Risk-Mitigated Deep Value—
Bigger Bang, Less Buck

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KEY FINDINGS

- Deep value has been successfully risk managed by shifting between stocks and intermediate Treasuries based on credit market surprise for BAA corporate bond yields.
- The 97-year return pickup over the total stock market and traditional diluted-value were 431bps and 327bps, respectively.

ABSTRACT

Value and growth are not simple binaries; instead, they reside on a continuum. Value comes in degrees or intensities, with deep value at one end of this continuum. Over the past 97 years, value has outperformed growth, and deep value has outperformed value. But no investor can wait 97 years for this result to become dependably harvestable. The periodic painful downdrafts along such a lengthy journey would leave the result unpalatable. This article suggests that the benefits of deep value can be retained and the unpleasant risk attributes can be partially mitigated through the use of a simple active risk management approach based on surprise to the upside in the current yield on BAA corporate credit. When such surprises occur, the risk managed portfolio moves out of deep value and into intermediate-term US Treasury bonds. Over the past 97 years, risk-managed moderately aggressive deep value returned 15.57% versus the total market's lesser 10.81%. Moreover, the risk managed moderate deep value portfolio, evaluated herein, delivered the smallest left-hand-tail risk and the smallest knockout risk of all portfolios considered. During episodic periods of rising interest rates, risk managed moderate deep value returned 19.12% versus growth's 12.95. And during episodic periods of rising inflation, it obtained a similar but even stronger result, with risk managed moderate deep value earning 12.49% versus growth's modest 6.61%. Moreover, during periods of slow or no economic growth for the US economy (as defined by 12-month real GDP), risk managed moderately aggressive deep value returned 5.81% versus growth's miserly 0.23%. And finally, when the value risk premium has been in one of its bull phases (71.6% of the months over the last 97 years), risk managed moderately aggressive deep value earned 25.57% per year versus growth's 11.74%. These data suggest the possibility for earning a superior return relative to the total market and also with respect to growth, when a risk managed approach to deep value is utilized.

This article has several objectives. First, we aim to parameterize the long-run appeal of the value risk premium and value (instead of growth) more generally. Second, we hope to identify several sharp-edged and problematic risk attributes inescapably associated with value. Third, to describe value's innate episodic nature, i.e., how it "pays off" or "works" only during periodic episodes (instead of continuously) and must therefore be accessed via an active process and not "always-on,"

much to the ruin of "value-only" shops. Fourth, to differentiate varying degrees or intensities of value, ranging from the traditional watered-down version of value to the most aggressive deep value expressions. Fifth, to demonstrate how the left-hand tail-risk characteristics of purer or more concentrated value expressions become unusually problematic when used without active risk management. Sixth, to suggest an active approach to risk-mitigation that historically (over the past 97 years) made various expressions of deep value highly attractive (higher return, lower risk, greater consistency). Seventh, to conclude with several possible practical business implications.

Several value-related topics are of major importance. These might include how the operating-definition of value has changed over the past 100 years as the role, nature, and importance of intangibles has evolved; the multi-dimensionality of value (versus growth); how best to define value in the future; and how best to mitigate value's left-hand tail-risk (Arnott et al. 2021, Arnott et al. 2023, Kalivas 2022 and 2023, and Tierney 2022). Despite the importance of these related topics, they remain out of scope for this article.

To motivate the topics addressed by this article, we observe that the total US stock market returned 10.81% (geometric mean return) and delivered a risk-adjusted return (return divided by risk, standard deviation) of 0.54x over the last 97 years. In contrast, the suggested risk-managed moderate deep value portfolio returned 15.12% (a 40% proportionate increase) and a risk-adjusted return of 0.70x (a 30% proportionate increase)—while the proposed risk-managed moderately aggressive deep value portfolio returned an even greater 15.57% return (a 44% proportionate improvement over the total market).

SEVEN DIFFERENT DEFINITIONS OR INTENSITIES OF VALUE

Value (and growth) are not simple binaries; instead, they reside on a continuum. Value comes in degrees or intensities (GMO 2023b). For example, consider two popular and heavily used value ETFs, RPV (Invesco S&P 500 Pure Value) and SPYV (SPDR S&P 500 Value). According to Bloomberg LP (as of December 19, 2022), RPV and SPYV carried factor loadings to value of 1.12 and 0.14, respectively. Moreover, RPV and SPYV carried factor loadings to growth of −0.53 and −0.28, respectively.

One of the glaring differences between pure-style and style (aka, degree or intensity) is understood by examining individual stock overlap between two of the largest growth/value ETFs, SPYG (SPDR S&P 500 Growth) and SPYV (SPDR S&P 500 Value). SPYG and SPYV each hold Microsoft and Amazon in a large percentage. Microsoft was 6.2% of SPYG and 4.9% of SPYV, while Amazon occupied 2.1% of SPYG and 2.7% of SPYV. There is a similar noticeable overlap in Johnson & Johnson, which is 1.7% of SPYG and 1.2% of SPYV.

To better understand this aspect, this article examines seven alternate degrees or intensities of value. But understanding only comes from the examination of a longevity of data. For this reason, we rely on the Kenneth R. French Data Library from Dartmouth College, which provides 97 years of monthly total returns for a broad range of alternate intensities/degrees of value, ranging from mild to extreme. Moreover, this data source provides a uniform approach to the definition of value, both cross-time and across alternate intensities.

Exhibit 1 describes the seven definitions of value we examine, in addition to the definition of growth and the total market. The French Data Library does not provide a measure for the total market, so we assume one as defined within this exhibit. The same is true for the value risk premium, so once again, an explicit definition is provided within Exhibit 1. Finally, many, if not most, active and passive investment

EXHIBIT 1

Alternate Definitions of Value and the Value Risk Premium

Total Market	21.43% lowest 30% P/B, 57.14% middle 40% P/B, 21.43% highest 30% P/B
Growth	Highest 30% P/B
Value	Lowest 30% P/B
Value Risk Premium	Value minus growth (using the above definitions)
Traditional Commonly-Used Value	60% lowest 30% P/B, 40% middle 40% P/B
Conservative Deep Value	Lowest 40% P/B
Moderate Deep Value	Lowest 30% P/B
Moderately Aggressive Deep Value	Lowest 20% P/B
Aggressive Deep Value	Lowest 10% P/B

NOTES: Indices provided by the Kenneth R. French Data Library, Dartmouth College.

SOURCE: All indices are market cap weighted and are constructed on the basis of the Price-to-Book Value ratio (P/B).

management products (both retail and institutional) provide a somewhat watered-down or meaningfully diluted version of value; they combine elements of both value and core intermixed together within a single portfolio. With the objective of addressing this all-important product segment, this article assumes an index intended to mimic or parallel this space. Exhibit 1 labels this index "Traditional commonly-used value" and defines it as indicated.

Eight of the nine indexes defined above are directly comparable, in the sense that they are long-only and provide direct/full market exposure. The exception is the "Value risk premium" that is "market-neutral," providing no net exposure to the stock market. Instead, it measures the return to value over and above that of growth, where "value" and "growth" are defined as indicated.

Finally, we emphasize that definitions are all-important. Almost any results for value can be obtained, depending upon the definitions used. This is one more reason that this article examines the behaviors of nine different measures over the same 97 years.

We next review key summary statistics for the nine stock market indexes. Exhibit 2 provides the results. We present five measures, but two of them, "Autocorrelation" and "Probability of Earning at Least 5%," benefit from added explanation. We define Autocorrelation as the correlation between the return of this month and that of the prior month. Probability of Earning at Least 5% is the result or outgrowth of a hypothetical client's investment objective.

Specifically, we assume that the investment portfolio is to be used to fund a spending need (or liability) that arrives between 10 and 15 years in the future. For simplification, we take the midpoint of that range, 12.5 years, as the explicit investment time horizon. Moreover, we assume that the investor, for planning purposes (such as determining how much they need to invest today), has utilized a 5% nominal rate of return. Based on this set of assumptions, we define success as earning at least 5% over the investment time horizon (12.5 years). Therefore, when comparing one portfolio against the next (i.e., the 10 different indexes), we are concerned with the probability of achieving success. This measure captures the essence of investor success versus failure.

