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Dollar-Cost Averaging Versus Lump-Sum Investing: Behavioral Considerations and Potential Outcomes



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Investors understandably would like a favorable start when deploying capital into their portfolios. But even for those with a long-term investment horizon, the desire to avoid stumbling out of the gate can prove distracting. Add to that a visceral aversion to losses, and investors can often become paralyzed by decisions of how and when to invest.

Morgan Stanley believes that, for investors to reach their long-term goals, they must commit to a carefully constructed plan. This primer is intended to empower informed decisions when launching an investment program or redeploying capital. Specifically, it provides guidance on two potential courses of action: dollar-cost averaging and lump-sum investing. We aim to support Financial Advisors and clients' decision making by exploring why and when to consider pursuing each course and by identifying the potential consequences of each approach.

Key Takeaways

- We explore the forces affecting investors' judgment, considering both the practical implications and insights from behavioral finance.
- We then study the evidence from historical and hypothetical trials, comparing the real-world costs and benefits of the two approaches.
- The analysis suggests that lump-sum investing may maximize investors' annualized total returns, with modestly higher realized volatility, over a seven-year horizon.
- Nonetheless, for certain investors and in specific situations, dollar-cost averaging may remain appealing, such as in cases of significant loss aversion or when the expected returns for the target investment strategy have become compressed.

Why and When Might Investors Face This Decision?

Before launching into our review of behavioral considerations, we will consider how the decision—between dollar-cost averaging and lump-sum investing—might arise. Below, we list several real-life scenarios:

1. *A liquidity event.* Selling a business or a concentrated stock position, receiving an inheritance, or launching a new foundation may result in a significant sum of investable assets. The investor in such cases is usually awaiting the receipt of this sum and may perceive a “ticking clock” as he or she thinks about how to proceed once such assets are in hand.
2. *Incentive compensation or fresh donations.* In some professions, individuals may receive sporadic but substantial incentive compensation. These windfalls mirror the liquidity events described above but may happen with known frequencies, such as annually. For foundations and endowments, a similar inflow might arise following an annual fundraising campaign.
3. *Prudently de-risking prior to or during a market selloff.* While we caution against market timing¹, investors may have navigated nimbly through a market downturn only to wonder: “What next?” In this scenario, the investor is concerned about missing a potential rebound while also looking to avoid participating in an unabated or renewed selloff.

In practical terms, the stress associated with “What next?” grows in proportion to the deployable sum relative to the investor's total investable assets, given the direct relationship to his or her financial health. To draw an analogy to consumer purchase decisions, consider the difference between adding some gum at the drugstore checkout versus buying a house. Consequently, investors and their Financial Advisors will naturally wish to analyze trivial versus consequential

decisions from several angles.

Occasionally, financial literature will use “dollar-cost averaging” to refer to the periodic investment of savings. For example, an investor may regularly invest a portion of his or her monthly salary. This steady, disciplined approach will likely support improved outcomes versus pooling capital over long periods to invest in the distant future. The long-term positive return spread between 1) cash or ultrashort fixed income; and 2) diversified portfolios makes this version of “dollar-cost averaging” mathematically and practically appealing.

In this primer, however, we focus on deploying a one-time sizable amount of investable cash into an appropriate diversified portfolio. With lump-sum investing, an investor immediately invests his or her assets into the diversified portfolio. With dollar-cost averaging, the investor methodically deploys the capital over multiple months.

For the purposes of our discussion, the implementation involves investing a fixed portion of the deployable cash evenly: for example, in thirds over a three-month period.

Behavioral Finance: Understanding Framing and Investor Motivations

Before weighing the potential outcomes of lump-sum investing versus dollar-cost averaging, we will seek to explain why this decision seems daunting.

Before the late 1960s, economists had progressively developed an intricate set of expectations about human behavior. They reasoned that decisions on economic or financial matters would be rational and predictable: Individuals would aim to maximize utility, or value, in coldly calculated terms, without exception. But instead of real humans, who make decisions based on a number of sometimes-irrational considerations, these economists were anticipating “robotic *econs*,” imaginary people who always think and behave logically and rationally.

Later, aberrations from these expected patterns threatened to unravel this “expected utility theory,” which held that people will choose the act with the highest expected value, or “utility” when faced with choices with uncertain outcomes. In a series of papers on judgment and decision making, Professors Daniel Kahneman and Amos Tversky interrupted the convenient, well-constructed but flawed theory. In experiments with individuals from different countries, they explored the mental shortcuts, or “heuristics,” that humans use to handle complexity in decision making and the biases that complicate effective choices. Their pioneering work would pave the way for behavioral economics—and finance—work accentuated later by major contributions from Richard Thaler and Meir Statman. (Kahneman and Thaler would





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separately receive the Nobel Memorial Prize in Economics in 2002 and 2017, respectively.)

In a 1974 article², Kahneman and Tversky pointed to the “anchoring” bias, in which decision makers place inflated value on an initial piece of data, thwarting appropriate judgment in totality. In negotiating the sales price of a used car, for example, the sticker price might set the anchor, with the buyer and seller discussing “fairness” in light of this arbitrary figure versus the car’s actual market value (now available through Internet-based pricing services). Behavioral economists introduced the term “framing” to highlight the general human tendency to make decisions based on how data is presented rather than on the facts, with anchoring providing one such example.

