WEALTH MANAGEMENT

Morgan Stanley

Client Conversations & Primers

The Case for Cryptocurrency

The Case for Cryptocurrency as an Investable Asset Class in a Diversified Portfolio

As of March 17, 2021

- Periodically, technology/product innovation—in tandem with policy and regulatory evolution–converges with the demands of the macroeconomic backdrop to pave a path for the emergence of a new investable asset class. This was the case with gold nearly 45 years ago, and is currently the case with cryptocurrency, which has crossed the critical thresholds of market liquidity, regulatory scrutiny and institutional acceptance at a time when managing cash and achieving portfolio diversification has become ever more challenging and meaningful.
- On the one hand, our recognition of cryptocurrency as a likely permanent investment category is an acknowledgement of its potential to power decentralized, tamper-resistant, anonymous transactions on blockchains leveraged for myriad applications. That is undeniably exciting. On the other hand, cryptocurrency represents a radical new invention lacking a known sponsor, a centralized standards-setting body or an actual physical incarnation that continues to search for the "killer app" or best applications and could ultimately prove challenging to sovereign governments, climate advocates and market regulators.
- In acknowledging cryptocurrency as a viable asset class, we nonetheless are suggesting that qualified* investors approach it as speculative. As with any asset class still in its speculative phase, there are a multitude of risks—some predictable, some identified and some yet to be uncovered. Such risk characteristics limit prudent advice to having exposures in small positions in a highly diversified form, akin to how one might approach venture capital investing. Our initial modeling, replicated in spirit by a recently published CFA Institute study, suggests diversification benefits from the low correlation of cryptocurrency to other assets and that Sharpe ratio improvements can be achieved with positions no greater than 2.5%. It is important to keep in mind that we are only in the top of the first inning.
- Our approach to cryptocurrency as an asset class should not be misconstrued for endorsement of any particular coin ownership. To the contrary, we see direct coin ownership, whether through private closed brokerages or cash app services, as still being in its infancy, with many questions yet to be answered about the achievability of low-cost best execution, central clearing, accurate and timely market data, and transparent and integrated custodial services.

*Please check specific investment documents, if applicable, for eligibility requirements.

Source: Morgan Stanley Wealth Management Global Investment Office

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Understanding the Controversy & Acknowledging the Opportunity

Understanding the Controversy

- **Decentralized and Intangible**: Cryptocurrency ("crypto") has proven particularly vexing as it lacks a known sponsor, a centralized standards setting-body or even a physical embodiment.

- **Best Use Case**? Is it simply a technology component that embodies the value creation of computer coding that enables anonymous, decentralized and tamper-resistant transactions to be recorded on a blockchain ledger? Is it a transaction medium or cash currency with reliable exchangeability for goods and services? Is it a commodity, essentially delivering a long-run store of real (net after inflation) value, like digital bullion? Is it a new means of payments processing? Or is it simply an investable asset?

- **How Should it be Regulated?** Should regulators and central banks handle it? How should it be governed and how should we think about investor protection? How should it be treated for compliance with the potential for anonymous currencies to be used for illegal and illicit activities?**

- **Unique Risk of Crypto Ownership**: Coin ownership is anonymous, connoted by a complex, long and computer-generated password. If the "private key" (password) is lost or stolen, the coin can be stolen, with no recourse to recovery. Custodians must ensure that no one person has the entire password and that passwords are protected from hackers. In a world highly sensitized to cybersecurity risks, the claim that something is "unhackable" has proven a tall order, begging credulity. While insurance is available, it is not yet standardized and can be quite expensive.

Acknowledging the Opportunity

- **Enable New Incentive Structures:** cryptocurrencies are the "award metric" or economic incentive for work done to process and validate transactions on a distributed ledger network (or blockchain). Because every transaction is independently and publicly validated by each network node, error and fraud are reduced and processing costs are low because the need for disintermediation is eliminated.

- **Powered by Scarcity**: Furthermore, cryptocurrencies can accrue value because of their scarcity, as the concept of a fixed/limited supply of coins ensures that processing continues, even as the blockchain network grows in complexity.

- **Leveraged for Myriad Applications**: Finally, because cryptocurrency is coded, it enables property rights information and value to be embedded on the same token, features that facilitate optimized peer-to-peer transactions.