So why concern ourselves with autocorrelations and probabilities of success over a randomly selected investment time window of 12.5 years? Why not instead just restrict our attention to means, correlations, standard deviations, and Sharpe ratios? Because markets are not iid (independent and identically distributed). They don't follow a trendless random walk. Instead, they express unusually high levels of trending, momentum, and episodic eras. Stocks, bonds, and commodities

EXHIBIT 2

Summary Statistics for the Total Market, Growth, Value, and Alternate Deep Value Definitions

Index	Return (geometric annualized mean)	Risk Adjusted Return (return divided by standard deviation)	Risk (annualized standard deviation of monthly returns)	Autocorrelation (from one month to the next)	Probability of Earning at Least 5% (annualized) over a 12.5-Year Investment Time Period
Total Market	10.81	0.54	20.0	0.133	87.1
Growth	9.66	0.52	18.5	0.078	80.4
Value	12.74	0.51	25.0	0.150	88.1
Value Risk Premium	2.81	0.21	13.6	0.177	30.7
Traditional Commonly-Used Value	11.85	0.53	22.5	0.151	88.0
Conservative Deep Value	12.26	0.47	26.3	0.156	86.4
Moderate Deep Value	12.74	0.51	25.0	0.150	88.1
Moderately Aggressive Deep Value	12.98	0.47	27.8	0.157	89.4
Aggressive Deep Value	11.74	0.37	31.5	0.147	82.3

NOTES: Based on the time period spanning 6/30/1926 through 12/31/2022.

experience potent bull and bear markets. Episodic eras do exist, during which interest rates, inflation, and even currencies may rise or fall for multiple decades (not multiple years). Trending and momentum are fundamental defining elements across stocks, bonds, commodities, currencies, domestic, and international … and most importantly, inflation.

The suggestion that we model investment market returns using iid random variables defined with simple means, standard deviations, and correlation coefficients encourages us to seek return- and risk mitigation-opportunities defined at each individual moment/instant in time. In other words, how do I beat my benchmark each individual period? Such an approach is at fundamental odds with the understanding or approach that is far more real-world, one driven by the presence of powerful trending behaviors across the full range of investment markets and consumer price inflation (Brown 2023a, Brown 2023b, Brown 2022a, Brown 2018, Asness et al. 2014, Hurst et al. 2017, Ilmanen et al. 2019, and Montier and Tarlie 2022).

By reporting the autocorrelations, this article provides a simple measure indicating the degree of trending behavior present. By measuring the probability of success, we overcome the trending/momentum aspects, which are now fully reflected in the resulting statistic due to measurement with respect to the stated client investment objective. If markets were in fact iid, these probabilities would be remarkably different.

The green and the red shading identify the best and worst performing index for each statistic. For example, moderately aggressive deep value delivered the highest return of 12.98%, while the value risk premium delivered the lowest return at just 2.81% (of course, that is understandable considering its market-neutrality). Several observations can be drawn. First, value outperforms growth, 12.74% versus 9.66%. Second, the return earned by ever more intense or distilled versions of value increases. For example, traditional commonly-used value (a somewhat watered-down version of value) returned just 11.85%, while moderately aggressive deep value returned 12.98%. Eventually, however, ever more concentrated expressions of deep value served to diminish returns, as seen by aggressive deep value returning just 11.74%, the lowest of any long-only value index.

The key takeaway is that value, and deep value in particular, provide meaningful benefit over the long run. Traditional commonly-used value provided a 23% proportion increase in return over growth (11.85% versus 9.66%). Moderately aggressive deep value provided a 34% proportion increase relative to growth.

These return benefits become even more stark (and compelling) when one adjusts for interest rates. To do that, we first adopt a measure of "interest rate surprise" defined as the percentage that the current level of the Not-Seasonally-Adjusted All-Urban Consumer Price Index is above/below its average level over the past 11 months (including the current month). This is the definition utilized by prior authors (Brown 2022a and Brown 2022b). Next, we examine the performance of the 10 stock indexes during: (1) 25% of all months when interest rate surprise to the UPSIDE was the greatest, (2) 50% of all months when interest rate surprise to the UPSIDE was the greatest, (3) 50% of all months when surprise was greatest to the DOWNSIDE, and (4) 25% of all months when surprise was greatest to the DOWNSIDE. Exhibit 3 provides the results.

Green and red shading identify the highest and lowest return from among the 10 indexes for each of the four categories of interest rate surprise. For example, during the 25% of all months (since 1926) when interest rates surprised to the UPSIDE the most, growth lost –1.08% … whereas the value risk premium gained +6.48%. These results are consistent with expectations in the sense that growth is viewed as severely challenged when interest rates rise the fastest, as in the market in general, but the value risk premium is market-neutral.

Perhaps more noteworthy is that value outperformed growth for three of the four interest rate surprise environments. In other words, the only time that growth outperformed value was during the 25% of the months when interest rates surprised to the DOWNSIDE the most. Building on the attractive return and probability of success numbers presented in Exhibit 2, this interest rate surprise sensitivity further promotes the use of value (relative to growth or the total market in general). For example, consider how moderately aggressive deep value outperformed growth by a proportionate 170% (9.23% versus 3.42%) during the 50% of all months since 1926 when interest rates surprised to the upside by the most.

EXHIBIT 3

Summary Statistics for When Interest Rates Surprise to the Upside or Downside

Statistic	Total Market	Growth	Value	Value Risk Premium	Traditional Commonly-Used Value	Conservative Deep Value	Moderate Deep Value	Moderately Aggressive Deep Value	Aggressive Deep Value
During 25% of the Months When Interest Rates Surprised to the UPSIDE the Most									
Return	0.89	–1.08	5.33	6.48	3.17	4.75	5.33	5.82	4.95
Risk-Adjusted Return (return divided by risk)	0.06	–0.07	0.27	0.51	0.18	0.23	0.27	0.27	0.19
Risk (standard deviation)	16.15	16.57	19.90	12.64	17.83	20.92	19.90	21.86	25.80
During 50% of the Months When Interest Rates Surprised to the UPSIDE the Most									
Return	5.58	3.42	8.88	5.29	7.39	8.29	8.88	9.23	8.16
Risk-Adjusted Return (return divided by risk)	0.32	0.20	0.43	0.44	0.39	0.38	0.43	0.40	0.31
Risk (standard deviation)	17.27	17.41	20.75	11.93	18.84	21.77	20.75	22.82	26.37
During 50% of the Months When Interest Rates Surprised to the DOWNSIDE the Most									
Return	16.30	16.28	16.73	0.39	16.50	16.36	16.73	16.86	15.44
Risk-Adjusted Return (return divided by risk)	0.73	0.84	0.59	0.03	0.64	0.54	0.59	0.53	0.43
Risk (standard deviation)	22.26	19.45	28.54	15.05	25.64	30.09	28.54	31.93	35.95
During 25% of the Months When Interest Rates Surprised to the DOWNSIDE the Most									
Return	17.45	18.56	14.87	–3.12	16.12	14.18	14.87	14.10	11.51
Risk-Adjusted Return (return divided by risk)	0.76	0.95	0.50	–0.19	0.60	0.45	0.50	0.42	0.30
Risk (standard deviation)	23.02	19.63	29.87	16.33	26.77	31.68	29.87	33.76	38.30

Unfortunately, as attractive as value, the value risk premium, and deep value are, they come with certain problematic, if not challenging, risks. The next two exhibits address two of these risks. We begin with the risk of episodic loss. We define or measure this risk by identifying the four longest (non-overlapping) time periods during which the total return on an index (before taxes and inflation) would have delivered a negative return. Exhibit 4 presents the results.

We use red shading to identify the highest episodic risk outcomes. Through the lens of episodic risk, growth is measurably more troublesome than value. And although traditional commonly-used value holds up well versus the total market, value (no matter its formulation) carries significant episodic risk—a level of risk that acts as a counter-weight to the rewards identified previously in Exhibits 2 and 3.