Then, in a seminal 1979 paper, Kahneman and Tversky shared the breakthrough insight of “prospect theory,” which recognized that “losses loom larger than gains”—perhaps twice as much so.³ As Thaler summarized in a follow-on paper on consumer choice, their research suggested that individuals make decisions based on “perceived gains and losses relative to some natural reference point, rather than wealth ... as in the standard [expected utility] theory. This feature reflects the fact that people appear to respond more to perceived changes than to absolute levels. (Kahneman and Tversky liken the individual in this model to a “pleasure machine,” with gains yielding pleasure and losses yielding pain.) By using a reference point, the theory also permits framing effects to affect choices.”⁴

Exhibit 1: Key Terms in Behavioral Finance

TERM	BACKGROUND
 EXPECTED UTILITY THEORY	Prior to the development of behavioral economics, economists believed that humans would rationally seek their own best interest, called their “expected utility” (or “expected value”), in all cases. For example, investors would rationally aim to maximize their long-term wealth. This theory appeared to be “settled science” as of the early 1960s. Under this theory, each person would make the same decision, given the same fact pattern.
 PROSPECT THEORY	Daniel Kahneman and Amos Tversky introduced prospect theory as a means of explaining why human behavior often deviates from the outcomes prescribed by the expected utility theory. The theory intends to explain decisions involving risk or uncertainty, such as investing. The theory holds that humans tend to assess their utility relative to a reference point, such as one’s current wealth, rather than long-term wealth (as prescribed under the expected utility theory).
 HEURISTICS	In making decisions, humans leverage mental models (“cognitive shortcuts” or rules of thumb) called “heuristics” as a means of reducing complexity. One such heuristic (“representativeness”) may cause investors to extrapolate recent history into the future. For example, if equities returned 10% last year, an investor’s tendency to extrapolate from recent events (one such heuristic) will encourage an expectation of similar returns over the foreseeable future.
 FRAMING	Humans typically make decisions based on the presentation of available data rather than the facts themselves. For this reason, marketing messages can be effective, and a limited statistical sample can become normative. For example, if someone mentions that a baseball team has just won five games in a row, our framing tendency will lead us to believe that this baseball team is skillful and destined for future success. In reality, the team might have started its season with a terrible string, indicative of its underlying mediocrity. Humans use such framing to untangle complexity, but the resulting decisions can be motivated by only part of the whole picture.

Source: Morgan Stanley Wealth Management Global Investment Office, summarizing behavioral finance contributions from Daniel Kahneman, Amos Tversky, and Richard Thaler

In 1982, Kahneman and Tversky published “The Psychology of Preferences,” in which they fleshed out the descriptions of heuristics that guide risky choices.⁵ This theoretical and experimental work explored how human decision makers exhibit not only risk aversion but, more specifically, “loss aversion” or “regret aversion.” Loss aversion encapsulates the differentiated experience between gains and losses. This effect appears more or less pronounced in each individual and

in varying situations, leading to unique risk tolerance among investors. Moreover, Kahneman and Tversky noted a positive correlation between regret and 1) the level of responsibility for a choice; and 2) the potential downside. That is, concern of regret weighs most heavily when one’s immediate responsibility seems strongest or when a negative outcome may prove more costly.

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In understanding these heuristics, one may begin to grasp how investors typically emphasize shorter-term changes, relative to a reference point, versus long-term outcomes. Specifically, these behavioral realities underscore what makes investors particularly sensitive to initial drawdowns after deploying investable cash.

Furthermore, heightened market volatility tends to amplify the perceived gravity of the decision about when to deploy cash. By its nature, market volatility flows from investors' uncertainty about such considerations as macroeconomic growth, monetary policy, interest rates, and corporate earnings. By creating greater expected dispersion in future outcomes, volatility itself contributes to confusion or tentativeness. Because investors typically extrapolate recent experience into the future, they may find it particularly challenging to allocate to risky assets following selloffs





This framing underscores the appeal of dollar-cost averaging, which can disrupt an investor's focus on short-term losses. Dollar-cost averaging essentially allows investors to stage

gradually into their portfolios' risk. Statman points out that rule-based strategies, including dollar-cost averaging, can "reduce responsibility," which he finds "especially helpful for investors who are concerned about their exposure to regret.⁶ By limiting potential regret, dollar-cost averaging may inhibit "investors from their tendency to base investment decisions on naive extrapolation of recent price trends."⁷

Testing the Value of Lump-Sum Investing versus Dollar-Cost Averaging

Recognizing the behavioral appeal of dollar-cost averaging, we examined and assessed the return differentials and probabilities of success for lump-sum investing and dollar-cost averaging.

Exhibit 2: Behavioral Factors Leading to the Appeal of Dollar-Cost Averaging

FACTOR		IMPLICATION
	ANCHORING	Given a substantial sum of deployable cash, investors may "anchor" on that dollar amount, considering their financial wellness based on short-term changes rather than their total wealth or long-term prospects
	LOSS AVERSION	According to "prospect theory," investors weigh losses as twice as painful as gains are pleasurable, leading them to overvalue potential losses and potentially take too little risk
	REGRET AVERSION	Investors naturally wish to avoid regret over their decisions; this regret grows in proportion to their perceived responsibility and the scale of any potential negative consequences
	EXTRAPOLATION	Investors tend to project recent market action as more likely to occur in the future, potentially becoming overly risk-averse after periods of downside volatility or overly confident after periods of upside volatility

Source: Morgan Stanley Wealth Management Global Investment Office, summarizing behavioral finance contributions from Daniel Kahneman, Amos Tversky, and Richard Thaler

Our tests assess the relative performance for these two strategies for several risk-based, multi-asset model portfolios: 1) historical sampling from January 1926 to June 2023 and 2) assessing hypothetical performance over the forthcoming market cycle. (Please see Exhibit 3 for these risk-based model portfolios' weightings.) These risk-based portfolios approximate the Global Investment Committee's recommendations for the strategic (seven-year) horizon, ranging from most conservative (Model 1) to most aggressive (Model 5), with Model 3 representing a balanced growth mandate. Due to its balanced nature, we have selected Model 3 as an indicative sample for some specific examples in

Exhibits 4 and 5 below.

