# Deleted Scenes

Introduction

My book *Investing Amid Low Expected Returns* had a target that was hard for me to meet: 250 pages of text—far fewer than what I had in early drafts. Picking and choosing among competing topics wasn't easy, and some ideas that I find interesting were ultimately cut.

But the constraints of a book don't have to be a constraint for hungry readers: I am making some of the content that didn't make it into the final version available exclusively on the aqr.com/serenity webpage.

- Antti Ilmanen, Author and Principal at AQR Capital Management

Contents

Ch. 2.1: A Perpetuity Analogy for Rich Valuations

For those familiar with bond maths, I hesitantly propose a stylized example of thinking of a broad global wealth portfolio of bonds, stocks and real estate as a consol or perpetuity – an asset that promises fixed coupons each year in perpetuity.[1] A consol's price has a particularly simple formula, it equals coupon over the discount rate. I argue here for simplicity that the global wealth portfolio is approximated by a consol with stable 4% real cash flows and a real discount rate which varies over time. At 4% discount rate (perhaps a long-run norm), the consol price is 100 and the real expected return is, duh, 4%. If the real discount rate rises to 6%, the consol price falls to 67, but at least the expected return is then high (6% real). This was the world forty years ago, characterized by stagflation and pessimism, just before a secular bull market in many asset classes. Then between early 1980s and early 2020s the real discount rate fell from 6% to 2%, tripling the consol price to 200 and providing large windfall gains along the way. This is today's world where future cash flows are capitalized dearly, but this benefit is balanced by low expected returns (2% real).[2]

Hopefully this stylized example illustrates how the rising asset valuations have "brought future returns forward" or how "we have borrowed returns from the future", compared to the case where discount rates and asset valuations stay near their long-run levels. It may feel like a sugar-high for asset owners today, but the thoughtful ones know that a payback time lies ahead. Young savers who did not benefit from asset richening will be the main payers, unless valuations normalize and expected returns rise soon.

P.S. in early 2022, it struck me that an empirical example of the perpetuity yield would be more compelling than my stylized example above. A simple chart below fits with the story above better than I could hope for. A simple average of real expected returns of U.S. equities, bonds, and housing (the three main sources of wealth, as discussed in the book's Box 3.1) averaged 4% in my lifetime, rose to exceed 6% in the early 1980s and then fell below 2% recently! Again, as a flipside, market valuations were low 40 years ago and are high now.

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1   I hesitate giving this example because the intuition it offers is balanced by the many shortcuts its use requires. To be clear, while all major long-lived asset classes – bonds, stocks and real estate – resemble consols in some ways, each has differences (finite and/or uncertain cash flows rather than an infinite stream of fixed coupons) which I ignore. The assumption of stable expected cash flows is a major simplification, but over very long horizons not a terrible one (since it is very difficult to predict deviations from the long-run real growth rate of 1-2% in equity earnings or payouts per share, and for real estate zero real income growth is a good baseline), and I want to focus on changing (real) discount rates. I also ignore inflation here as its impact on stocks and real estate is debatable. Finally, nonlinearities such as the asset duration being especially high at low yields are overstated when we assume infinite-maturity consols. Haghani and White (2019) explain well how the negative-yield puzzle for perpetuities is resolved with finite maturity, and how the lottery-like features implied by nonlinearity (rare events push the expected/mean value way over the likely/median value) are mitigated by taking an expected utility perspective.

2   This 4% decline in discount rates reflects some mix of lower short rates and lower required risk and illiquidity premia. Whatever the reason, the decline has mechanically provided windfall capital gains to the long-lived asset portfolio of almost 3% p.a. (Given the power of compounding, a 2.8% annual rate compounded over 40 years raises portfolio value threefold.)