Next we turn to a second type of risk, that which is sometimes labeled knockout risk. Knockout risk is intended to represent the danger that an investor could be scared out of a position for behavioral bias reasons. We measure this risk by identifying the seven worst 12-month (non-overlapping) returns for each of the 10 stock indexes. Exhibit 5 provides the results.

As before, the worst performance is highlighted in red. Exhibit 5 more clearly communicates the risk associated with value … and particularly for its more intense or distilled versions. Aggressive deep value is a disaster and moderately aggressive deep value isn't much better.

EXHIBIT 4

Comparative Risk of Episodic Loss (Loss before Inflation and Taxes)

Statistic	Total Market	Growth	Value	Value Risk Premium	Traditional Commonly-Used Value	Conservative Deep Value	Moderate Deep Value	Moderately Aggressive Deep Value	Aggressive Deep Value
Longest Period (ever) When the Cumulative Total Return was Negative									
Number of Years	14.8	15.6	7.5	16.0	14.3	14.7	7.5	13.6	16.2
Period Ending	May 1944	Mar 1945	Feb 1937	Dec 2022	Dec 1943	Apr 1944	Feb 1937	Mar 1943	Apr 1945
Second Longest Period (non-overlapping)									
Number of Years	5.3	7.1	6.1	10.5	5.8	6.1	6.1	5.8	9.3
Period Ending	Aug 2012	Sep 2007	Apr 1943	Feb 1944	Feb 2013	Jun 2013	Apr 1943	Feb 2013	Oct 2016
Third Longest Period (non-overlapping)									
Number of Years	3.5	6.6	5.9	6.4	3.1	3.5	5.9	2.9	3.9
Period Ending	Nov 1949	Jul 1979	Apr 2013	Jul 1933	Dec 1971	Nov 1949	Apr 2013	Dec 2020	Apr 1950
Fourth Longest Period (non-overlapping)									
Number of Years	3.2	3.5	2.4	4.9	2.5	3.0	2.4	2.5	3.1
Period Ending	Jan 1972	Nov 1949	Nov 2003	Dec 1973	May 1975	Jan 2021	Nov 2003	May 1975	Dec 1971

EXHIBIT 5

Comparative Knockout Risk—Seven Worst-ever Non-overlapping 12-month Windows

Total Market	Growth	Value	Value Risk Premium	Traditional Commonly-Used Value	Conservative Deep Value	Moderate Deep Value	Moderately Aggressive Deep Value	Aggressive Deep Value
–72.9%	–62.7%	–72.2%	–45.3%	–73.9%	–73.1%	–72.2%	–69.9%	–80.5%
–50.7	–47.2	–64.8	–36.6	–57.9	–68.2	–64.8	–68.4	–74.6
–49.2	–46.1	–54.4	–33.2	–52.5	–57.5	–54.4	–59.9	–62.6
–46.4	–42.7	–54.1	–31.6	–51.1	–56.0	–54.1	–59.2	–60.2
–34.7	–37.1	–48.4	–27.1	–38.3	–52.5	–48.4	–47.8	–59.6
–26.6	–33.8	–30.8	–23.5	–29.9	–32.3	–30.8	–35.9	–42.8
–24.4	–26.5	–28.5	–21.7	–26.9	–29.1	–28.5	–32.7	–42.0

Exhibits 2 and 3 communicate the attraction of value, and particularly its more distilled versions. But Exhibits 4 and 5 relate value's unpleasant dark side. If I know or am willing to act on the presumption that interest rates will continue to surprise to the upside and at some meaningful level, then value's risks are likely of little concern. But such a presumption may very well be a bridge too far. What's to be done?

RISK MANAGED DEEP VALUE

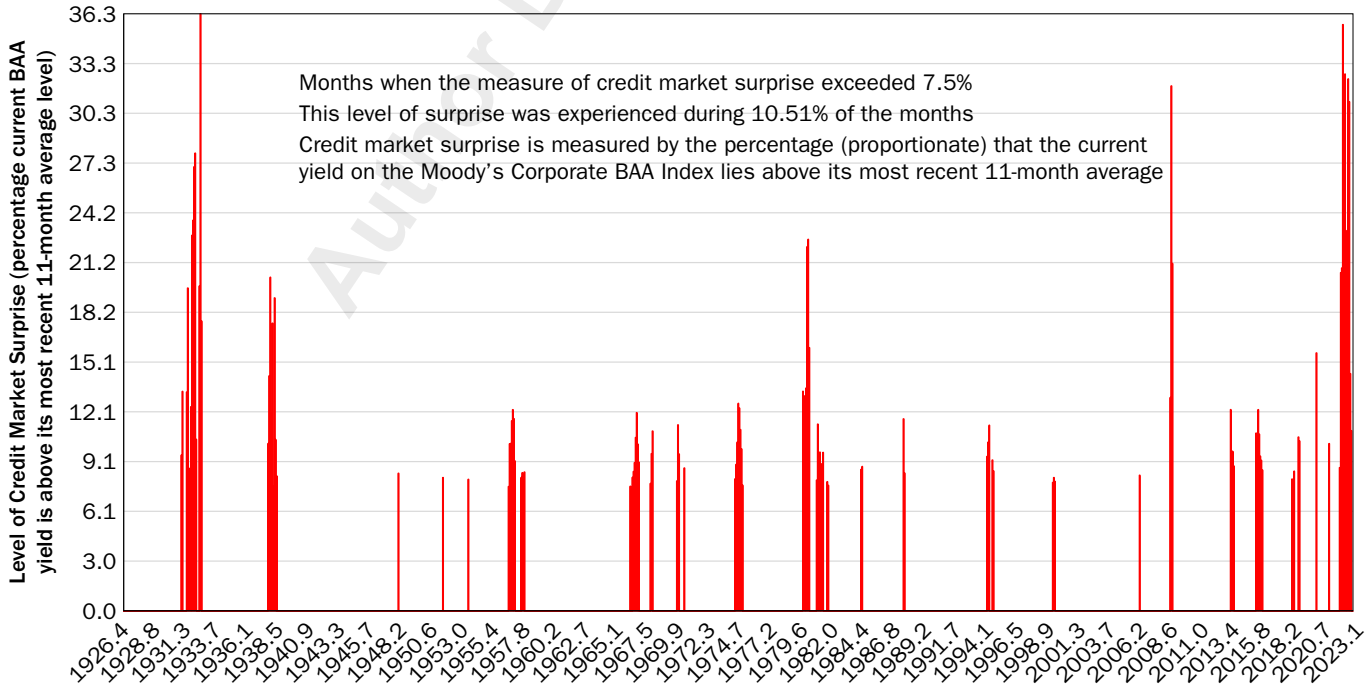
Could one capture the benefits of value or deep value, while at the same time mitigating their downsides? It is generally accepted that companies falling within the value universe often are more susceptible to financial distress, cost of capital increases, and even bankruptcy during macroeconomic downturns (or global pandemics). The industries represented by value often are more cyclical, industrial, and natural resource based. On average, value companies are more capital-intensive and more labor-intensive than growth companies. For these reasons, the credit market as represented by BAA current yields provides a potentially useful tool for risk managing various expressions of deep value.

This article takes a simple generic approach to risk management based on BAA current yield surprise. This approach avoids the need to forecast, predict, or estimate. It also relies on a remarkably simple and straightforward rule, i.e., move out of value stocks and into Treasuries whenever BAA yields spike upward. A simple binary, light-switch rule.

We define "credit market surprise" as the percentage that the current yield on the Moody's Corporate BAA Index is above/below its average level over the past 11 months (including the current month). The use of an 11-month period is consistent with the methodology used elsewhere (Brown 2022a, 2023a and 2023b). Exhibit 6 shows

EXHIBIT 6

Credit Market Surprise, When and How Severe



the history of BAA corporate credit market surprise since 1926. The vertical axis measures the proportion percentage and not the absolute percentage difference.

