painful in real-life time but not as shocking in statistical time (it was a big standard deviation event but not a “black swan”). Second, the explanation was clear—about 100% of the pain came from multiple expansions/contractions for the expensive/cheap stocks. Not only should that have made the pain easier to bear, it should have also been very encouraging going forward because value spreads tend to normalize historically.

Third, attempting to add alpha from rational active investing was only a line item in almost all portfolios, and usually a small one compared with, say, market exposures. That alone should give some perspective and some staying power, but context again mattered. Both of the painful episodes, 1999–2000 and 2019–2020, were quite strong ones for overall portfolios long stocks and bonds. And, to different degrees, the next few years of recovery for rational active investing came when it was more needed, as overall portfolios were not as strong (quite bad in 2000–2002, and really tough in 2022).

This type of pattern should make a strategy easier to stick with, but in real life it actually sometimes works the other way. That is, when everything else is making money, losing money makes the loser look more like a fool! Of course, again, that’s a permanent consequence of real diversification. Something will almost always look foolish. I have no magic formula for fixing this, but talking about it upfront has to (I hope!) help. Putting line items in perspective should indeed help.

In the same spirit of focusing too much on individual line items, investors are actually often too conservative in how they run these line items, particularly in the ones that are highly diversifying. It’s often pointed out that compound returns are

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<sup>82</sup> One of my favorite Yogi Berra quotes (maybe, he famously also didn’t say all the things he said) that relates directly to diversification is, “you have to go to other people’s funerals otherwise they won’t come to yours.”



what matters and compound returns don't like volatility (e.g., +50% followed by -50% ain't flat, it's -25%). That's all true. But it's relevant to the whole portfolio, far less so to individual line items, particularly when they are small parts of the portfolio.

Examples are easy to construct. Imagine you had an investment that each year would either double with a 2/3 probability or go to zero with a 1/3 probability. Further imagine that the outcome is independent from anything else in the portfolio ("uncorrelated"). I don't think many investors would want this as their whole portfolio, as the expected compound returns are clearly -100%.<sup>83</sup> But, hopefully everyone would say "I want some of this in my portfolio." They'd do some every year and just reload back to the original amount after either doubling or going to zero on that presumably modest portion. Putting that modest amount in this hypothetical investment should be a no-brainer.

So, compound returns do rule the world of the overall portfolio, but they actually do not rule over properly rebalanced line items.<sup>84</sup> Yes, now I'm really being cheeky as a pervasive theme of this piece is that it's hard to stick with real-life investments, even very good ones, and now I'm saying many of them should be run even more aggressively. I recognize how difficult this is, but I'm not wrong about the math! At the very least, if one understands this it should make it easier to stick with line items through their hard times (even if my dream of taking even more volatility there is unattainable).

Investors should work on how they think about the most popular horizons for evaluating investments, 3–5-year periods. In my experience as an asset manager and from serving on quite a few investment committees, these evaluation periods are ubiquitous. Presenting these results is, of course, reasonable. But, to be frank, investors seem to act backward at these horizons.<sup>85</sup> That is, they move their portfolio toward what has been strong at these horizons and away from what's been weak. Now, momentum investing is a legitimate strategy in which I have a small amount of experience.<sup>86</sup> But that is a 6–12 month phenomenon.<sup>87</sup> At a longer horizon like 3–5 years, most things show at least a modest tendency to reverse, not continue. In other words, sure at 6–12 months it's OK to be somewhat of a trend follower, but at 3–5 years it's probably best to be a (mild) contrarian.<sup>88</sup> Yet, the world repeatedly doesn't work that way. There is no easy cure for this but, yet again, I hope studying it and acknowledging it can help.

Finally, here's one that's practically a throwaway: Make your process better! For quants, that's improving your factors and optimization processes. As much as I defend long-term rational stock picking throughout this piece, one should not be above diversifying from it if possible. To this end, modern quants have pushed into things such as machine learning (both for factor selection and factor creation like using natural language processing to build better fundamental momentum factors), "adaptive" models that vary factor weights more systematically over time based on out-of-sample evidence, factor momentum, alternative data sources that are less picked over, and others that I could tell you about but would have to kill you.<sup>89</sup>

<sup>83</sup>It turns out that one measly -100% makes the portfolio -100% forever. Though in real life you often get to "restart" in some fashion so perhaps I go a bit too far here, but only a bit.

<sup>84</sup>You do rebalance, don't you?

<sup>85</sup>See Peeve #3 in Asness (2014).