Exhibit 2.6. Expected Real Return of a Perpetuity Proxy, an Equal-Weighted Average of U.S. Equities, Treasury Bonds, and Housing
1961-2021
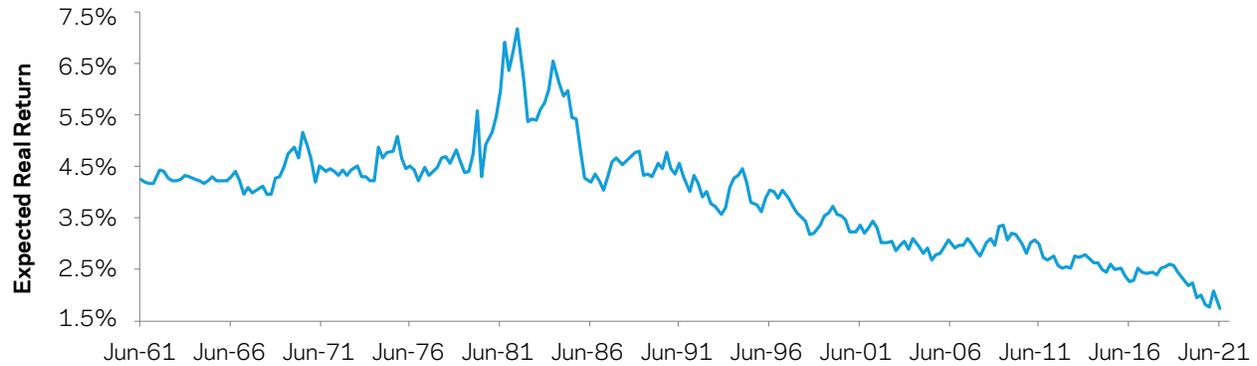
Source: AQR, Robert Shiller's website, Kozicki-Tinsley. (2006), Federal Reserve Bank of Philadelphia, Blue Chip Economic Indicators, Consensus Economics. Equity is represented by the S&P500 stocks (before 1926 using Cowles data as in Robert Shiller website). The equity real yield is the sum of income and growth proxies. Income is an average of two measures: D/P ratio and half of the cyclically-adjusted E/P ratio (which uses smoother 10-year real earnings in the numerator, and implicitly assumes 50% payout ratio), while growth is assumed to be 1.5% (long-run real EPS growth). No mean reversion is assumed. The real bond yield is the 10-year Treasury yield minus survey-based or statistical inflation forecast for a decade, as in Ilmanen (2011). For housing, I use the rent/price ratio of U.S. housing based on Davis-Lehnert-Martin (2008) data on https://www.aei.org/historical-land-price-indicators/.

Ch. 2.4: Expanding on Big 21ˢᵗ Century Themes and Tech Company Dominance

Box 2.1. Other big themes of the 21ˢᵗ century

I argued that low expected returns may be the second-most important generational challenge today. Clearly, climate change tops the list, and yet 2020 reminds that we cannot forget other candidates like pandemics, nuclear threat, cyber security or bio terrorism. These challenges share the feature that they are important but may not seem urgent, allowing the "kicking the can down the road" solution. All of them may suddenly become urgent, as we saw with Covid; then they compete for scarce resources and make the low expected returns challenge even worse.

To stay with the big themes of 21ˢᵗ century, it is important to first remind of the huge positive developments in wealth and health especially among the poorest people on Earth, and some positive steps on equality and diversity fronts (admittedly, this glass is still at best half full). Books like Pinker's *Enlightenment Now*, Rosling's *Factfulness*, and Siegel's *Fewer, Richer, Greener* remind us that not everything is bad, and that there has been no better time in history to be alive than today. Still, the demographic challenge is growing. The boomer generation got the investment decades of windfall gains (and many the DB pension without fully funding it) while delaying the

costly environmental and fiscal reckoning for which the young will ultimately bear the consequences.

In geopolitics, the major story is of ascendant China as a global power, with a relative decline of Europe and the U.S. The main hope for the latter is that democratic capitalism should beat state capitalism. Within countries, the main political debate is no longer between right and left but between authoritarian/nationalistic populists and liberal globalists (overlapping dimensions like 'somewheres' vs 'anywheres', old vs young, rural vs urban, educated vs uneducated). Like globalization, the technological change has not been good for everyone (shift from physical to virtual world, dominance of FAMAG and other disruptive winners, automation and job losses, privacy and cybercrime concerns…). The backlash by the losers of globalization and technological disruption deserves attention, as do the demands by the historically disadvantaged groups, as the extreme polarization undermines our societies. There are no easy solutions; dealing with all this will be costly and reinforce the low expected returns challenge, and potentially the inflation pressures.

Looking at the 2010s from the century perspective, it is clear first that it was a disinflationary decade (bond rewards were well above average despite low starting yields, while commodity indices earned negative returns). The 2010s was also a benign decade for risky

assets – more so for U.S. large-cap stocks and even more for tech stocks. Virtually any kind of diversification away from the U.S. 60/40 hurt performance: non-U.S. stocks including emerging markets, hedge funds, alternative risk premia – all unhelpful in the 2010s. This

is how it was, but **Exhibit 2.7.** shows that this is not something you should expect on any decade and perhaps least of all after a decade of a U.S. tech and large-cap -led bull market. The 2020s may turn out very differently. Time will tell if we are in for a Covid-scarred decade, another roaring 20s, or inflationary 70s, or something all-new?

Easy central bank policies (both low rates and quantitative easing) supported continued richening of already rich bonds, stocks and all risky assets – whether liquid or illiquid. "The Fed put" became available to an increasingly broad range of assets whenever things looked shaky, as the alternative of fast pain was too unbearable for policymakers. This also meant that any macro trends were cut short, which hurt trend-followers and macro traders. Meanwhile, reaching for yield worked better beyond the traditional liquid asset universe as investors shifted to riskier and less liquid assets (to achieve their return targets even when traditional markets were now offering less).