Despite such challenges, crypto's unique attributes are unassailable and its value proposition must be acknowledged. Given these provocative and innovative properties and myriad of potential applications, investor interest is understandable.

**Fueled in part by its anonymity and disparate regulatory regimes, the financial crime-associated risks of cryptocurrencies are significant. Digital assets may have an illicit history or come from the proceeds of illegal activity. There is increasing evidence of countries using cryptocurrency to evade or violate economic sanctions laws. These abuses, and related enforcement actions, could impact the stability or legitimacy of digital assets.

Source: Bloomberg, Morgan Stanley Wealth Management Global Investment Office

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On a Path Toward Financial Market Maturation

The head-spinning price appreciation, together with greatly increased trading volume, forced a material acceleration in crypto's path toward financial market maturation. Currently, all cryptocurrencies carry a market capitalization nearly the size of the entire high yield bond market and half the size of the small-cap universe.

Cryptocurrencies Still Small but Rapidly Relevant

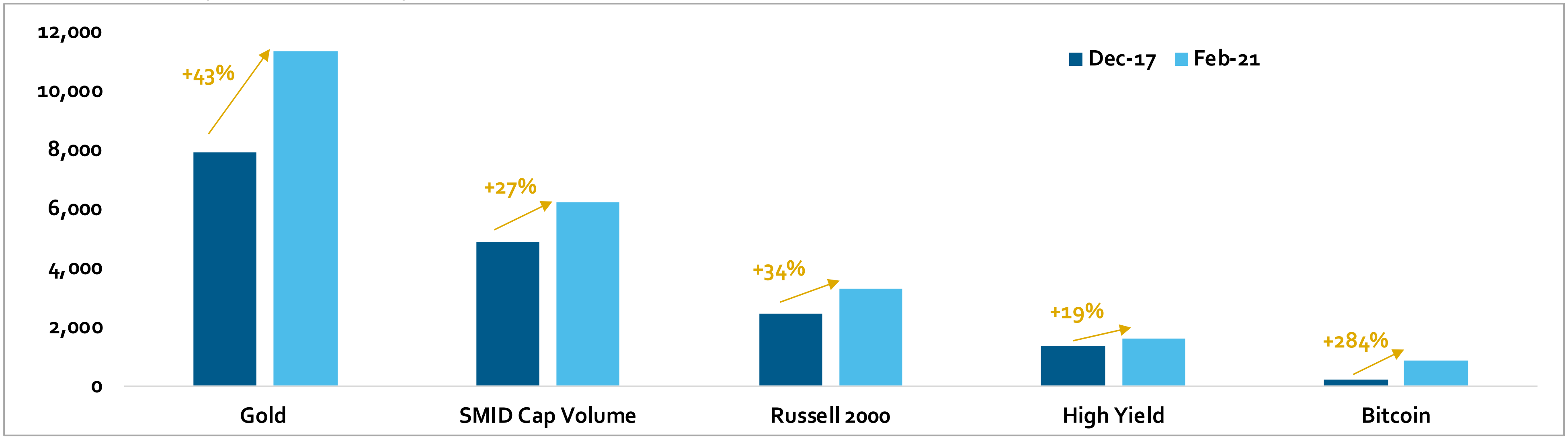
Data as of February 28, 2021, Bitcoin price $46,340

	Market Capitalization (USD, bn)		Daily Average Volume (USD, bn)	
Asset	Dec-17	Feb-21	Dec-17	Feb-21
Gold (OTC+Exchanges+Gold ETFs)	7,916	11,325	129	169
Gold (Exchanges)			43	54
SMID Cap Volume	4,896	6,205	44	96
Russell 2000	2,454	3,293	24	53
High Yield	1,339	1,595	N/A	N/A
Bitcoin	225	864	14	81
BTC % of Gold	*3%*	*8%*		

Note: Bitcoin daily average volume includes trades versus fiat, stable coins and other cryptocurrencies. CryptoCompare volume data, which excludes cryptocurrency transactions, shows volume of $6 billion and $13 billion in December 2017 and February 2021.