We computed our tests over overlapping seven-year periods, timeframes selected to capture the average market cycle and in concert with the Global Investment Committee (GIC)'s strategic time horizon. As a result, the historical evidence reflects 1,087 overlapping periods, while the hypothetical scenarios include close to 120,000 overlapping periods from a Monte Carlo simulation.

For the historical analysis, we constructed a dataset of total return indexes for seven major asset classes across equities, fixed income and commodities. We sourced the data from

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AQR Capital Management, Bloomberg, FactSet, Global Financial Data and Morningstar. The international equities asset class includes emerging market equities in its near-term history, based on the MSCI All-Country World ex-US Index. We calculated all returns in US dollar terms. For the hypothetical analysis, we used the [GIC's Capital Markets Assumptions](#) (published in March 2023)⁸ and expanded the asset class roster to include emerging markets equities.

These tests assume that an investor starts with 100% of his or her assets in ultrashort fixed income for each overlapping period. The lump-sum investing implementation leads to

immediately allocating 100% of the portfolio to the risk-based, multi-asset portfolio. With the dollar-cost averaging cases, we assume the investor deploys assets from ultrashort fixed income in stages, over a given number of months. The model assumes that we achieve the model portfolios' percentage weight in ultrashort fixed income by the final implementation date. (Please see Exhibit 4 for sample weightings for Model 3, given a four-month dollar-cost averaging period.) In each test, we assume that the investor rebalances to the model portfolios' weights at each 12-month interval.

Exhibit 3: Risk-Based Model Portfolios for Historical and Hypothetical Testing

Historical			Risk-Based Model Portfolios				
Asset Class	Sector	Subsector	1	2	3	4	5
Equities	US	Large-Cap	12%	19%	26%	31%	38%
		Small-Cap	3%	5%	7%	8%	10%
	International		10%	16%	22%	26%	32%
Fixed Income	US	Ultrashort	15%	10%	5%	5%	0%
		Invnt. Grade	50%	40%	30%	20%	10%
		High Yield	5%	5%	5%	5%	5%
Alternatives	Global	Commodities	5%	5%	5%	5%	5%

Hypothetical			Risk-Based Model Portfolios				
Asset Class	Sector	Subsector	1	2	3	4	5
Equities	US	Large-Cap	12%	19%	26%	31%	38%
		Small-Cap	3%	5%	7%	8%	10%
	International		7%	11%	15%	18%	22%
	Emerging Mkts.		3%	5%	7%	8%	10%
Fixed Income	US	Ultrashort	15%	10%	5%	5%	0%
		Invnt. Grade	50%	40%	30%	20%	10%
		High Yield	5%	5%	5%	5%	5%
Alternatives	Global	Commodities	5%	5%	5%	5%	5%

Exhibit 4: Portfolio Weight for Model 3, Given a Four-Month Dollar-Cost Averaging Approach

			Weights as of Month-End (Indicative)				
Asset Class	Sector	Subsector	0	1	2	3	4
Equities	US	Large-Cap		6%	13%	19%	26%
		Small-Cap		2%	4%	5%	7%
	International			6%	11%	17%	22%
Fixed Income	US	Ultrashort	100%	76%	52%	28%	5%
		Invnt. Grade		8%	15%	22%	30%
		High Yield		1%	3%	4%	5%
Alternatives	Global	Commodities		1%	3%	4%	5%

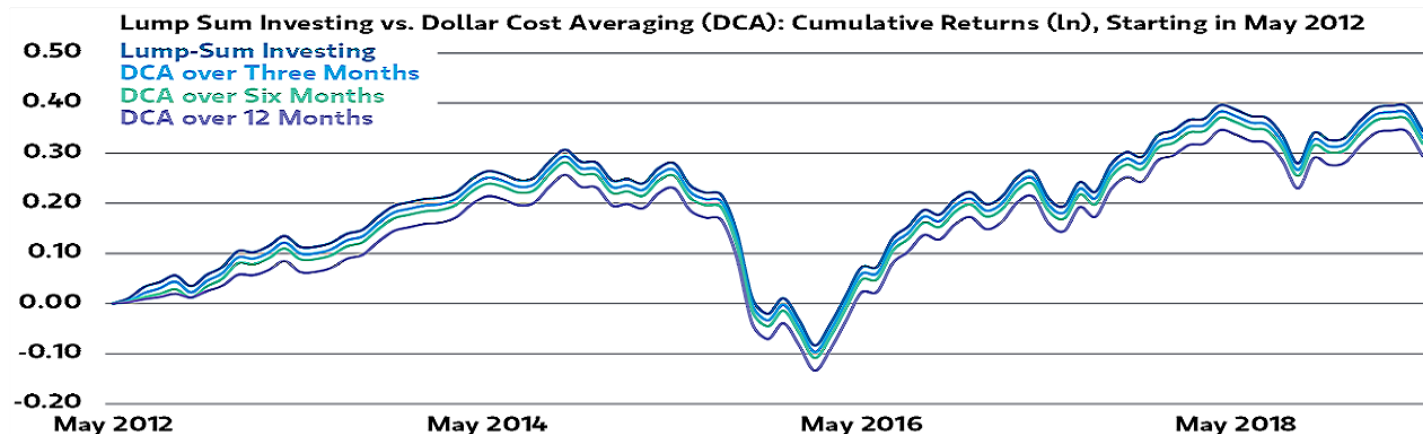
Source: Morgan Stanley Wealth Management Global Investment Office