Another major development has been the increasing global dominance of tech-oriented superstar platform companies (see **Exhibit 2.2.**). These include FAMAG (Facebook, Apple, Microsoft, Amazon, Alphabet (Google) … the acronym covering the largest five U.S. firms …sometimes extending to other hot firms like Netflix and Tesla), but also some Chinese peers (Alibaba and Tencent), as well as some long-unlisted unicorns (Uber, Airbnb).[3] Investors believe(d) in the ever greater concentration of monopolistic profits among these disruptive firms, thanks to network effects, R&D edge, increasing returns to scale, winner-takes-all outcomes. The presumption is that the dominating disrupters will not themselves be disrupted either by upstart competitors (which they can buy) or by policymakers/regulators (which they can influence with their vast cash pools and increasing political power). The shift from a physical world to a digital/virtual world was speeded up by Covid-19 and lockdowns, further aiding these companies.

Exhibit 2.2. World's Largest Companies in 2021

	Company	Market Cap ($ trn) 31/3/2021	Earnings ($ bn)	Cash+STinv (end 2020)
1	Apple	2.07	77	77
2	Saudi Aramco	1.89	115	58
3	Microsoft	1.83	63	132
4	Amazon	1.59	26	84
5	Alphabet (Google)	1.44	48	137
6	Facebook	0.85	33	62
7	Tencent	0.81	29	35
8	Tesla	0.64	?	19
9	Alibaba	0.63	27	71
10	Berkshire Hathaway	0.59	60	138

Source: https://companiesmarketcap.com/ April 2 2021, etc. The information contained herein is for informational and illustrative purposes only and does not constitute an offer or invitation to buy, sell or otherwise transact in any security.

3   "Unicorn" refers to non-listed startup firms valued above $1billion (which used to be rare, as the name implies, but during the past decade have become a dime a dozen…).

This development has contributed to the large valuation change between growth and value stocks. The concentration of market cap in the disruptive superstar firms is historically extreme. Will they keep winning it all, or are we experiencing a bubble? Bubbles often coincide with new technologies. Amara's Law says "We tend to overestimate the impact of new technology in the short term and underestimate it in the long run," perhaps justifying the more sustainable second leg of the internet-based bull market after the first dot.com bubble ended in a bust in 2000. The internet revolution 2.0 could be a valid structural change, and structural changes are bad for contrarian strategies. Yet, history also tells us that financial markets tend to take things too far. While the fundamental

valuation anchor may change and limit mean reversion in returns, in this case, I suspect some reversal will happen. Regulatory and political backlash is in the air, and the prices of certain disruptive companies discount a very rosy future. More in **Chapter 6.1.**

Beyond the general asset richening, apart from inflationary assets, and growth/tech stock outperformance, 2010s was characterized by the rise of ESG investing and private assets. Some of these trends will revert in 2020s. In a humble discretionary view, I predict that the general asset richening, disinflationary trend, and growth stock outperformance will reverse in 2020s, while the rise of ESG seems like the most certain trend to continue. Let us see in 2030 how I fared with this call.

Ch. 4.5: A Brief Focus on Oil

Oil: Arguably the two most followed single commodities are oil and gold. Both prices have been historically related to inflation, oil often in a causal fashion, as oil crises in 1973 and 1980 (and smaller spikes in 1990 and 2008) pushed the CPI higher.

The real oil price has not increased since mid-1970s (see **Exhibit 4.18.**). Even though the WTI Crude Oil futures contract was launched amid a low price in 1987 ($18), it has subsequently underperformed cash (as -4% average roll

return has offset 3% spot return) and has experienced plenty of volatility. Besides visiting $100 price per barrel many times when oil was deemed scarce, April 2020 saw a negative oil price for a day.[4]

Beyond the Covid-related glut of supply and low demand for oil, the long-term prospects for fossil fuels are obviously debated and controversial, as major economies are trying to shift toward more environmentally friendly energy sources.

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4   The negative price was for the front contract just before its expiry, when the futures holder might have to take responsibility of storing the delivered oil when all storage facilities were full. (The negative price is not seen in **Exhibit 4.31.** because main commodity indices had already rolled to the next contract.)

Exhibit 4.18. Oil Price History
1946-2021
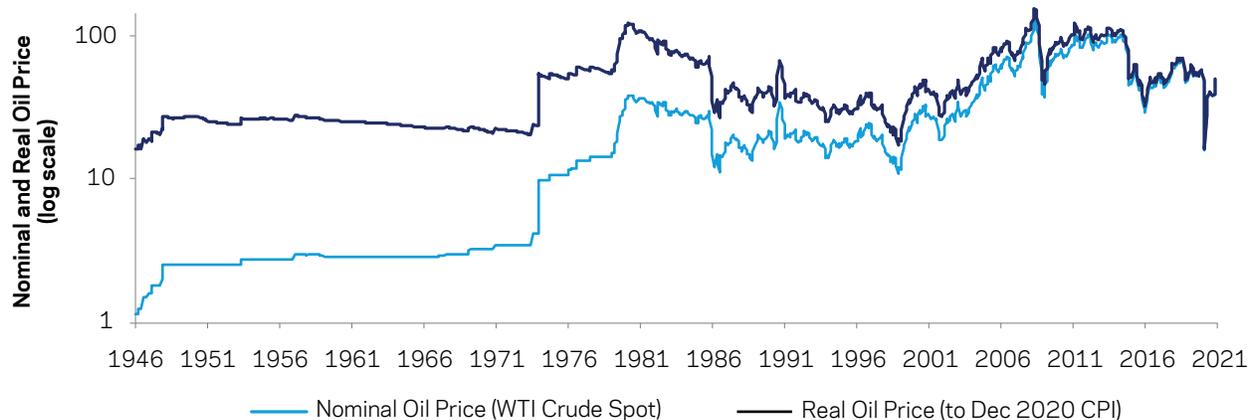
Source: Bloomberg.