This exhibit shows the periods during which credit market surprise exceeded 7.5% (current yields jumped up, significantly above trend) and by how much (i.e., the height of the red bars). We used BAA yields because they are the lowest yielding segment of the corporate bond market for which quality monthly data exist back to 1926.

As Exhibit 6 demonstrates, credit market surprise is a regular and consistent aspect of bond market behavior. However, perhaps five periods stand out more than the rest: the early years of The Great Depression (1931–1932), the approximate end of The Great Depression (1938), the oil crisis/Volker recession (1980–1981), The Great Recession (2008–2009), and The Great Interest Rate Shock (2020–2022).

This measure requires no forecasting or prediction. For this reason, it can be used in real time as a mechanism for moving out of value and into a safe asset such as intermediate-term US Treasury bonds. To simplify the analysis, this article concentrates on just two definitions of value: moderate deep value and moderately aggressive deep value (as defined previously in Exhibit 1). In the case of moderate deep value, we use 5-year US Treasuries as the safe haven. However, for moderately aggressive deep value, we use 10-year US Treasury bonds. We selected these two based on data availability (monthly total returns back to 1926), restricting the analysis to US Treasuries, and what maximized the probability of success (as previously defined).

Whenever the measure of credit market surprise exceeded 7.5% (the periods shown in Exhibit 6), the value portfolio (moderate or moderately aggressive) moved out of stocks and into Treasury bonds. These shifts were based on monthly current yields and total returns. Exhibit 7 provides the high-level summary statistics over the past 97 years.

As before, red and green shading is used to identify the worst and best performing portfolio (or index) for each statistic. For example, over the last 97 years, the total US stock market returned just 10.81%. In contrast, risk managed moderately aggressive deep value delivered 15.57% (a 44% proportionate increase).

Perhaps more important than the 476-basis point increase in return is the increased probability of success in moving from the total US stock market (at 87.1% probability) to risk managed moderate deep value (at 95.0% probability). By focusing in on these probabilities, we give equal weight to each and every 12.5- year investment time window. This prevents us from being falsely swayed by the "one trick pony" in which all of the return advantage is concentrated within a single (or a small number of) years or periods.

A final important observation concerns the risk adjusted returns (return divided by standard deviation). The total market comes in at 0.54x, whereas the risk managed moderate deep value delivers a more attractive 0.70x (a 30% proportionate increase).

EXHIBIT 7

Summary Statistics for Risk Managed Deep Value versus Standard indices

Summary Statistic	Total Market	Traditional Commonly-Used Value	Moderate Deep Value	Risk Managed Moderate Deep Value	Moderately Aggressive Deep Value	Risk Managed Moderately Aggressive Deep Value
Return (geometric annualized mean)	10.81	11.85	12.74	15.12	12.98	15.57
Risk Adjusted Return (return divided by standard deviation)	0.54	0.53	0.51	0.70	0.47	0.64
Risk (annualized standard deviation of monthly returns)	19.97	22.53	24.97	21.66	27.77	24.47
Autocorrelation (from one month to the next)	0.133	0.151	0.150	0.110	0.157	0.106
Probability of Earning at Least 5% (annualized) over a 12.5-year investment time period	87.1	88.0	88.1	95.0	89.4	94.0

But any valid comparison must focus equally upon the various risk metrics. Yes, in the truest sense, risk already is subsumed by the probability of success metric. Nevertheless, let's review two additional risk measures so as to develop a fuller appreciation for the strength and/or weaknesses of the proposed risk management approach described above. We begin by reporting the percentile outcomes for the 12.5 year return distributions. Exhibit 8 shows the results.

Exhibit 8 shows the annualized returns for 12.5-year investment time horizons for each portfolio/index at 11 different percentile levels. By doing so, we more completely reveal the risk characteristics of each investment. As observed earlier, relying on standard deviations of monthly returns would severely mask/hide the inherent risk characteristics due to the potent time series properties of each investment, i.e., trending, momentum, bull/bear markets, and episodic eras.

This exhibit offers several important takeaways. First, for the worst (most undesirable) 10% of all possible outcomes (remaining focused on the previously stated investment objective, defined by 12.5-year investment time horizons), the risk managed moderate deep value portfolio excels, offering significantly higher returns … approximately 4% per year above the total market (at percentile levels 0.5% through 10.0%).

Second, for percentile outcomes at the 15% level and above, the risk managed moderately aggressive deep value index delivers the most attractive results, generally 5% per year above the total market. But before drawing any conclusions, let's next turn to knockout risk. Exhibit 9 provides the results.

This exhibit shows the eight worst (non-overlapping) 12-month investment returns for each index. Of the six indexes examined, risk managed moderate deep value offered a reduced exposure to knockout risk. Or in other terminology, its 12-month left-hand-tail-risk is measurably lower. During its three worst years, the total market lost –72.9%, –50.7%, and –49.2%, while risk managed moderate deep value lost far less, –48.4%, –44.7%, and –37.9%. When viewed together, Exhibits 8 and 9 clearly

EXHIBIT 8

Annualized Return (for 12.5-year Investment Time Windows) at Different Percentile Levels

	Different Percentile Levels (in %)										
Portfolio	**0.5**	**1**	**2**	**3**	**5**	**7.5**	**10**	**15**	**20**	**25**	**50**
Total Market	–3.8%	–2.6%	–2.0%	–0.8%	1.2%	2.4%	3.5%	5.6%	6.6%	7.4%	12.1%
Traditional Commonly-Used Value	–4.0	–3.0	–2.4	–1.5	0.4	2.0	3.7	6.0	7.0	7.9	13.4
Moderate Deep Value	–3.9	–3.2	–2.6	–1.8	0.3	2.2	4.3	5.8	7.0	8.4	14.4
Risk Managed Moderate Deep Value	1.1	2.0	2.7	3.3	4.9	6.3	7.5	10.1	11.2	11.8	15.5
Moderately Aggressive Deep Value	–4.7	–4.1	–3.6	–2.5	–0.3	1.7	4.6	6.6	7.9	9.0	14.0
Risk Managed Moderately Aggressive Deep Value	0.3	0.8	1.9	2.3	4.1	5.9	7.5	10.6	11.7	12.3	15.9

EXHIBIT 9

Comparative Knockout Risk for the Risk-managed Deep Value Portfolios

Portfolio	**Eight Worst Non-Overlapping 12-Month Investment Periods (in %)**							
Total Market	–72.9	–50.7	–49.2	–46.4	–34.7	–26.6	–24.4	–23.7
Traditional Commonly-Used Value	–73.9	–57.9	–52.5	–51.1	–38.3	–29.9	–26.9	–26.7
Moderate Deep Value	–72.2	–64.8	–54.4	–54.1	–48.4	–30.8	–28.5	–28.1
Risk Managed Moderate Deep Value	–48.4	–44.7	–37.9	–33.0	–32.8	–30.8	–27.3	–26.5
Moderately Aggressive Deep Value	–69.9	–68.4	–59.9	–59.2	–47.8	–35.9	–32.7	–29.2
Risk Managed Moderately Aggressive Deep Value	–59.9	–48.4	–37.1	–36.0	–35.9	–34.8	–29.2	–27.8