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Exhibit 5 provides context for visualizing these trials, showing the outcomes of lump-sum investing and dollar-cost averaging for the seven-year period, starting in May 2012. In this specific instance, the positive return spread over cash

leads to a clean sorting of the outcomes, with lump-sum investing outperforming and with longer-duration dollar-cost averaging periods faring worse.

Exhibit 5. Lump-Sum Investing and Dollar-Cost Averaging Implementations Lead to Differentiated Outcomes over a Seven-Year Investment Horizon



Source: Calculated by Morgan Stanley Wealth Management Global Investment Office from data provided by AQR Capital Management, Bloomberg, FactSet, Global Financial Data and Morningstar. © 2023 Morningstar, Inc. All rights reserved. Used with permission. This information contained herein: (1) is proprietary to Morningstar and/or its content providers; (2) may not be copied or distributed; and (3) is not warranted to be accurate, complete or timely. Neither Morningstar nor its content providers are responsible for any damages or losses arising from any use of this information.

Note: This example represents one seven-year period. The historical tests take into account 1,087 periods in order to evaluate the effectiveness of lump-sum investing and dollar-cost averaging over multiple market environments. Were we to have selected a different starting point for this analysis, the differentials in the lump-sum investing and dollar-cost averaging outcomes would be different. Specifically, weak returns for the multi-asset portfolio over the first 12 months would have translated to more favorable outcomes for the dollar-cost averaging cases.

Historical Evidence, January 1926 to June 2023

Our study of 1,087 rolling seven-year periods showed that lump-sum investing generated higher annualized returns than dollar-cost averaging in more than 56% of the cases, assuming a three-month or longer dollar-cost averaging period. Exhibit 6 summarizes the probabilities of success for lump-sum investing and the annualized return differentials compared with dollar-cost averaging approaches over multiple months.

These results make sense in light of the historically positive return spread between the risk-based, multi-asset portfolios and ultrashort fixed income—and particularly between equities and ultrashort fixed income. This positive return spread resulted in less favorable results for 1) longer-duration dollar-cost averaging schemes; and 2) those risk-based, multi-asset portfolios with greater weights in equities. As Exhibit 6 indicates, the historical testing suggested a 0.04% average annualized return advantage for lump-sum investing for Model 1 over a three-month dollar-cost averaging period versus a 0.42% average annualized return advantage for

lump-sum investing for Model 5 over a 12-month dollar-cost averaging period.

Hypothetical Tests, Based on the GIC's 2023 Capital Markets Assumptions

We then computed 10,000 years of simulated forward-looking asset class returns, providing 119,917 rolling seven-year periods, based on the GIC's capital markets assumptions for the eight underlying asset classes. The hypothetical dataset roughly matches the expected returns, volatilities and cross-correlations of the underlying asset classes and permits robust scenario evaluation.

This forward-looking testing produced results similar to the historical tests. But while the return differentials were similar in direction, they were smaller in magnitude (see Exhibit 8). While lump-sum investing still demonstrated greater than 50% favorable percentages and positive annualized-return differentials, its absolute advantage decreased versus the historical sample.

Exhibit 6: Lump-Sum Investing Historically Outperformed Dollar-Cost Averaging with a Greater Than 55% Probability for Dollar-Cost Averaging Periods of Three Months or Longer

Incidences: Lump-Sum Investing Outperformed Dollar-Cost Averaging						Return Differentials: Lump-Sum Investing vs. Dollar-Cost Averaging					
Model No. → No. of Months ↓	1	2	3	4	5	Model No. → No. of Months ↓	1	2	3	4	5
2	54.6%	54.8%	54.6%	53.9%	53.6%	2	0.02%	0.03%	0.03%	0.03%	0.04%
3	56.0%	56.0%	56.0%	56.2%	56.6%	3	0.04%	0.05%	0.06%	0.07%	0.08%
4	58.5%	58.5%	58.4%	57.6%	57.5%	4	0.06%	0.08%	0.09%	0.10%	0.11%
5	59.6%	59.0%	58.9%	59.2%	59.5%	5	0.08%	0.10%	0.12%	0.14%	0.15%
6	59.6%	60.3%	60.1%	60.3%	59.8%	6	0.10%	0.13%	0.15%	0.17%	0.19%
7	61.8%	61.0%	60.8%	60.5%	60.2%	7	0.12%	0.15%	0.18%	0.20%	0.23%
8	61.9%	61.8%	61.1%	61.4%	61.4%	8	0.14%	0.18%	0.22%	0.24%	0.27%
9	62.9%	62.7%	62.2%	62.3%	62.4%	9	0.16%	0.20%	0.25%	0.27%	0.30%
10	64.3%	63.4%	64.0%	63.2%	62.8%	10	0.18%	0.23%	0.28%	0.30%	0.34%
11	64.6%	64.0%	64.0%	63.6%	63.2%	11	0.20%	0.25%	0.31%	0.33%	0.38%
12	65.3%	64.9%	64.1%	63.6%	63.4%	12	0.21%	0.28%	0.33%	0.37%	0.42%

Source: Calculated by Morgan Stanley Wealth Management Global Investment Office from data provided by AQR Capital Management, Bloomberg, FactSet, Global Financial Data and Morningstar. © 2023 Morningstar, Inc. All rights reserved. Used with permission. This information contained herein: (1) is proprietary to Morningstar and/or its content providers; (2) may not be copied or distributed; and (3) is not warranted to be accurate, complete or timely. Neither Morningstar nor its content providers are responsible for any damages or losses arising from any use of this information.