Asset Class Market Capitalization

Data as of February 28, 2021, Bitcoin price $46,340



Source: Bloomberg, World Gold Council, Morgan Stanley Wealth Management Global Investment Office

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Increasing Regulatory Clarity Since 2013

- While the Financial Crimes Enforcement Network (FinCEN) was the first regulator on the crypto scene in 2013, quickly followed by the IRS, it wasn't until late 2017, when Bitcoin peaked at nearly $20,000, that there was a transformational structural change in regulatory frameworks.
- Since then, we have seen further regulatory action. In the last six months alone, the number of venues offering coin brokerage, custody and payment services executable with cryptocurrencies has multiplied.

Evolution of Regulatory Treatment of Cryptocurrency

Date	Event
March 2013	Financial Crimes Enforcement Network (FinCEN) issued guidance on "Persons Administering, Exchanging, or Using Virtual Currencies" defining exchangers or administrators of cryptocurrency as money-services businesses under the Bank Secrecy Act.
April 2014	Internal Revenue Service defined Bitcoin as property, not foreign currency, for tax purposes. It explained how mining profits and Bitcoin-based wages should be treated.
August 2015	State of New York required a BitLicense to deal with cryptocurrency in the state.
December 2017	Commodity Futures Trading Commission approved futures trading at the CME and CBOE.
April 2018	In Congressional testimony, the chair of the Securities and Exchange Commission (SEC) said that Bitcoin is not a security.
April 2019	SEC outlined a framework for when cryptocurrencies should be considered and regulated like securities.
May 2019	FinCEN provided clarification on how anti-money laundering rules should be implemented with respect to cryptocurrencies.
June 2019	CFTC approved Ledger X to sell derivatives that pay out in Bitcoin.
November 2019	New York Dept. of Financial Services issued a digital trust charter to Fidelity.
July 2020	Office of the Comptroller of the Currency (OCC) issued an interpretive letter authorizing the custody of digital assets by national banks.
January 2021	OCC Issued an interpretive letter authorizing use of stable coins for payment activities.

Source: Morgan Stanley Wealth Management Global Investment Office

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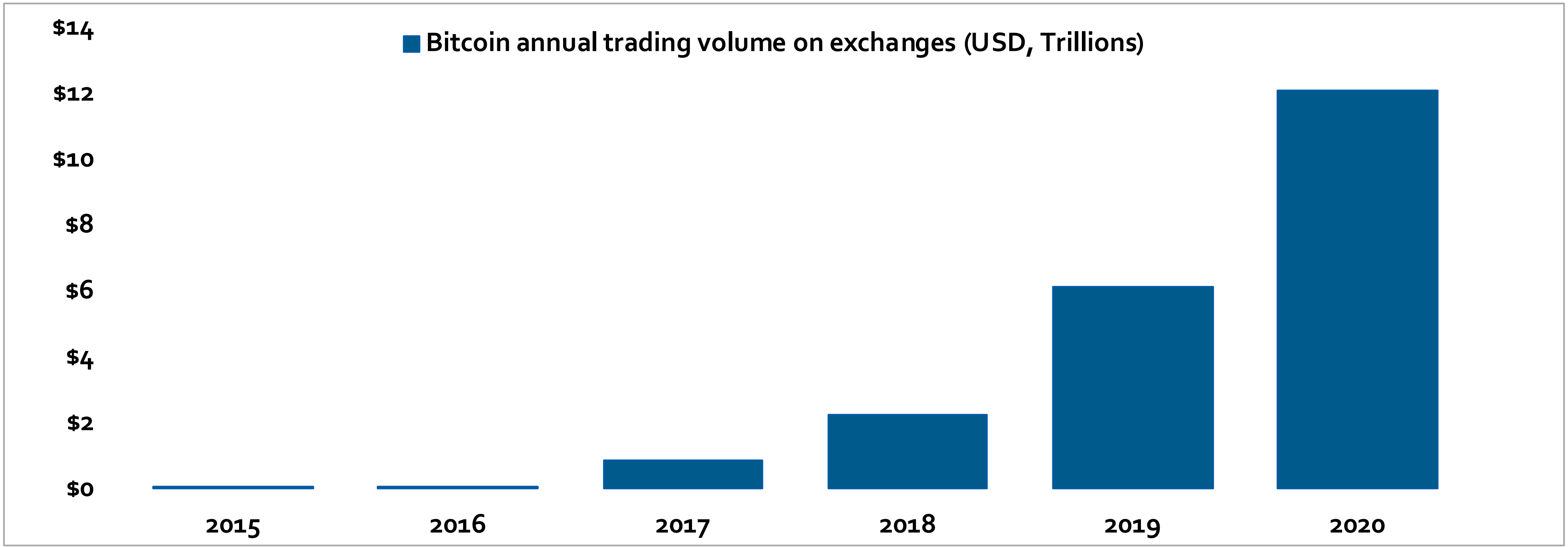
Increased Volume with Expanded Access and Availability of Products