Ch. 5.1: A Brief Focus on Venture Capital

Venture capital deserves some words given its role as the riskiest and perhaps highest-returning asset class. Venture capital managers try to pick winners, often specializing in certain areas (tech, innovation). They may invest in a few dozen start-up companies and small businesses, often being active owners when new-venture founders lack broad business knowledge. They recognize that most will fail but hope that one or two big wins make up for the losses and more. Mauboussin-Callahan (2020) highlights the very different (highly asymmetric, power-law-like) payoff distribution in venture capital from that in buyouts or publicly listed equities. More broadly, being on the right side of a technological revolution and riding its winners can result in outsized gains, especially when

market sentiment is bubbly. The idea of Silicon Valley experts identifying the next Microsoft or Google is alluring, but there is obvious hindsight with these examples. Owning optionality and lottery tickets tends to be costly, and the positive skewness in venture capital asset class may imply lower expected returns. Even with internal rate of return (IRR)-based returns, the actual history has been volatile, including over 100% return in 1999, followed by a lost decade with negative returns, then strong 2010s. Valuations are not cheap in early 2020s.

P.S. I add in 2022 that Tom Nicholas and Sebastian Mallaby have written excellent books covering the history of venture of capital.

Ch. 6.2/6.3: Looking Beyond the Sharpe Ratio on Trend and Carry

Exhibit 6.4. suggests that looking beyond the Sharpe ratio makes especially Trend ---following and Macro Momentum look even better. Over half a century, these strategies have had zero/positive skew, negative equity correlation, positive equity tail performance, and a tolerable drawdown. Stock selection Momentum strategy looks somewhat worse with its negative skew and large drawdown, mainly due to the spring 2009 crash.

Exhibit 6.4. 50-Year History on Performance and Risk Characteristics
1971-2020

	S&P500 ExR	Mom US SS	Trend	Mom All	Mom AA	Mom SS	MacroMom
Mean	**6.7%**	**8.0%**	**10.4%**	**4.0%**	**2.6%**	**8.9%**	**8.8%**
Vol	**15.2%**	**14.8%**	**11.9%**	**5.1%**	**4.7%**	**12.6%**	**10.6%**
SR	0.44	0.54	0.87	0.78	0.55	0.70	0.81
Skew	-0.47	-1.58	0.00	-0.75	-0.41	-1.29	0.40
EqCorr	1.00	-0.20	-0.04	-0.11	-0.01	-0.22	-0.19
EqTailPerf	-30%	16%	22%	6%	4%	16%	18%
MaxDD	-57%	-58%	-35%	-17%	-11%	-50%	-12%

Source: AQR. "EqCorr" is the correlation of monthly returns with S&P500 index, and "EqTailPerf" is the strategy performance averaged across the ten largest drawdowns for S&P500 index during the sample period. Columns include S&P500 index excess return over cash and several momentum strategy returns. "Mom U.S. SS" is a momentum-based U.S. long/short stock selection strategy. A similar momentum approach is applied more broadly in stock selection (SS) in many countries as well as in many country allocation (AA) strategies, and then SS and AA shown separately (Mom All, Mom SS, Mom AA). In all cases momentum trading is based on 12-month lookback window and one-month execution lag. The momentum series are updated in aqr.com data library and based on Ilmanen-Israel-Lee-Moskowitz-Thapar (2021). "Trend" averages a trend-following strategy excess return for up to 29 assets in four asset classes, using a 12-month lookback window, with a one-month lag (conservative version of Hurst-Ooi-Pedersen (2018)). "MacroMom" is a long/short country allocation strategy in several asset classes based on past year's macro trends, as in Brooks (2017). For illustrative purposes only.

It is worth looking beyond Sharpe ratios, especially since carry strategies are infamous for their asymmetric outcomes ("going up the stairs, down the elevator") and ill-timed losses ("selling lottery tickets that pay off in bad times"). I already emphasized that this bad reputation is not warranted for all carry strategies. **Exhibit 6.5.** confirms that credit and currency carry as well as volatility selling have negative skew and negative performance in equity market drawdowns, while the fixed income carry (country allocation strategy favoring countries with steep yield curves) looks more benign, and a dividend yield -based stock selection strategy looks even risk-reducing. The real puzzle is why also the latter strategies would be positively rewarded.