These less-favorable results stem from the relatively lower forecast return spread for the risk-based, multi-asset portfolios versus ultrashort fixed income. For example, the GIC projects a 0.5% geometric return advantage for US large-cap equities versus ultrashort fixed income over the seven-year horizon (4.3% – 3.7%), compared with a 6.8% annualized return advantage in the historical data (10.1% – 3.3%). This outcome highlights how the expected return spread may influence the attractiveness of lump-sum investing relative to dollar-cost averaging:

A greater positive spread would likely augur well for lump-sum investing, while a negative spread would potentially benefit dollar-cost averaging approaches. Exhibit 7 shows the annualized geometric returns for each of the underlying asset classes, both over the 1926–2023 historical period and per the GIC's seven- and 20-year capital markets assumptions.

Exhibit 7: Annualized Returns for Major Asset Classes: 1926–2023 and Forward-Looking

Asset Class	Sector	Subsector	Geometric Returns (Ann.)		
			Historical: 1926–2023	Expected: Strategic (7Y)	Expected: Secular (20Y)
Equities	US	Large-Cap	10.1%	4.3%	8.3%
		Small-Cap	11.0%	6.1%	7.8%
	International		11.2%	5.2%	7.2%
Fixed Income	US	Ultrashort	3.3%	3.7%	3.1%
		Invnt. Grade	5.0%	4.8%	3.5%
		High Yield	6.0%	7.1%	5.4%
Alternatives	Global	Commodities	6.7%	4.0%	6.4%

Source: Morgan Stanley Wealth Management Global Investment Office, calculated with data provided by AQR Capital Management, Bloomberg, FactSet, Global Financial Data and Morningstar. © 2023 Morningstar, Inc. All rights reserved. Used with permission. This information contained herein: (1) is proprietary to Morningstar and/or its content providers; (2) may not be copied or distributed; and (3) is not warranted to be accurate, complete or timely. Neither Morningstar nor its content providers are responsible for any damages or losses arising from any use of this information.

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Exhibit 8: Based on Forward-Looking Simulations, Lump-Sum Investing Outpaces Dollar-Cost Averaging but Appears Less Favorable Than Historical Precedent

Incidences: Lump-Sum Investing Outperformed Dollar-Cost Averaging						Return Differentials: Lump-Sum Investing vs. Dollar-Cost Averaging					
Model No. → No. of Months ↓	1	2	3	4	5	Model No. → No. of Months ↓	1	2	3	4	5
2	53.0%	52.5%	52.2%	52.0%	51.7%	2	0.01%	0.01%	0.01%	0.01%	0.01%
3	53.9%	53.2%	52.7%	52.4%	52.1%	3	0.02%	0.02%	0.02%	0.02%	0.02%
4	54.6%	53.8%	53.3%	52.9%	52.7%	4	0.03%	0.03%	0.03%	0.03%	0.03%
5	55.3%	54.3%	53.6%	53.2%	52.9%	5	0.03%	0.04%	0.04%	0.04%	0.04%
6	55.8%	54.8%	54.1%	53.6%	53.2%	6	0.04%	0.05%	0.05%	0.05%	0.05%
7	56.3%	55.2%	54.5%	54.0%	53.5%	7	0.05%	0.06%	0.06%	0.06%	0.07%
8	56.7%	55.6%	54.8%	54.2%	53.8%	8	0.06%	0.07%	0.07%	0.07%	0.08%
9	57.1%	56.0%	55.1%	54.5%	54.0%	9	0.07%	0.08%	0.08%	0.09%	0.09%
10	57.5%	56.3%	55.3%	54.7%	54.2%	10	0.08%	0.09%	0.10%	0.10%	0.10%
11	57.9%	56.6%	55.6%	54.9%	54.4%	11	0.09%	0.10%	0.11%	0.11%	0.11%
12	58.3%	56.9%	55.8%	55.2%	54.7%	12	0.09%	0.11%	0.12%	0.12%	0.12%

Source: Morgan Stanley Wealth Management Global Investment Office

Hypothetical Tests, Based on Simulated Return Differentials and Volatility Levels

To round out our testing, we looked at lump-sum investing's advantages with varying levels of annualized return spread and volatility levels for a hypothetical multi-asset portfolio, comparing lump-sum investing versus a 12-month dollar-cost averaging implementation for each case presented in Exhibit 9.

This analysis suggests that lump-sum investing's advantages follow predictable patterns, leading to preferences for a higher expected annualized return spread and lower expected

annualized volatility over the seven-year investment horizon. With a more positive return spread, the lump-sum investing cases showed a greater probability of outperforming, with more favorable differentials in returns versus the dollar-cost averaging cases. For example, a volatility of 6% with a +5% return spread translated into favorable results for lump-sum investing: a 72.3% probability of outperforming, with an average return differential of 0.32%. On the other hand, a 12% volatility and a -1% return spread resulted in unfavorable results for lump-sum investing: a 45.4% chance of outperforming, with an average return differential of -0.11%. The line demarcates the break-even points at which lump-sum investing showed more favorable results than dollar-cost averaging in this hypothetical testing.