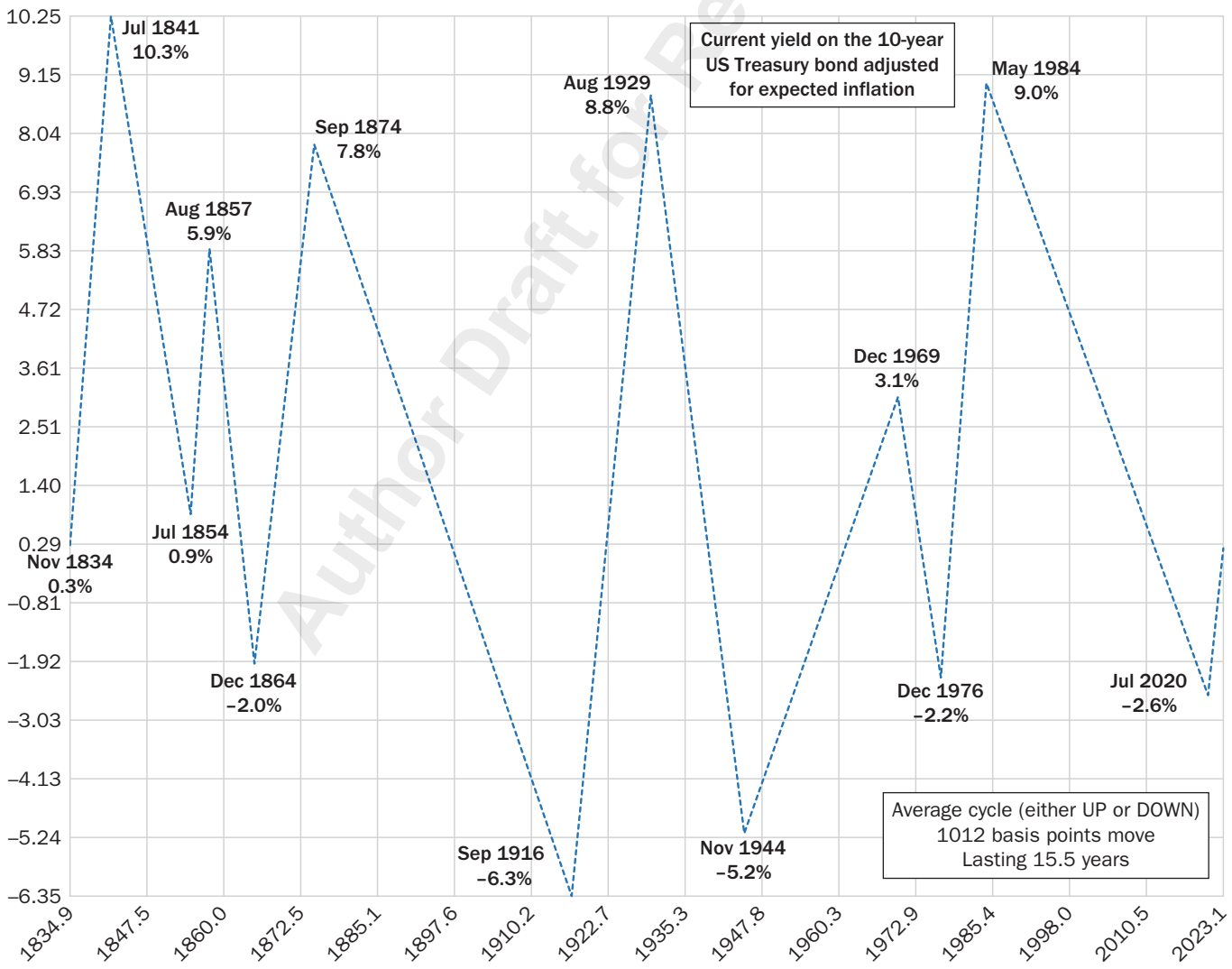
show that risk managed moderate deep value provides a lower-risk solution than the total stock market.

But let's step back from the results presented in Exhibits 7–9. Yes, they make the case for risk managed deep value, with respect to both return and risk (whether left-hand-tail or knockout). But what if we enter an environment characterized by rising real interest rates, rising inflation, or even slow-to-no economic growth? How would the risk managed deep value portfolios perform during such environments? Let's examine each of these in turn, beginning with a rising interest rate environment.

It can be argued that real interest rates proceed through long protracted episodic eras, during which they are generally rising or falling (not over a year or two, but instead over a decade or two). Exhibit 10 shows this behavior since 1834. To create this exhibit, we used the current yield on the 10-year US Treasury bond. We assumed expected inflation for a given instant in time to be actual realized inflation during the 7.5-year period centered on that instant. In other words, we assumed expected inflation to be 50% the past and 50% the future (perfect foreknowledge). All data were provided by Global Financial Data, Inc.

EXHIBIT 10

Real Interest Rate Cycles—Large and Long-lasting



We all remember the 1984-to-2020 period, when interest rates fell consistently and by historic proportions. But what many forget, or were just unaware of, such long-duration swings, whether up or down, have been the norm (not the exception) throughout the history of our nation (and most other major industrialized nations).

The Kenneth French Data Library only provides value data back to 1926, but this still provides coverage for three episodic eras during which interest rates were falling episodically, and four during rising episodic eras. So, how did our value indexes perform (both from return and risk standpoints) during such episodic eras? Exhibit 11 provides the results.

The three rising interest rate environments encompassed 60.5% of the months (since 1926) and the four falling a lesser 39.5%. During the falling interest rate episodes, the two highest returning indexes were risk managed moderate deep value and risk managed moderately aggressive deep value, delivering 12.57% and 13.37%, respectively … versus the total market's 8.16%. This constituted proportionate increases over and above the total market of 54% and 64%. On a risk-adjusted basis, these same two indexes were the best performing, delivering return/risk ratios of 0.50x and 0.47x, respectively … versus the market's 0.35x (proportionate improvements of 43% and 34%, respectively).

Value's real advantage showed up during the four episodes of rising interest rates. The two highest returning indexes were again the risk managed moderate deep value and risk managed moderately aggressive deep value, delivering 19.12% and 19.03% respectively … versus the total market's 15.00%. This constituted

EXHIBIT 11

Summary Statistics for Eras when Interest Rates Are Either Rising or Falling (Episodically)

Index	Return (geometric annualized mean)	Risk Adjusted Return (return divided by standard deviation)	Risk (annualized standard deviation of monthly returns)	Autocorrelation (from one month to the next)
During Falling Episodic Interest Rate Environments (covering 3 episodic eras, spanning 60.5% of the months)				
Total Market	8.16	0.35	23.2	0.16
Growth	7.57	0.37	20.6	0.10
Value	9.08	0.31	29.3	0.18
Value Risk Premium	1.40	0.09	15.5	0.19
Traditional Commonly-Used Value	8.67	0.33	26.5	0.18
Moderate Deep Value	9.08	0.31	29.3	0.18
Risk Managed Moderate Deep Value	12.57	0.50	25.0	0.13
Moderately Aggressive Deep Value	9.55	0.29	32.9	0.18
Risk Managed Moderately Aggressive Deep Value	13.37	0.47	28.5	0.12
During Rising Episodic Interest Rate Environments (covering 4 episodic eras, spanning 39.5% of the months)				
Total Market	15.00	1.10	13.6	0.00
Growth	12.95	0.88	14.8	0.02
Value	18.59	1.16	16.1	–0.01
Value Risk Premium	5.00	0.51	9.9	0.09
Traditional Commonly-Used Value	16.92	1.16	14.6	–0.01
Moderate Deep Value	18.59	1.16	16.1	–0.01
Risk Managed Moderate Deep Value	19.12	1.26	15.2	0.03
Moderately Aggressive Deep Value	18.45	1.07	17.3	0.02
Risk Managed Moderately Aggressive Deep Value	19.03	1.15	16.5	0.06

NOTES: Based on the time period spanning 6/30/1926 through 12/31/2022.