<sup>86</sup>Asness, Moskowitz, and Pedersen (2013), but also for my dissertation for Gene Fama. You want to do something scary in the world of academic finance? You go tell Gene Fama you want to write a dissertation studying the strategy of simply buying what's been going up over the last 6–12 months and selling what's gone down, and then adding "it seems to work."

<sup>87</sup>Even shorter for some things like factor momentum (Gupta and Kelly 2019) and industry momentum (Moskowitz and Grinblatt 1999; Asness, Porter, and Stevens 2000).

<sup>88</sup>Pure 3–5-year contrarianism is, IMHO, likely a positive but pretty low Sharpe ratio strategy stand-alone. I don't advocate doing a lot of it, rather I advocate not doing a lot of the opposite!

<sup>89</sup>This is difficult, as *The Journal of Portfolio Management* is quite successful and has a large circulation. Plus, it's illegal, and lastly, probably immoral. Probably.

I am aware that this is the weakest section of this piece. The task is not easy and the advice is straightforward not any new genius! But perfection is never the goal and one can get better, perhaps much better, and hopefully these ideas help.

## CONCLUSION

I believe markets have gotten less efficient over the 34 years since the data in my dissertation ended. I believe it's likely happened for multiple reasons but technology, gamified 24/7 trading on your phone, and social media in particular are the biggest culprits. Whether this will last forever I can't say. It seems that over history new technologies are eventually adapted to, and one day maybe that adaptation renders this piece obsolete. But for now, I think it has raised the stakes of rational active investing. I think the ups and downs will be bigger and last longer, making more money for those who can stick with it long term, but making it harder to do so. That seems fair to me. I think some investors should lean into it, taking advantage of this larger opportunity than in the past, and hopefully some of my suggestions for doing so at least help. I think indexing is a perfectly reasonable option for those who know they can't do it. I think assets that simply launder these risks for you are not the answer; rather they are a potential drag on their legion of believers going forward as a bug you get paid for bearing becomes a feature you pay to enjoy.

Do not think you can hide from volatility. It either finds you very painfully eventually or you pay too dearly for the fake smoothness along the way. Don't trade the wrong direction on 3–5-year results. Don't be fooled by valuation changes, even over some very long periods, into throwing away what's right. Don't overfocus on line items, particularly small ones that are diversifying—they are there to do well long term but they won't always, and you need to keep perspective and remember why they are there.

Smart investors worry about good strategies getting arbitrated away. That is, too many people are doing them, so going forward they will not look as good as their presumably attractive past. I think old-school active value and quality stock picking has seen the opposite occur.<sup>90</sup> We should all look to fade strategies that have been arbitrated down and feed strategies that have been starved for capital.

Remember, efficient markets matter. They matter for society's allocation of resources, and bubbles misallocate resources. The advice in this piece is meant to make your investing life better, not a charitable service to society. But you are allowed to be gratified that you are doing both.<sup>91</sup>

Good investing has always been a challenge combining a) discerning what is right, and b) sticking with what is right. Both have always been vital and both still are. But if markets are indeed “less efficient,” the first task has actually gotten easier and the second harder—and the skills needed to pursue good investing have shifted. That tells us what we should work on going forward. Good luck!

## ACKNOWLEDGMENTS

I thank William Bernstein, David Chamness, Antti Ilmanen, Kevin Infante, David Kolb, John Liew, Toby Moskowitz, Laurence Siegel, Alec Stais, Richard Thaler, Dan Villalon, Tuomo Vuolteenaho and Brent Wheeler for helpful comments and suggestions.

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<sup>90</sup> If it were arbitrated away, we'd see my “value spreads” come way in, not hit historical highs in 2020 and still be quite high versus history.

<sup>91</sup> Adam Smith would be proud of you.

This article is not intended to, and does not relate specifically to any investment strategy or product that AQR offers. It is being provided merely to provide a framework to assist in the implementation of an investor's own analysis and an investor's own view on the topic discussed herein. The information contained is only as current as of the date indicated and may be superseded by subsequent market events or for other reasons. Charts and graphs provided herein are for illustrative purposes only. The information in this presentation has been developed internally and/or obtained from sources believed to be reliable; however, neither AQR nor the author guarantees the accuracy, adequacy, or completeness of such information. Nothing contained herein constitutes investment, legal, tax or other advice nor is it to be relied on in making an investment or other decision. There can be no assurance that an investment strategy will be successful. Historical market trends are not reliable indicators of actual future market behavior or future performance of any particular investment which may differ materially, and should not be relied upon as such. Diversification does not eliminate the risk of experiencing investment losses.

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