- **Availability:** The emergence of regulatory guidelines, in turn, is driving the **swift availability of crypto products**, which avoids the complexities of direct coin ownership. While there was a single publicly traded trust product for investors in 2017, today there are at least a dozen similar products that passively track crypto coin price indexes through privately placed and closed-end funds.
- **Access:** Alongside the availability of packaged products for investors, the **expansion of trading venues from the large regulated exchanges to leading fintech firms** that have integrated commission-free crypto purchasing into their desktop and mobile trading and payment apps, has supported a deepening of daily market liquidity.

Bitcoin Trading Surge Contributes to Liquidity

Data as of February 22, 2021



Source: Macrobond; Morgan Stanley & Co. Research

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2020: Policymakers and the Pandemic Create Inflection Point

It was not until the 2020 COVID-19 pandemic that cryptocurrency's viability as a financial investment option for qualified investors was cemented.

- **Availability of Products:** The broader adoption of digital wallets/payment systems by dint of the need for contactless business models during the COVID crisis.
- **Expanding Regulatory Framework:** The emergence of regulatory guidelines is driving the swift availability of crypto products.
- **Need for Portfolio Diversifiers**: A dwindling list of diversifying and uncorrelated assets: Long-term investors, pension funds with long-dated liabilities and corporate treasurers naturally have begun to seek out new "stores of value," and cryptocurrency has emerged as an option.
- **Deep Pool of Liquidity:** A surge in policymaker-driven global liquidity that rendered most traditional asset classes fully valued in a historical context.

These four forces push cryptocurrency across a threshold that helps it achieve and maintain the status of a unique asset class, meaning that it constitutes a grouping of investments that exhibit similar characteristics, legal definitions and regulations, and are potential viable sources of capital returns and possess unique and low-to-negative correlations with the major traditional investment asset classes (cash, bonds, stocks).

Consequently, the Global Investment Committee believes the time has come for qualified investors to consider it a viable portfolio asset class.

Four Catalytic Forces Drive Institutionalization of Cryptocurrency

Source: Bloomberg, Morgan Stanley Wealth Management Global Investment Office

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Announced Institutional Endorsements Have Multiplied

In 2020 alone, we saw publicized interest in crypto explode from multiple corners.

Date	Institutions Adding to Crypto
September 2019	BAKKT launched physically delivered futures
August 2020	Fidelity Custody launched inaugural Bitcoin fund for wealthy investors
August 2020	MicroStrategy, a software company, announced that it had purchased $250 million Bitcoin for its corporate treasury
October 2020	Square invested $50 million in Bitcoin
October 2020	PayPal announced a cryptocurrency service. The company said it would allow domestic and international customers to buy Bitcoin through its existing apps and website
December 2020	MassMutual, a 169-year-old insurance company, announced its purchase of $100 million in Bitcoin
December 2020	MicroStrategy announced it would issue convertible bonds so it could buy Bitcoin. The deal was oversubscribed and upsized due to strong demand from fixed income investors looking for a call option on Bitcoin
December 2020	BAKKT launched Bitcoin options on futures
January 2021	BlackRock filed registration for two funds to invest in Bitcoin
January 2021	Visa backed credit card with Bitcoin rewards
February 2021	Guggenheim Partners allocated $500 million to invest in the Grayscale Bitcoin Trust
February 2021	Tesla invested $1.5 billion in Bitcoin
February 2021	Miller Opportunity Trust allowed its Opportunity Fund to buy into the Grayscale Bitcoin Trust
February 2021	Mastercard said it will allow merchants to accept Bitcoin over its network
February 2021	Bank of New York said it will allow cryptocurrency custody in new product
February 2021	BlackRock said it started to "dabble" in Bitcoin
February 2021	Square purchased another $170 million in Bitcoin

Source: Morgan Stanley Wealth Management Global Investment Office

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A Speculative Asset Class Emerges

Finding new asset classes is few and far between, but not without precedent. In the mid-1980s baby boomers added gold to their mix amid the 1982-2000 bull market, and in the early 2010s, master limited partnerships (MLPs) emerged as an investor favorite with unique tax treatment of dividend pass-throughs.