Exhibit 9: Lump-Sum Investing's Advantage Becomes More Evident When the Multi-Asset Portfolio Shows Higher Levels of Expected Annualized Return Spread and Lower Expected Annualized Volatility

Incidences: Lump-Sum Investing Outperformed Dollar-Cost Averaging over 12 Months							Return Differentials: Lump-Sum Investing vs. Dollar-Cost Averaging over 12 Months						
Volatility (Ann.) → Return Spread (Ann.) ↓	3%	6%	9%	12%	15%	18%	Volatility (Ann.) → Return Spread (Ann.) ↓	3%	6%	9%	12%	15%	18%
-2%	35.3%	40.4%	42.2%	42.5%	43.0%	43.2%	-2%	(0.13%)	(0.14%)	(0.15%)	(0.18%)	(0.20%)	(0.24%)
-1%	42.5%	44.1%	45.0%	45.4%	45.1%	45.2%	-1%	(0.07%)	(0.08%)	(0.09%)	(0.11%)	(0.14%)	(0.18%)
0%	50.0%	48.8%	48.9%	47.8%	48.1%	45.9%	0%	(0.00%)	(0.01%)	(0.03%)	(0.05%)	(0.07%)	(0.12%)
1%	56.5%	54.5%	51.7%	50.0%	48.9%	48.0%	1%	0.06%	0.05%	0.04%	0.01%	(0.01%)	(0.06%)
2%	64.0%	58.1%	55.7%	52.4%	51.7%	49.8%	2%	0.13%	0.12%	0.11%	0.08%	0.06%	0.00%
3%	70.2%	63.9%	58.8%	55.2%	53.7%	51.5%	3%	0.20%	0.19%	0.17%	0.15%	0.12%	0.08%
4%	76.3%	67.5%	61.7%	59.0%	56.5%	54.7%	4%	0.27%	0.25%	0.24%	0.22%	0.19%	0.16%
5%	80.6%	72.3%	65.1%	61.0%	58.3%	56.2%	5%	0.33%	0.32%	0.31%	0.28%	0.25%	0.22%
6%	85.8%	76.3%	68.3%	64.2%	60.7%	58.0%	6%	0.40%	0.39%	0.37%	0.35%	0.32%	0.28%
7%	89.3%	79.0%	71.3%	67.1%	63.1%	58.3%	7%	0.48%	0.47%	0.45%	0.43%	0.39%	0.35%
8%	92.3%	82.1%	73.7%	69.4%	64.8%	62.4%	8%	0.55%	0.53%	0.52%	0.50%	0.47%	0.43%

Source: Morgan Stanley Wealth Management Global Investment Office

What could lead to greater or lesser expected returns for the multi-asset portfolio? In the wake of a significant equity correction, the multi-asset portfolio's expected return spread would likely increase, supporting the case for lump-sum investing. While statistically defensible, this guidance counteracts our behavioral tendency to become more loss-averse after having just witnessed an equity correction. On the flip side, exceptionally strong returns for equities in the recent period may have compressed the expected returns spreads, increasing the potential attractiveness of dollar-cost averaging. Again, investors typically eschew caution after tracking an equity rally, extrapolating these gains into the future and perhaps even becoming concerned about missing out.

When Could Dollar-Cost Averaging Make Sense?

Both historically and hypothetically, lump-sum investing holds an advantage over dollar-cost averaging over a seven-year time horizon, particularly as the expected annualized-return spread increases. Nonetheless, dollar-cost averaging may appeal to certain investors and become potentially more favorable as the expected return spread falls. Below, we consider potential motivators for selecting dollar-cost averaging:

- *Inaction, caused by overthinking the entry point.* As noted above, investors typically extrapolate future outcomes from recent observations. In both upward- and downward-trending markets, this behavioral tendency can lead to foggy judgment, prompting indecision or second-guessing. Furthermore, given investor hunger for positive starts, the sense of responsibility can feel overwhelming, increasing the perceived pain of potential regret. As Statman noted, the “advantage of following rules extends beyond a reduction in responsibility.” It leads to potentially greater discipline by giving definition to the “when” riddle.⁹
- *Short-term realized volatility, potentially causing an investor to take inappropriately low risk over the long term.* For many investors, moving from the extremely low volatility of ultrashort fixed income to a balanced multi-asset portfolio, such as Model 3 above, may lead to mild anxiety, especially in periods of greater volatility. As a systematic investment strategy, dollar-cost averaging imposes discipline and mitigates the total portfolio's initial risk level, softening the impact of volatility. Staging into the multi-asset portfolio's full risk level may encourage faithfulness to the appropriate long-term investment plan and its attendant risk level.

- *Extreme valuations, particularly for equities.* Due to equities' higher volatility and high correlations with one another, a balanced multi-asset portfolio, such as Model 3 here, will receive an 80% risk contribution¹⁰ from equities. In times of extreme equity valuations or following major equity rallies, the expected return spread for a multi-asset portfolio may have decreased. In a similar manner, multi-asset portfolios with significant allocations to fixed income may have smaller expected return spreads after a major decline in interest rates. As we demonstrated in Exhibit 8, this smaller expected return spread suggests diminished advantages for lump-sum investing.