Exhibit 6.5. 50-Year Performance and Risk Statistics for Various Carry Strategies
1971-2020

	S&P500 ExRet	Carry Century	Credit	FX Carry74	FI Carry	SS (DY) Carry	Koijen Composite (end 2012)
Mean	**6.7%**	**2.8%**	**1.1%**	**2.8%**	**2.4%**	**0.7%**	**6.0%**
Vol	**15.2%**	**3.6%**	**4.4%**	**6.6%**	**4.2%**	**12.0%**	**5.5%**
SR	0.44	0.77	0.25	0.42	0.56	0.06	1.09
Skew	-0.47	-0.21	-1.35	-0.58	-0.07	0.02	0.15
EqCorr	1.00	0.08	0.41	0.35	-0.03	-0.44	0.12
EqTailPerf	-30%	4%	-6%	-2%	3%	22%	6%
MaxDD	-57%	-13%	-24%	-28%	-13%	-52%	-24%

Source: AQR. "Mean" is the average annualized return. "Vol" is the annualized volatility. "EqCorr" is the correlation of monthly returns with S&P500 index, and "EqTailPerf" is the strategy performance averaged across the ten largest drawdowns for S&P500 index during the sample period. Columns: S&P500 index excess return over cash and several carry strategy returns. "Carry Century" is a composite of yield-seeking long/short equity, bond, currency, and commodity allocation strategies. "FXCarry74" is a strategy trading G-10 currencies based on deposit rate levels since 1974. "FI Carry" is a cross-bond market allocation strategy based on yield curve steepness. These three series are updated in aqr.com data library and based on Ilmanen-Israel-Lee-Moskowitz-Thapar (2021). "Credit" is the credit risk premium series in Asvanunt-Richardson (2016), also in aqr.com data library. "SS (DY) Carry" is a U.S. stock selection strategy based on dividend yields, sourced from Ken French's data library. "Koijen Composite" is a composite of yield-seeking long/short strategies in several asset classes (see Koijen et al. (2018)), sourced from Ralph Koijen's website (series ends in 2012). For illustrative purposes only.

The currency carry strategy experienced its worst drawdowns in 2008 and 1992, while broader carry strategies suffered more in 1974 and 1981 (as well as in 1930s-40s). The left-tail risk tends to be asset-class specific and much of it has been diversified away in a broad carry portfolio. Thus, strong positive carry returns can be captured while greatly mitigating much of the occasional carry crashes that occur in one asset class like currencies.

Ch. 6.3: Applying Carry Strategies in Other Contexts

In **Chapter 6.3**, I covered the performance of carry strategies in many asset classes. **Exhibit 6.14.** looks at even longer histories in Ilmanen etal. (2021b). We do not include carry-based stock selection because D/P and B/P strategies are highly correlated (and both have modest positive SRs). Instead, we study almost a century of country allocation strategies among currency-hedged equity indices and government bonds, as well as commodity allocation strategies. The G-10 currency allocation strategy begins only in 1974. Performance in the early decades was unimpressive, but since 1950s carry strategies were profitable every decade in each asset class, except for equity country allocation in the 2010s.

Exhibit 6.14. Per-Decade and Century-Long SRs of Carry Style Premia in Several Asset Classes
1926 - 2020
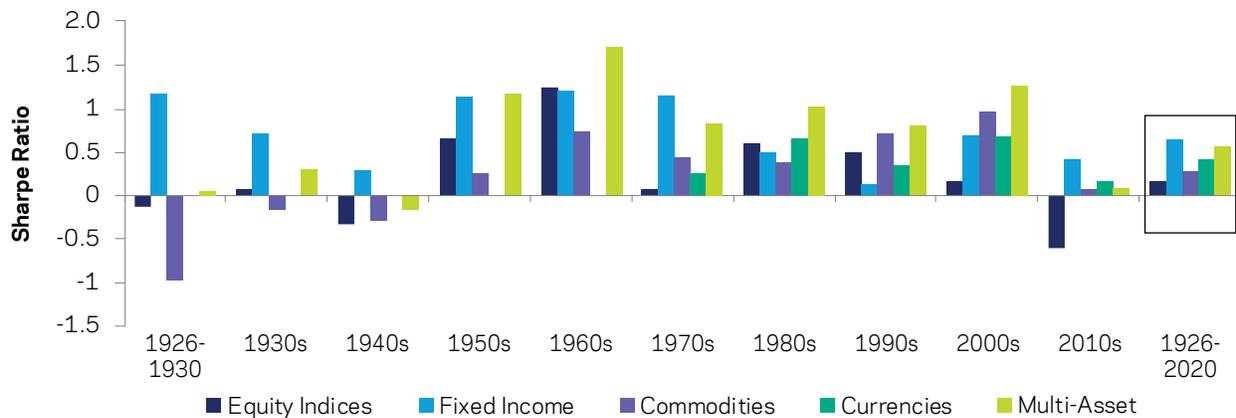
Source: AQR. Carry is defined as in Koijen, Moskowitz, Pedersen, and Vrugt (2018), which is the expected return on an asset assuming market conditions are unchanged. For equity indices, carry is the futures-to-spot discount of the front month contract, where prior to 1990 when futures discount data is available, we use excess-of-cash dividend yield. For global currencies, carry is the short-term interest rate differential between the two countries (difference in 3-month LIBOR rates or closest 3- month equivalent unsecured lending rates). For bonds, carry is the ten-year term spread (10-year yield minus 3-month interest rate). For commodity futures, carry is the return from holding a futures contract if there is no shift in the futures curve, measured by the percent difference in prices between the nearest and next-nearest-to-maturity contract. We do not construct a carry strategy for individual stocks because carry and value are nearly identical here and there are no futures on individual names. See Ilmanen etal. (2021b) and aqr.com for more details.