Gold Is the Most Appropriate Analogy:

- The 'institutionalization" of gold was spurred by the same anti-inflation, rampant central bank money growth narrative we are currently hearing about Bitcoin.

A Volatile Start:

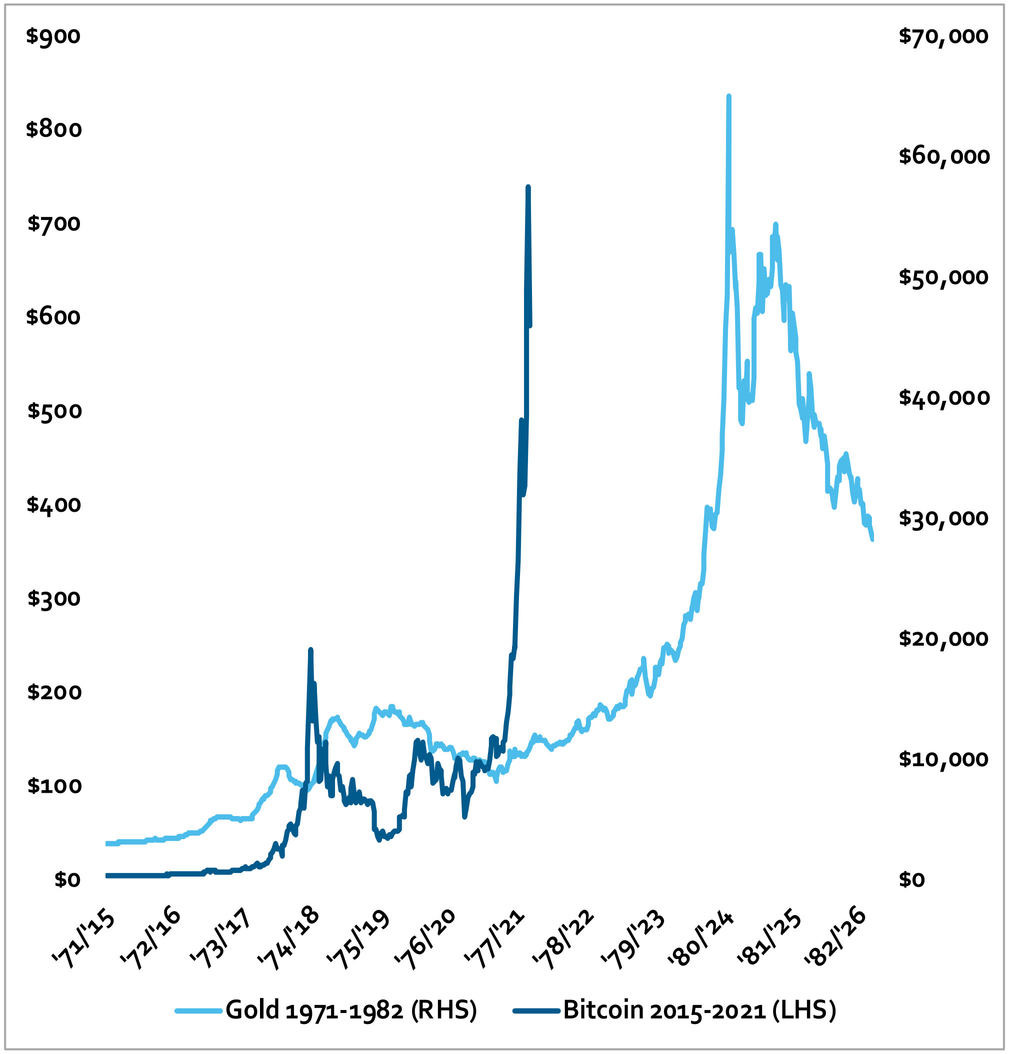
- Gold as an investment was illegal in the US until 1974, though dollars could be redeemed for gold in Europe until 1971. COMEX gold futures first began trading in 1974. The gold price had been fixed at $35 per ounce since 1933 and started 1971 at $37.44, but as Bretton Woods came unraveled it rose nearly 500% to $184 by the end of 1974, and then lost nearly half its value in a two-year bear market. Gold rose 541% to its new monthly high close of $850 in January 1980, a record that would stand for more than 25 years.