Practical takeaways. As the historical and hypothetical evidence in this report illustrates, investors face favorable chances of outperforming over a seven-year horizon with lump-sum investing when deploying a one-time sizable amount of investible cash into an appropriate diversified portfolio. But as behavioral-finance research has demonstrated, individuals may consider factors other than ultimate outcomes in real-life decision making.

Morgan Stanley Wealth Management advocates that investors (and their Financial Advisors) pursue strategies that maximize the likelihood of achieving long-term goals and that limit imperiling the long-term plan for short-term considerations. We strongly believe that long-term success comes from appropriate planning and disciplined implementation of those plans. Disciplined action—either lump-sum investing or dollar-cost averaging—and patience¹¹ can promote faithfulness to that plan, thereby outranking both undisciplined action and overanalyzed inaction.

Overreacting in the short term—particularly to extreme gains or losses—can derail long-term objectives. Given the small likelihood of effective market timing, we caution against over-optimizing the entry points for either a lump-sum investing or dollar-cost averaging plan. Sticking to any selected approach will likely lead to improved outcomes and lower stress than will timing-based guesswork, sowing the seeds for continued adherence to the plan.

Endnotes

¹ Estrada, Javier. "Black Swans and Market Timing: How Not to Generate Alpha." Available at https://papers.ssrn.com/sol3/papers.cfm?abstract_id=1032962. The author explains that, while missing significant losing days in the market would have contributed to higher investor returns, the small incidence of these days makes market timing more about luck than skill.

² Tversky, Amos, and Daniel Kahneman. "Judgment under Uncertainty: Heuristics and Biases." *Science*. Vol. 185, Issue 4157 (September 27, 1974): 1124–1131.

³ Kahneman, Daniel, and Amos Tversky. "Prospect Theory: An Analysis of Decision under Risk." *Econometrica*, Vol. 47, No. 2: 263–291.

⁴ Thaler, Richard. "Mental Accounting and Consumer Choice." *Marketing Science*, Vol. 4, No. 3 (Summer 1985): 199–214.

⁵ Kahneman, Daniel, and Amos Tversky. "The Psychology of Preferences." *Scientific American*, Vol. 246, No. 1 (January 1982): 160–173.

⁶ Statman, Meir. "A Behavioral Framework for Dollar-Cost Averaging: Dollar-Cost Averaging May Not Be Rational Behavior, But It Is Perfectly Normal Behavior." *Journal of Portfolio Management*, Vol. 22, No. 1 (January 1995): 70–78.

⁷ Hayley, Simon. "Dollar Cost Averaging: The Role of Cognitive Error." Available at https://papers.ssrn.com/sol3/papers.cfm?abstract_id=1032962.

⁸ Morgan Stanley Wealth Management. "[Annual Update of GIC Capital Markets Assumptions](#)." March 29, 2023.

⁹ Statman, Meir. "A Behavioral Framework for Dollar-Cost Averaging: Dollar-Cost Averaging May Not Be Rational Behavior, But It Is Perfectly Normal Behavior." *Journal of Portfolio Management*, Vol. 22, No. 1 (January 1995): 70–78.

¹⁰ We compute the "risk contribution" as an equally weighted blend of value-at-risk and covariance share at a 95% confidence level and average these values over the entire historical sample.

¹¹ Thaler, Richard; Amos Tversky; Daniel Kahneman; and Alan Schwartz. "The Effect of Myopia and Loss Aversion on Risk Taking: An Experimental Test." *The Quarterly Journal of Economics*, Vol. 112, Issue 2 (May 1997), 647–661. Checking investment results too frequently, which the authors termed "myopia," promoted a greater degree of risk aversion.

DOLLAR-COST AVERAGING VERSUS LUMP-SUM INVESTING: BEHAVIORAL CONSIDERATIONS AND POTENTIAL OUTCOMES

Disclosure Section

For index, indicator and survey definitions referenced in this report please visit the following: <https://www.morganstanley.com/wealth-investmentsolutions/wmir-definitions>

Monte Carlo Analysis Assumptions: As indicated above, the hypothetical (forward-looking) analysis uses a Monte Carlo simulation to generate randomized, correlated returns that overall have similar characteristics to the Global Investment Committee's 2020 strategic (seven-year) capital markets assumptions. The Monte Carlo simulation involves sampling from those monthly returns for the constituent asset classes. From those monthly returns, we can compute hypothetical monthly returns for portfolios constructed with a lump-sum investing or dollar-cost averaging approach as of any month in the simulated returns data.

IMPORTANT: The projections or other information generated by this Monte Carlo simulation analysis regarding the likelihood of various investment outcomes are hypothetical in nature, do not reflect actual investment results and are not guarantees of future results. Results may vary with each use and over time.

Glossary

Correlation is a statistical measure of how two securities move in relation to each other. This measure is often converted into what is known as correlation coefficient, which ranges between -1 and +1. Perfect positive correlation (a correlation coefficient of +1) implies that as one security moves, either up or down, the other security will move in lockstep, in the same direction. Alternatively, perfect negative correlation means that if one security moves in either direction the security that is perfectly negatively correlated will move in the opposite direction. If the correlation is 0, the movements of the securities are said to have no correlation; they are completely random. A correlation greater than 0.8 is generally described as strong, whereas a correlation less than 0.5 is generally described as weak.

Volatility is a statistical measure of the dispersion of returns for a given security or market index. Volatility can either be measured by using the standard deviation or variance between returns from that same security or market index. Commonly, the higher the volatility, the riskier the security.

Risk Considerations

Investing in the market entails the risk of market volatility. The value of all types of securities may increase or decrease over varying time periods.