Volatility selling is arguably the ultimate yield-seeking strategy, and one whose reward is potentially compensation for risk. For references on its long-run performance in different asset classes, see Ilmanen (2011, chapter 15) and Fallon-Park-Yu (2015). More to come in **chapter 13** when I discuss the long-run costs of volatility-buying tail insurance strategies.

Ch. 6.4: Visual Evidence on Defensive Style Performance

Now, turning to performance outside U.S. stock selection, **Exhibit 6.15** shows pretty compelling evidence of pervasiveness. For all countries, both BAB and QMJ strategies have achieved positive SRs over the past three decades.

The global SRs are 0.98 and 0.70. Note that information ratios (CAPM alpha divided by the tracking error) would be near 1 for both BAB and QMJ since the latter has a more negative equity market correlation (-0.40 vs -0.05).

Exhibit 6.15. SR of BAB- and QMJ-Based Stock Selection Rules in Many Countries 1989-2020.
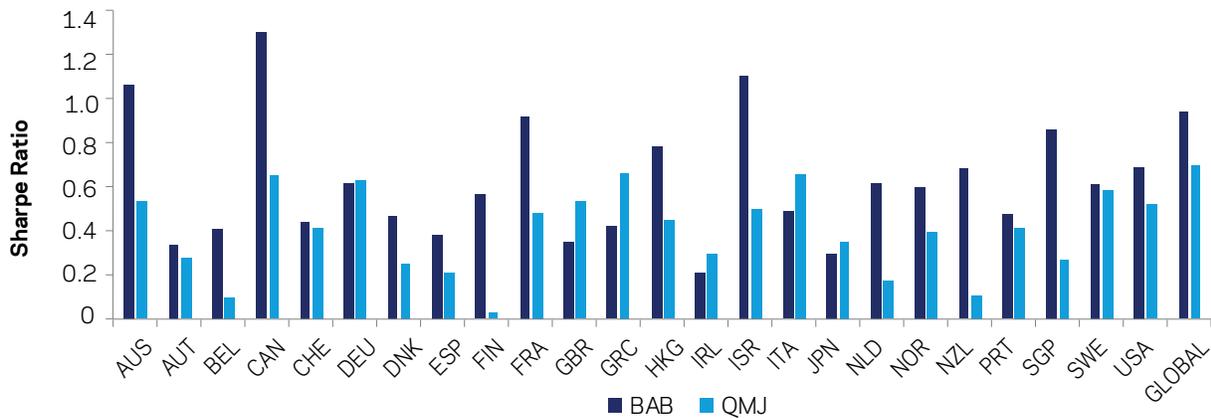
Source: AQR. The universe of stocks in each country is the MSCI universe. The BAB, or "bet-against-beta" factor, by Frazzini-Pedersen (2014) involves buying stocks with low beta and selling stocks with high beta every month, weighting stocks by the strength of their signal (rank weighting) and targeting market neutrality. The QMJ, or "quality minus junk" factor, by Asness-Frazzini-Pedersen (2019) is a broad composite based on 16 single metrics within three subgroups (profitability, growth, and safety). It follows the Fama-French (1993) procedure used in many academic papers: double-sort stocks by their market capitalization and some characteristic; then buy a value-weighted portfolio of the 30% of most attractive stocks and sell a value-weighted portfolio of the 30% of least attractive stocks; do this separately for the large- and small-cap universes, and then average the returns of these portfolios. The start dates vary by country (1989 to 1991, except for Israel 1998), so there is about a 30-year history for each country (as the end date is December 2020).

Exhibit 6.16 from the Ilmanen etal. (2021b) century study shows that BAB-like strategies worked especially well in stock selection strategies but also in equity country allocation.