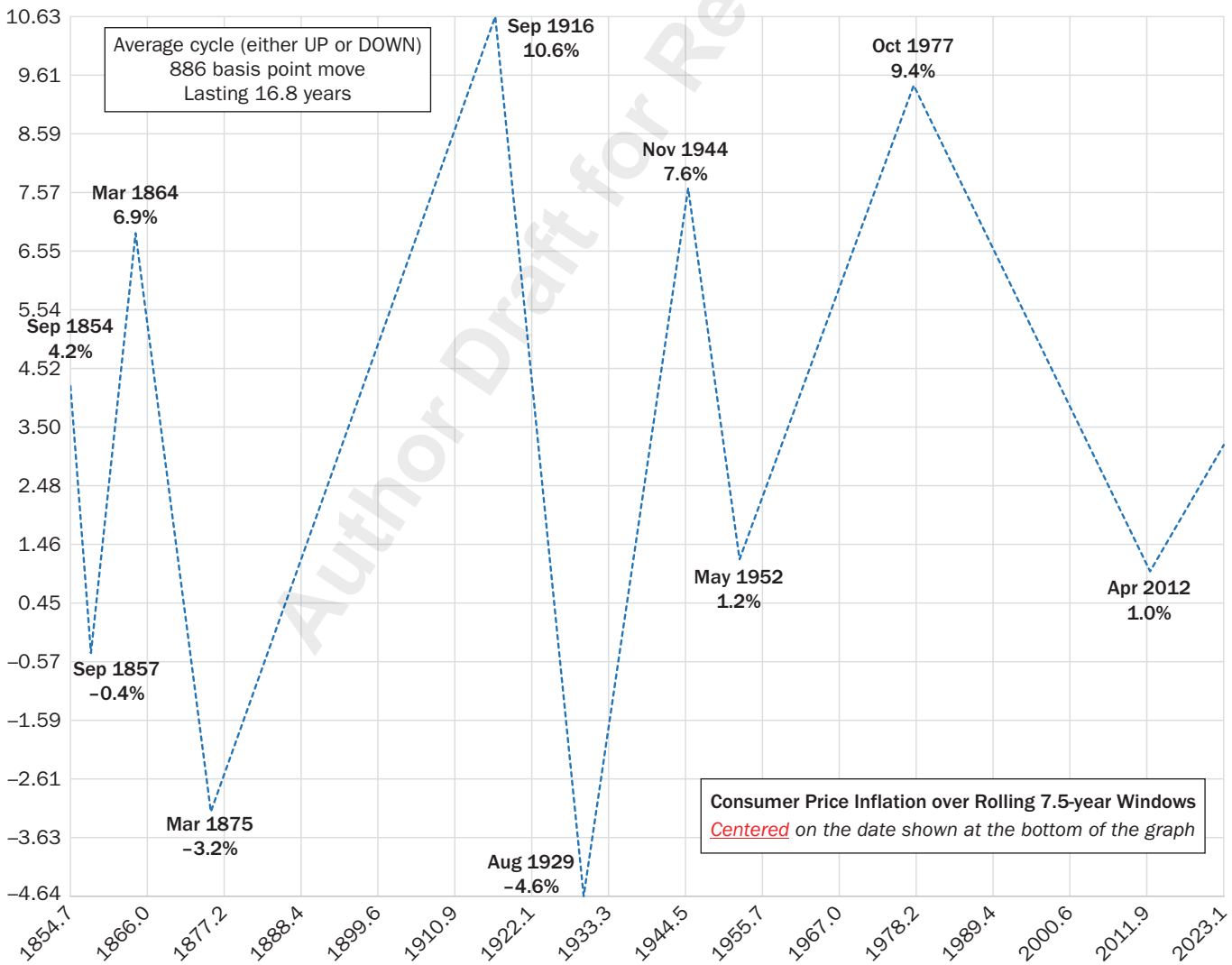
proportionate improvements over and above the total market of 27% for both. On a risk-adjusted basis, the two indexes offering the highest return/risk ratios were risk managed moderate deep value and traditional commonly-used value, at 1.26x and 1.16x respectively.

These results suggest that value is not just for episodic eras characterized by rising interest rates. However, without an appropriate risk management overlay, value and deep value may be unattractive on a risk-adjusted basis during falling interest rate episodic eras. For example, compare the return/risk ratios for growth and moderately aggressive deep value (during falling interest rates), delivering 0.37x and 0.29x, respectively.

But how do value and risk managed value perform during different inflationary environments? Inflation, like real interest rates, proceeds through long drawn-out episodic eras during which it is generally either rising or falling (again, not for a year or two, but for a decade or two). This should come as no surprise given that many of us remember the recent 35-year period of falling inflation rates. Exhibit 12 shows these episodic eras for the US since 1854 using the previously defined measure for expected inflation.

EXHIBIT 12

Expected Inflation Cycles—Large and Long-lasting



With the French Data Library starting in 1926, we are able to examine three episodic eras of falling inflationary expectations (occupying 46.8% of the months) and three eras of rising ones (occupying 53.2% of the months). As the definition of "inflationary expectations" for a given point in time, this article uses the realized inflation rate over a 7.5-year time window that is centered on that instant in time. Through this approach, we have chosen to measure expected inflation as 50% look-back and 50% look-forward (i.e., perfect foreknowledge). As before, we examine the nine stock indexes during each of these two alternate environments. Exhibit 13 provides the results.

During eras characterized by falling inflation, the two highest returning indexes were risk managed moderate deep value and risk managed moderately aggressive deep value, delivering 18.17% and 19.47% respectively, versus the total market's 14.48%. This constituted proportionate increases of 25% and 34%. If one adjusts for risk, then these same two indexes delivered the highest return/risk ratios of 1.13x and 1.12x, versus the total market's lesser 0.95x. This constituted proportionate improvements of 19% and 18%.

But it is during episodic periods of rising inflation that value excels relative to other indexes. The two highest returning indexes during such eras were risk managed moderate deep value and risk managed moderately aggressive deep value, delivering 12.49% and 12.24% respectively … versus the total market's 7.68%. This constituted proportionate return increases of 63% and 59%. On a risk-adjusted basis using the return/risk ratios, these same two indexes delivered the most

EXHIBIT 13

Statistics for Eras when EXPECTED Inflation Is Either Rising or Falling (Episodically)

Index	Return (geometric annualized mean)	Risk Adjusted Return (return divided by standard deviation)	Risk (annualized standard deviation of monthly returns)	Autocorrelation (from one month to the next)
During Falling Episodic Expected Inflation Environments (covering 3 such eras, spanning 46.8% of the months)				
Total Market	14.48	0.95	15.2	0.07
Growth	13.23	0.81	16.3	0.07
Value	15.73	0.92	17.1	0.09
Value Risk Premium	2.20	0.21	10.4	0.13
Traditional Commonly-Used Value	15.23	0.95	16.0	0.08
Moderate Deep Value	15.73	0.92	17.1	0.09
Risk Managed Moderate Deep Value	18.17	1.13	16.0	0.05
Moderately Aggressive Deep Value	17.00	0.93	18.2	0.08
Risk Managed Moderately Aggressive Deep Value	19.47	1.12	17.3	0.05
During Rising Episodic Expected Inflation Environments (covering 3 such eras, spanning 53.2% of the months)				
Total Market	7.68	0.33	23.4	0.16
Growth	6.61	0.33	20.3	0.09
Value	10.17	0.34	30.3	0.17
Value Risk Premium	3.34	0.21	15.9	0.19
Traditional Commonly-Used Value	8.97	0.33	27.0	0.17
Moderate Deep Value	10.17	0.34	30.3	0.17
Risk Managed Moderate Deep Value	12.49	0.49	25.6	0.13
Moderately Aggressive Deep Value	9.56	0.28	34.0	0.18
Risk Managed Moderately Aggressive Deep Value	12.24	0.42	29.3	0.12

NOTES: Based on the time period spanning 6/30/1926 through 12/31/2022.

attractive outcomes of 0.49x and 0.42x, versus the total market's 0.33x. This constituted proportionate improvements of 48% and 27%.

Clearly, risk-managed deep value (and in particular risk managed moderate deep value) excels in general, during rising interest rate eras, and during environments characterized by rising inflation. Let's next turn to slow versus fast economic growth environments.

To explore this issue, we begin by defining economic growth as the growth rate in real GDP over a 12-month window that is centered on (or otherwise identified with) the mid-point of that 12-month window. For example, if real GDP grows by 1.0% during calendar year 2000, then the growth rate of 1.0% is assigned to the date June 30, 2000. Slow economic growth is defined as the 25% of all 12-month time windows with the lowest growth rates. Fast economic growth is defined as the remaining 75%. Since 1914, the breakpoint has been at 0.94%. In other words, 25% of the time, the US economy has grown more slowly than 0.94%. Exhibit 14 shows the results.

As shown Exhibit 14, slow growth and outright decline have always been present. Yes, the severity of the declines has been reduced, but not the frequency of slow/no growth. If anything, examining the period since 2007, frequency has increased slightly over the historical average. So how did the total US stock market, growth, and our various value indexes perform during slow/no growth (the 25% of the time marked in red above) and during fast growth (the 75% of the time marked in white above)? Exhibit 15 provides the answers.