This analysis does not purport to recommend or implement an investment strategy. Financial forecasts, rates of return, risk, inflation, and other assumptions may be used as the basis for illustrations in this analysis. They should not be considered a guarantee of future performance or a guarantee of achieving overall financial objectives. No analysis has the ability to accurately predict the future, eliminate risk, or guarantee investment results. As investment returns, inflation, taxes, and other economic conditions vary from the assumptions used in this analysis, your actual results will vary (perhaps significantly) from those presented in this analysis.

Any type of **continuous or periodic investment plan** does not assure a profit and does not protect against loss in declining markets. Since such a plan involves continuous investment in securities regardless of fluctuating price levels of such securities, the investor should consider his financial ability to continue his purchases through periods of low price levels.

Active or frequent trading to effectuate a dynamic allocation strategy entails greater risk and is more speculative, but also entails the possibility for above-average returns, compared with a long-term investment strategy. It may also entail more costs and fees, as well as a larger and more immediate tax liability.

Hypothetical Performance

General: Hypothetical performance should not be considered a guarantee of future performance or a guarantee of achieving overall financial objectives. Asset allocation and diversification do not assure a profit or protect against loss in declining financial markets.

Hypothetical performance results have inherent limitations. The performance shown here is simulated performance based on benchmark indices, not investment results from an actual portfolio or actual trading. There can be large differences between hypothetical and actual performance results achieved by a particular asset allocation.

Despite the limitations of hypothetical performance, these hypothetical performance results may allow clients and Financial Advisors to obtain a sense of the risk / return trade-off of different asset allocation constructs.

Indices used to calculate performance: The hypothetical performance results in this report are calculated using the returns of benchmark indices for the asset classes, and not the returns of securities, fund or other investment products.

Indices are unmanaged. They do not reflect any management, custody, transaction or other expenses, and generally assume reinvestment of dividends, accrued income and capital gains. Past performance of indices does not guarantee future results. Investors cannot invest directly in an index.

Performance of indices may be more or less volatile than any investment product. The risk of loss in value of a specific investment is not the same as the risk of loss in a broad market index. Therefore, the historical returns of an index will not be the same as the historical returns of a particular investment a client selects.

The assumed return rates in this analysis are not reflective of any specific investment and do not include any fees or expenses that may be incurred by investing in specific products. The actual returns of a specific investment may be more or less than the returns used in this

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analysis. The return assumptions are based on hypothetical rates of return of securities indices, which serve as proxies for the asset classes. Moreover, different forecasts may choose different indices as a proxy for the same asset class, thus influencing the return of the asset class.

Equity securities may fluctuate in response to news on companies, industries, market conditions, and general economic environment.

International investing entails greater risk, as well as greater potential rewards compared to U.S. investing. These risks include political and economic uncertainties of foreign countries as well as the risk of currency fluctuations. These risks are magnified in countries with **emerging markets and frontier markets**, since these countries may have relatively unstable governments and less established markets and economies.

Investing in commodities entails significant risks. Commodity prices may be affected by a variety of factors at any time, including but not limited to, (i) changes in supply and demand relationships, (ii) governmental programs and policies, (iii) national and international political and economic events, war and terrorist events, (iv) changes in interest and exchange rates, (v) trading activities in commodities and related contracts, (vi) pestilence, technological change and weather, and (vii) the price volatility of a commodity. In addition, the commodities markets are subject to temporary distortions or other disruptions due to various factors, including lack of liquidity, participation of speculators, and government intervention.

Bonds are subject to interest rate risk. When interest rates rise, bond prices fall; generally, the longer a bond's maturity, the more sensitive it is to this risk. Bonds may also be subject to call risk, which is the risk that the issuer will redeem the debt at its option, fully or partially, before the scheduled maturity date. The market value of debt instruments may fluctuate, and proceeds from sales prior to maturity may be more or less than the amount originally invested or the maturity value due to changes in market conditions or changes in the credit quality of the issuer. Bonds are subject to the credit risk of the issuer. This is the risk that the issuer might be unable to make interest and/or principal payments on a timely basis. Bonds are also subject to reinvestment risk, which is the risk that principal and/or interest payments from a given investment may be reinvested at a lower interest rate.

Bonds rated below investment grade may have speculative characteristics and present significant risks beyond those of other securities, including greater credit risk and price volatility in the secondary market. Investors should be careful to consider these risks alongside their individual circumstances, objectives and risk tolerance before investing in high yield bonds. High yield bonds should comprise only a limited portion of a balanced portfolio.

Ultrashort-term fixed income asset class is comprised of fixed income securities with high quality, very short maturities. They are therefore subject to the risks associated with debt securities such as credit and interest rate risk.

Yields are subject to change with economic conditions. Yield is only one factor that should be considered when making an investment decision.

Because of their narrow focus, **sector investments** tend to be more volatile than investments that diversify across many sectors and companies.

Asset allocation and diversification do not assure a profit or protect against loss in declining financial markets.

Rebalancing does not protect against a loss in declining financial markets. There may be a potential tax implication with a rebalancing strategy. Investors should consult with their tax advisor before implementing such a strategy.

The **indices** are unmanaged. An investor cannot invest directly in an index. They are shown for illustrative purposes only and do not represent the performance of any specific investment.

The **indices selected by Morgan Stanley Wealth Management** to measure performance are representative of broad asset classes. Morgan Stanley Smith Barney LLC retains the right to change representative indices at any time.

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