Exhibit 6.16. Per-Decade and Century-Long SRs of Defensive Style Premia in Several Asset Classes
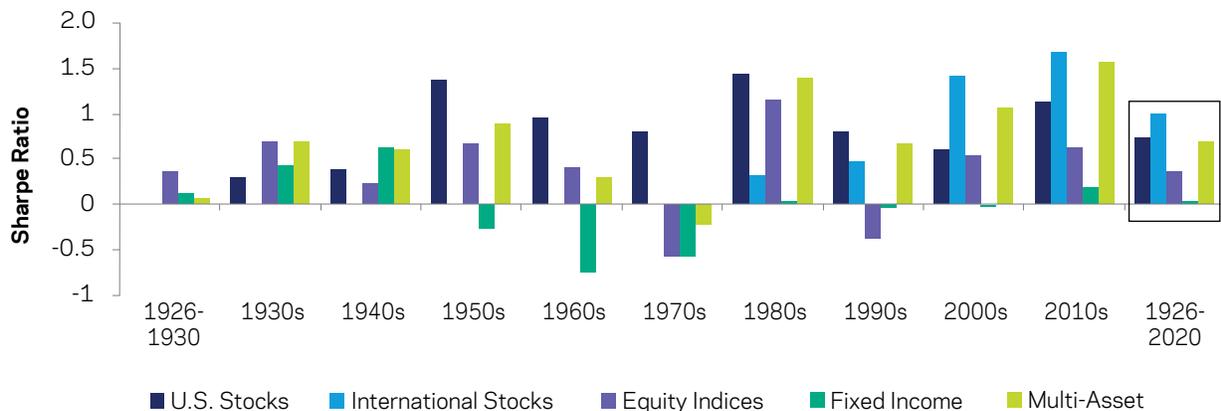
Source: AQR. For BAB construction, we use the (negated) beta of the asset with respect to its local market index following Frazzini and Pedersen (2013). For global equity indices and bonds, betas are estimated from a 36-month rolling regression of asset returns on the equal-weighted returns of all country indices and bonds, respectively. We do not construct a defensive strategy for currencies because there is no logical market index. We do not construct a defensive strategy for commodities because returns from different commodities do not share a common market component. See Ilmanen etal. (2021b) and aqr.com for more details.

Ch. 11.3: Supporting Data on Style Correlations and Sharpe Ratio Boosting

The key behind all that Sharpe ratio boosting is of course low correlations among long/short style premia. **Table 11.1.** shows that most style pairs have near-zero correlations with each other – and the value-momentum correlation is very helpful -0.6. Correlations of multi-style composites across asset classes are also low, though mainly positive. The lowest row shows that style premia have had varying correlations with the equity market, but the all-in style premia composite has -0.07 correlation with equities. (I use here data for the more relevant recent period 1990-2020, but the big picture is similar using the full sample, and the main

patterns look robust over time. For example, the 10-year rolling pairwise average style correlation has been quite stable near zero, while the all-in composite's rolling equity correlation has varied between -0.2 and +0.2.)

Such low correlations are not available when diversifying within a long-only asset class. Within equity markets, pairwise correlations tend to exceed 0.5, given the common systematic risk. Within bond markets, typical pairwise correlations are even higher. Between stocks and bonds there can of course be good diversification opportunities.

Table 11.1. Correlations of Four Styles Across Asset Classes and of Multi-asset Styles Across Many Asset Classes
1990-2020

	U.S. Stock Selection Multi-Style	Intl Stock Selection Multi-Style	Equity Indices Multi-Style	Fixed Income Multi-Style	Currencies Multi-Style	Commod-ities Multi-Style	All Asset Classes Value	All Asset Classes Momentum	All Asset Classes Carry	All Asset Classes Defensive	All Asset Classes Multi-Style	Equity Indices Market
U.S. Stock Selection Multi-Style	1.00											
Intl Stock Selection Multi-Style	0.63	1.00										
Equity Indices Multi-Style	0.24	0.40	1.00									
Fixed Income Multi-Style	0.06	0.02	0.04	1.00								
Currencies Multi-Style	-0.02	-0.08	0.03	0.14	1.00							
Commodities Multi-Style	-0.03	-0.01	-0.02	0.08	0.05	1.00						
All Asset Classes Value	-0.04	-0.13	-0.05	0.19	0.16	0.02	1.00					
All Asset Classes Momentum	0.32	0.40	0.37	0.10	0.14	0.32	-0.61	1.00				
All Asset Classes Carry	0.02	0.04	0.35	0.43	0.46	0.21	0.06	0.06	1.00			
All Asset Classes Defensive	0.65	0.63	0.28	0.25	-0.03	-0.10	-0.08	0.16	0.05	1.00		
All Asset Classes Multi-Style	0.58	0.59	0.52	0.45	0.35	0.35	0.06	0.58	0.47	0.57	1.00	
Equity Indices Market	-0.22	-0.35	-0.17	0.15	0.31	0.03	0.17	-0.21	0.19	-0.12	-0.07	1.00

Source: AQR. Data trom Ilmanen-Israel-Lee-Moskowitz-Thapar (2021), available in aqr.com data library.

Ch. 11.3, Footnote 10: Expanding on a Misunderstood Article

Hendrik Bessembinder's (2018) *Do Stocks Outperform Treasury Bills?* is in finance media one of the most popular and misinterpreted academic works of the past decade. Some readers think that this article validates concentrated picking of winners (good luck trying!). A better reading of the evidence is that the article endorses broad diversification so that also those winners are in your portfolio.

That was likely too succinct. Now I make the same points slowly.