When the economy is growing strongly (by more than 0.94% per year), value beats growth, 17.23% to 12.70% (a 36% proportionate increase). Risk managed moderately aggressive deep value does even better, generating an 18.71% return (a 47% proportionate improvement over growth). On a risk-adjusted basis the results are still quite strong, but less spectacular. Growth, value, and risk managed moderate deep value

EXHIBIT 14

When Has US Economic Growth Disappointed, and by How Much

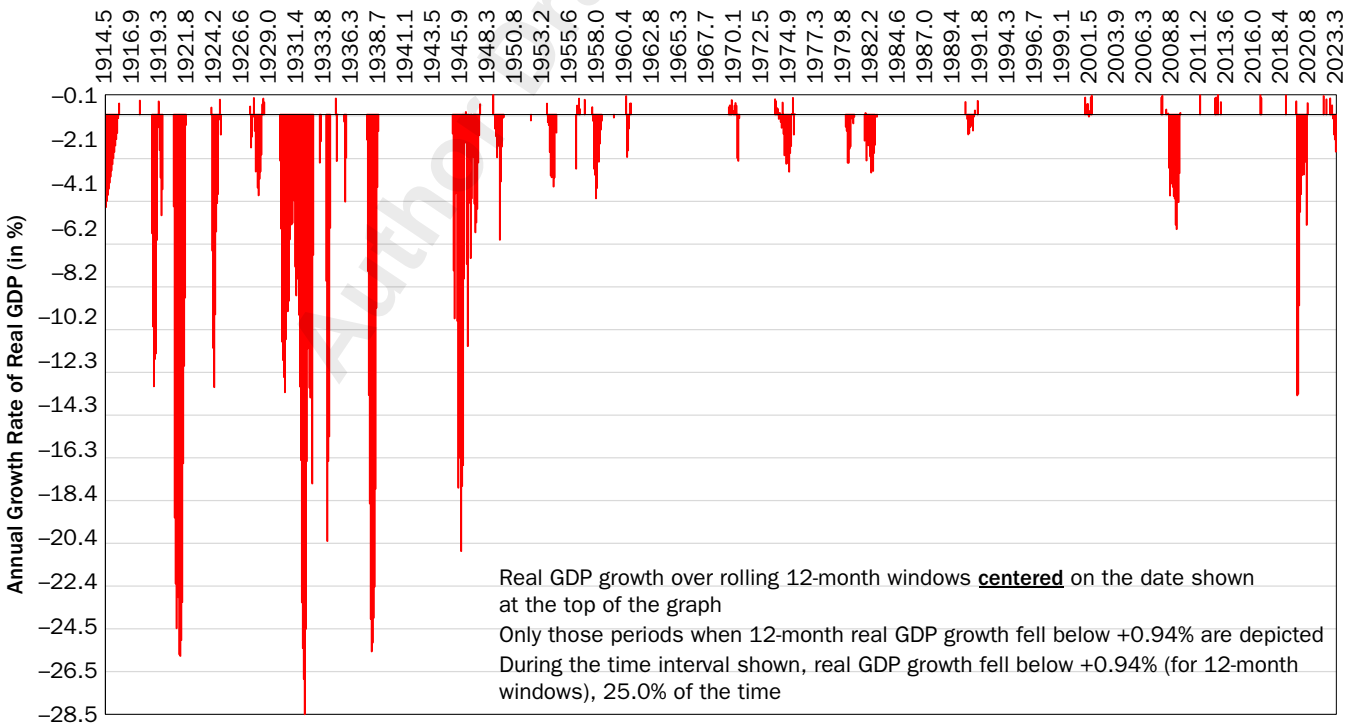


EXHIBIT 15

Summary Statistics for When US GDP Was Growing Strongly or Weakly

Statistic	Total Market	Growth	Value	Value Risk Premium	Traditional Commonly-Used Value	Moderate Deep Value	Risk Managed Moderate Deep Value	Moderately Aggressive Deep Value	Risk Managed Moderately Aggressive Deep Value
STRONG Growth – When Real US GDP Growth was Greater than 0.94% (covers 76.68% of the months)									
Return (geometric annualized mean)	14.74	12.70	17.23	4.02	16.17	17.23	18.28	17.42	18.71
Risk Adjusted Return (return divided by standard deviation)	0.91	0.80	0.87	0.34	0.90	0.87	0.95	0.78	0.86
Risk (annualized standard deviation of monthly returns)	16.12	15.79	19.79	11.92	17.87	19.79	19.23	22.25	21.72
WEAK Growth – When Real US GDP Growth was Less than 0.94% (covers 23.32% of the months)									
Return (geometric annualized mean)	–1.19	0.23	–0.85	–1.08	–1.25	–0.85	5.29	–0.46	5.81
Risk Adjusted Return (return divided by standard deviation)	na	0.01	na	na	na	na	0.19	na	0.18
Risk (annualized standard deviation of monthly returns)	29.14	25.48	37.16	18.00	33.46	37.16	28.15	40.94	31.83

NOTE: Based on the time period spanning 6/30/1926 through 12/31/2022.

SOURCE: "Strong" and "Weak" growth is measured for each individual month, but looks back 6 months and forward 6 months (in other words, for a 12-month interval, but centered on the middle of that interval).

deliver return/risk ratios of 0.80x, 0.87x, and 0.95x, respectively. Or in proportionate terms, value and risk managed moderate deep value beat growth by 9% and 19%, respectively.

The slow/no growth environment is a bit more interesting. Since 1926, slow/no growth comprised 23.32% of the months (recall that Exhibit 14 was based on the longer time period extending further back in time). During this environment, growth earned 0.23%, outperforming the total market (–1.19%) and value (–0.85%). However, our two risk managed deep value indexes performed much better. Risk managed moderate deep value and risk managed moderately aggressive deep value came in at 5.29% and 5.81%, respectively (500bps to 600bps above growth).

On a risk-adjusted basis the results are similarly compelling. The return/risk ratios for growth, risk managed moderate deep value, and risk managed moderately aggressive deep value came in at 0.01x, 0.19x, and 0.18x, respectively.

In summary, value outperforms growth over the very long run, as well as during periods of interest rate surprise, episodically rising interest rates, and episodically rising inflation. If one uses a risk managed approach to deep value, then value outperforms growth even during slow/no growth environments. But this leaves us with one last environment to consider. How does value perform after growth has delivered a large and long-lasting period of relative outperformance?

To address this issue, this article identifies bull and bear cycles for the value risk premium (as defined in Exhibit 1). Bull and bear markets are defined such that the value risk premium must rise or fall by at least 25% before a regime change has occurred (a switch from bull to bear or vice versa). Using this definition, Exhibit 16 identifies each of the market cycles since 1926.

Based on these data, the value risk premium initiated a bull market back on September 30, 2020 (using month-end data). The median (or "typical") value bull lasts just 2.0 years and delivers a cumulative +86% return (the margin value outperforms growth). However, perhaps more noteworthy is the period that preceded value's current bull cycle. This unique period was the longest ever experienced (since 1926),

EXHIBIT 16

Bull and Bear Markets for the Value Risk Premium Since 1926

	Cumulative Percentage Return, Unannualized	Duration in Years	Start Date	End Date	Volatility, Annualized Standard Deviation of Monthly Returns	Percentage of Monthly Returns that were POSITIVE	Annualized Return
	–52	5.25	Feb 1927	May 1932	16.1	32	–13.1
	78	0.25	May 1932	Aug 1932	42.3	100	902.9
	–38	0.33	Aug 1932	Dec 1932	13.2	0	–76.4
	94	0.67	Dec 1932	Aug 1933	33.0	75	170.7
	–50	1.58	Aug 1933	Mar 1935	23.6	26	–35.5
	86	2.00	Mar 1935	Mar 1937	15.4	71	36.3
	–46	2.42	Mar 1937	Aug 1939	15.4	34	–22.5
	2376	49.25	Aug 1939	Nov 1988	10.6	54	6.7
	–28	3.08	Nov 1988	Dec 1991	5.7	38	–10.1
	49	6.42	Dec 1991	May 1998	8.3	57	6.4
	–33	1.58	May 1998	Dec 1999	10.2	26	–22.4
	162	7.00	Dec 1999	Dec 2006	11.2	69	14.7
	–37	2.17	Dec 2006	Feb 2009	16.1	27	–19.0
	28	0.58	Feb 2009	Sep 2009	11.8	86	51.7
	–58	11.00	Sep 2009	Sep 2020	11.0	40	–7.7
	75	2.25	Sep 2020	?	18.1	63	28.2
Median BULL Market	86	2.00			11.8	71	36.3
Median BEAR Market	–42	2.29			14.3	29	–20.7

NOTES: Bull and bear markets are defined as moves of at least 25% using month-end stock index total returns.