Finding its Footing as a New Asset Class:

- From the mid-1970s to the early 1980s, gold became widely available through brokerages and retail-oriented products.
- Gold had completed its 18-year transition from new asset to a recognized part of an institutional portfolio. Over that time, the dynamics around the volatility and correlations have matured, with gold consistently and predictably moving inversely with the trade-weighted US dollar and US real interest rates.

Crypto Asset-Class Maturation Twice as Fast as Gold's

Data as of February 26, 2021



Source: Bloomberg; Morgan Stanley Wealth Management Global Investment Office

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Understanding the Investment Case Within a Portfolio

Crypto indexes and the two largest coins by market capitalization, Bitcoin and Ethereum, have had modest three-year trailing correlations with major portfolio asset classes.

Crypto Indexes Have Exhibited Low Correlations with Traditional Asset Classes

Data as of February 26, 2021

Daily Correlations for Three Years Ending February 26th, 2021						
	Cryptocurrency Indexes				Cryptocurrencies	
	BGCI	HODL5	BITX	CCMIX	Bitcoin	Ethereum
US Dollar	-0.06	-0.11	-0.09	-0.06	-0.07	-0.05
S&P 500	0.18	0.10	0.03	0.17	0.16	0.18
Barclays Aggregate	-0.03	0.03	0.00	-0.01	-0.02	-0.13
Broad Commodity	0.18	0.17	0.03	0.18	0.18	0.17
Gold	0.13	0.14	0.07	0.14	0.16	0.13
Precious Metals	0.16	0.15	0.06	0.17	0.19	0.16

Source: Bloomberg; Morgan Stanley Wealth Management. Note: Bloomberg Galaxy Crypto Index (BGCI) is a capped market capitalization-weighted index designed to measure the performance of the largest digital assets traded in US dollars. 21 Shares Crypto Basket Index (HODL5) tracks the financial performance of the top and most-liquid cryptoassets as well as provides a professional benchmark for the broader crypto asset class. Bitwise 10 Large Cap Crypto Index (BITX) tracks the total return of the 10 largest cryptoassets as measured and weighted by free-float market capitalization. Crescent Crypto Market Index (CCMIX) is a rules-based cryptocurrency market index that is designed to measure the performance of the largest and most-liquid cryptocurrencies.

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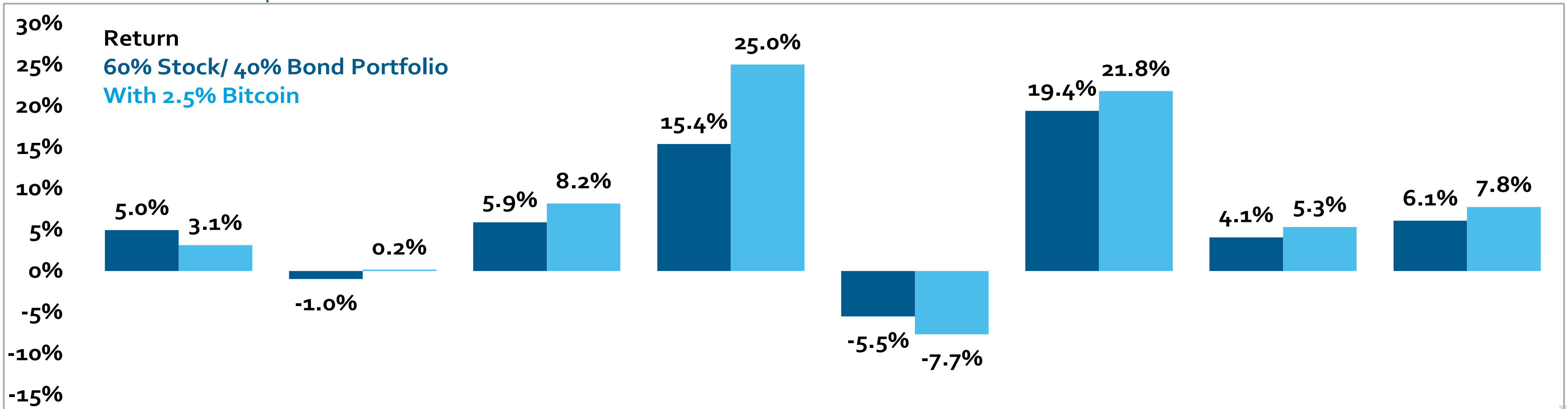
Preliminary Portfolio Modeling Is Constructive: Crypto Has Been Additive in a Traditional Portfolio