The article documents that: (i) the majority of U.S. common stocks since 1926 have lifetime buy-and-hold returns less than one-month T-bills; (ii) in terms of lifetime dollar wealth creation, the best-performing 4% of listed companies explain the net gain for the entire U.S. stock market since 1926, since other stocks collectively matched T-bills;[5] and (iii) these long-run results reflect the positive skewness in the distribution of individual stock returns, attributable both to skewness in monthly returns and to the effects of compounding.[6]

For realistic investors, the article's key message is the importance of diversification. By missing the few stars, which is easy, you can miss all the long-run gains. Random poorly diversified portfolios are likely to underperform (while a minority will shine), especially over the long run and if they do not rebalance. There are few implications for typical active managers, except perhaps that diversification is even more important for long-term investors with static holdings.

The danger in this article is in the seductive idea of concentrated positions in ex-post lottery winners. You might misread that you need to identify those big-winner stocks to succeed in markets or even that these ex-post winners can be identified in advance. You might also start to exhibit more skewness preference if you don't know that lottery tickets tend to be overpriced.

5   Some headline results are frequently misinterpreted: While 4% of stocks matched all positive dollar gains of the market since 1926, another 38% of stocks created value beyond cash, but just enough to offset the value reduction of the remaining 58%. Thus, 96% of stocks collectively matched T-bills while 4% fared better and created dollar value equal to the market.
6   The driver behind the key results is that long-run stock returns exhibit large positive skewness because downside is floored at -100%. Positive skewness is pronounced when compounding over long horizons even if short-run returns exhibit no skew. Most wealth will eventually be created by a few winning investments – but these are identified with hindsight.
    We rarely measure the long-run buy-and-hold compound returns that Bessembinder tracks, and it is debatable that we should, especially if we hold diversified portfolios and tend to rebalance. (These results were missed by the common use of arithmetic means and a focus on short-run returns of diversified rebalanced portfolios as opposed to long-run compound returns of unrebalanced holdings of volatile single stocks.)

Ch.18: Expanded Concluding Remarks: Discretionary Predictions on Five Current Investment Trends

What follows is the original beginning of the final chapter of the book. It includes some discretionary speculation, much of which I later edited out as it goes against the evidence-based spirit of this book.

The early chapters stressed that recent decades have given investors windfall gains and have essentially borrowed returns from the future. Low starting yields for most assets suggest that we are in for low returns, but it is not clear whether these will materialize through slow pain (persistent low income) or fast pain (repricing toward lower valuations and higher prospective returns).

As a subjective call, I leaned for many years toward the slow-pain outcome, but writing this in mid-2021, the fast-pain scenario is becoming more plausible. We face a bubbly situation where nearly all assets are expensive, supported by central banks through record-low policy rates and quantitative easing (as well as abundant fiscal stimulus). It is all too easy to see how rising inflation might force central banks to make hard choices for the first time in ages. There are many other signs of speculative excess, from the fast near ten-fold rise in Tesla stock price and some cryptocurrencies after the 2020 covid trough to wild retail investor activity in meme stocks in early 2021. Conservative investors today merely reach for yield, while the inexperienced risk-seeking Redditers look for fast gains on virtually anything, with scant economic analysis – and are expecting to have fun on their way to riches. A generation or two of investors do not remember inflation, rising bond yields, or

persistent equity bear markets (thus, buy on dips…). Scary.

I confess I'd selfishly like things to be more "ordinary" at the end of my book's sample period rather than see at least segments of financial markets in a possible bubble. We still have near record rich equities, low bond yields, extreme value-growth spread, etc., all of which make historical average returns biased and could make the book more quickly dated. Well, I should have the serenity to accept I cannot alter this. At least I can debias historical average returns or study yield-based forward-looking returns when

Incidentally, the low-rate policies are often characterized as friendly for the wealthy savers. This reading may turn out to be premature. These policies may help borrowers over savers in the long run, and they help old savers (those who capture the upside of bringing future returns forward) compared to the young savers.

Since I began to opine on markets – with opinions worth as little as those of the next pundit, I warn – let me go on and assess the investment prospects of the five hottest trends in recent years: ESG, China, ML/AI, Disruptive growth stocks, and Cryptocurrencies.

I listed them above in the order of sustainability, based on my admittedly cloudy crystal ball. Before commenting on each individually, I give my highest-conviction view: None of them will solve the collective low expected return challenge we face.

- ESG will remain the most sustainable trend, especially the efforts to limit climate change. Initially this may give return tailwinds to ESG investing, but eventually the trade-offs will show up.

- China will keep growing and will not face a slowdown like Japan since the 1990s, but it too will begin the gentle decline toward a more mature economy.

- Machine learning and artificial intelligence will become ever more important in many domains, but their impact in improving investment returns will be modest.

- Disruptive growth stocks will see competition and regulation catching up with them. Some will continue to flourish but many will disappoint, and the valuations will come back to Earth.

- Bitcoin and other cryptocurrencies might benefit for a while from an inflationary scare in traditional currencies, but they will ultimately be too volatile for a store of value and medium of exchange. This old fogey still views cryptos a fad that will pass, however widespread the broader blockchain technology becomes.

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