SOURCE: Data span the time period June 1926 through December 2022.

during which growth outperformed value—lasting 11.0 years and ending September 30, 2020. This period also delivered the largest relative gain for growth ever experienced. Finally, this period corresponds with the second tech wave (the first having ended with The Great Tech Wreck which began December 31, 1999, using month-end data).

The Great Tech Wreck delivered a seven-year period of relative outperformance for value over growth, amounting to +162% in additional incremental return. Some have suggested that forces are currently aligned to deliver something greater in the current cycle (GMO 2023a, Levisohn 2023 and Greenblatt 2005). But such a conclusion is nothing more than ideal speculation.

Instead let us ask and answer a different question, one based on the results appearing in Exhibit 16. Specifically, during those time periods when the value risk premium is in either its bear (descending) or bull (ascending) phase, how did our various value indexes perform, both unmanaged and risk-managed? Exhibit 17 provides the answer.

When in a bear market for the value risk premium (28.4% of the time since 1926), value does much worse than growth. Not surprising, after all, as that is the specific definition of a bear market. But before abandoning this bear market data, consider the performance of risk managed moderate deep value (–5.07%) versus that of the total stock market (–4.68%). Yes, risk managed still underperformed the total market, but by a surprisingly small margin considering that value was in a bear phase.

Of equal or greater interest is the bull phase for value (71.6% of the time since 1926). Growth, risk managed moderate deep value, and risk managed moderately aggressive deep value earned 11.74%, 24.27%, and 25.57%, respectively.

EXHIBIT 17

Summary Statistics for When The Value Risk Premium is in BEAR or BULL Market Phase

Statistic	Total Market	Growth	Value	Value Risk Premium	Traditional Commonly-Used Value	Moderate Deep Value	Risk Managed Moderate Deep Value	Moderately Aggressive Deep Value	Risk Managed Moderately Aggressive Deep Value
During those Months When the Value Risk Premium is in a BEAR phase (28.4% of the time)									
Return	–4.68	4.59	–11.55	–15.42	–9.08	–11.55	–5.07	–13.02	–6.24
Risk-Adjusted Return (return divided by risk)	na	0.21	na	na	na	na	na	na	na
Risk (standard deviation)	23.05	21.88	28.17	14.14	25.56	28.17	22.78	31.25	25.94
During those Months When the Value Risk Premium is in a BULL phase (71.6% of the time)									
Return	17.63	11.74	24.13	11.09	21.44	24.13	24.27	25.34	25.57
Risk-Adjusted Return (return divided by risk)	0.96	0.69	1.05	0.87	1.03	1.05	1.17	0.98	1.09
Risk (standard deviation)	18.37	17.02	23.07	12.71	20.80	23.07	20.82	25.74	23.47

On a risk-adjusted basis the results are equally appealing. The return/risk ratios for growth, risk managed moderate deep value, and risk managed moderately aggressive deep value were 0.69x, 1.17x, and 1.09x, respectively … or proportionate increases of 70% and 58% for our two risk managed indexes, respectively. If the current value risk premium bull continues, then the outlook for risk managed deep value might be unusually compelling.

Finally, let's return to the very beginning of this article, wherein we identified several important topics that remain out of scope for this article. One in particular merits a brief comment. It concerns the criteria by which value is defined both today and tomorrow. This is a meaty topic, and likely would require several articles to do it justice. This article relied on the simple price-to-book ratio for delineating value from growth and the various intensities of value. This approach allows for consistent and uniform data stretching back over 97 years.

However, today most investment products (both retail and institutional) use a multi-dimensional approach. Criteria being used today include price-to-earnings ratio, price-to-book, price-to-sales, and five-year growth rates for sales, cash flows, and dividends. Perhaps most important has been the attention being paid to difficult to measure intangibles that remain excluded from traditional accounting definitions of book value. These intangibles may be unusually important in today's and tomorrow's economy since they drive absolute growth and enhanced profit margins. Examples include intellectual property, patents, brands, software, human capital, reputational capital, vendor relationships, and customer relationships.

CONCLUSIONS

Over the past 97 years, as based on the Kenneth French Data Library, value has outperformed growth by an average 2.81% per year. Moreover, moderately aggressive deep value returned 12.98% versus growth's more modest 9.66% (a 3.32% margin). When we examine the 25% of the months when interest rates surprised by the most to the upside and the downside, we find that value outperformed growth by +6.48% and by –3.12% per year, respectively.

Perhaps somewhat more interesting, when we examine the 50% of the months when interest rates surprised to the upside by the most, the risk-adjusted returns (return/risk ratio) for moderate deep value were 0.43x versus that for growth of

just 0.20x (a 115% proportionate improvement). Unfortunately, the risk properties of value (or growth), when compared to those of the total stock market, are relatively unpleasant and may overpower value's relative success over the past 97 years.

This article suggests a risk management approach for deep value based on surprise to the upside in the current yield on BAA corporate credit. When such surprises occur, the risk managed portfolio moves out of deep value and into intermediate-term US Treasury bonds. Over the past 97 years, risk managed moderately aggressive deep value returned 15.57% versus the total market's lesser 10.81%. And the probability of earning at least 5% during a randomly selected 12.5-year investment window jumps from 87.1% to 95.0% (when moving from the total market to risk managed moderate deep value). Moreover, the risk managed moderate deep value portfolio we evaluated delivered the smallest left-hand-tail risk and the smallest knockout risk of all portfolios considered.

During episodic periods of rising interest rates, risk managed moderate deep value returned 19.12% versus growth's 12.95%. And during episodic periods of rising inflation, a similar but even stronger result was obtained, with risk managed moderate deep value earning 12.49% versus growth's modest 6.61%. Moreover, during periods of slow or no economic growth for the US economy (as defined by 12-month real GDP), risk managed moderately aggressive deep value returned 5.81% versus growth's miserly 0.23%. And finally, when the value risk premium was in one of its bull phases (71.6% of the months over the past 97 years), risk managed moderately aggressive deep value earned 25.57% per year versus growth's 11.74%.

These data suggest the possibility for earning a superior return with respect to both the total market and growth on a standalone basis when a risk managed approach to deep value is utilized. They also support the observation that both the absolute risk and the risk-adjusted returns remain compelling.

From a business standpoint, several observations could be considered. First, deep value stocks are generally less liquid and entail higher trading costs. Therefore, advisors who wish to implement a risk managed deep value approach generally would be best served by using pure value ETFs. Second, investment management organizations could potentially benefit the marketplace by creating all-on-one ETFs that encapsulate both exposure to deep value stocks and the risk management overlay within a single unified package. This would improve tax efficiency, enhance simplicity, reduce account minimums, lower total expense ratios if sufficient economies are realized, and transfer work from the end investor to the institutional investment manager. Third, the use of a risk managed deep value portfolio is motivated by the 97 years of data showing higher return, lower risk, and superior performance during certain environments (interest rate, inflation, economic growth, value/growth cycles). It is also motivated by its higher probability of earning a pre-specified rate of return over a reasonable investment time horizon. But if an investor (or product provider) desires tight tracking to the S&P 500 Index, then a risk managed deep value portfolio would severely disappoint.

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