Assuming a 2.5% allocation to Bitcoin was added to a traditional 60%/40% equity/bond portfolio, with monthly rebalancing, the simulated portfolio improved returns on both an absolute and risk-adjusted basis in five of the past seven years; **it improved annualized returns by 165 basis points without significantly increasing volatility of maximum drawdowns.** It also positively affected the portfolio even in periods where the price of Bitcoin declined due to the high volatility and regular rebalancing.

Historical Data from 2014 to 2020



	2014		2015		2016		2017		2018		2019		Jan. 1, 2020-Sep. 30, 2020		Jan. 1 2014 - Sep. 30 2020	
Volatility (%)	5.0	5.1	7.5	7.5	7.5	7.3	3.4	4.4	7.3	7.5	5.5	5.5	17.9	18.3	8.4	8.5
Sharpe Ratio	1.0	0.6	-0.1	0.0	0.8	1.1	4.3	5.6	-1.0	-1.3	3.1	3.6	0.2	0.3	0.6	0.8
Max Drawdown	-5.2	-5.7	-9.2	-8.8	-6.1	-6.2	-1.0	-1.4	-11.6	-12.9	-2.9	-3.1	-21.4	-21.8	-21.4	-21.8

Source: Bloomberg, Morgan Stanley Wealth Management Global Investment Office. Note: For illustrative purposes only. Equities are represented by the MSCI All Country World Index (USD-Unhedged), net of dividend withholdings. (For US-based investors, certain dividends are not paid or available due to the tax withholdings in foreign jurisdictions. As such, net of dividends is a more appropriate comparison in this instance.) Bonds are represented by the Bloomberg Barclays US Aggregate Index. The Bitcoin price is sourced from Bloomberg's XBTUSD Currency series, with a daily frequency. We utilized the 2014-2020 time frame, providing a comparative analysis to the CFA Institute Research Foundation's cryptoassets analysis over the same time period. Please see our report, *The Case for Cryptocurrency as an Investable Asset Class in a Diversified Portfolio*, March 17, 2021, for more details. Drawdown is the peak-to-trough decline during a specific period. Sharpe Ratio is a statistic that measures a portfolio's rate of return based on the risk it assumed and is often referred to as its risk-adjusted performance. Using standard deviation and returns in excess of the returns of T-bills, it determines reward per unit of risk. This measurement can help determine if the portfolio is reaching its goal of increasing returns while managing risk. 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.

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Asset Class Access Does Not Equal Coin Valuation Recommendation

Asset Class Valuation Methodologies

	Price	Inherent Value
Cash Generating Assets	●	●
Commodities	●	◔
Crypto	Fits Here?	
Currencies	●	○

Current Methodologies for Valuing Hybrid Assets

Approach	Example: Bitcoin Hypothetical Assumption	Theoretical Potential Price/Coin
"Digital Gold" Store of Value	Bitcoin takes 10% share of current gold + neg. yielding debt (~25tn)	~$119K
Alt Reserve Currency	Bitcoin takes 5% of Global Currency M2 $102tn	~$243K
Production Cost	1 Bitcoin @ $0.02/kWh at 80 TWh processing	~$16K
Transaction Processing Comp	Bitcoin = PayPal market cap	~$13K

Source: CFA Institute Whitepaper, *Cryptoassets: The Guide to Bitcoin, Blockchain, and Cryptocurrency for Investment Professionals*, January 2021, Morgan Stanley Wealth Management Global Investment Office. Assumes 18.5 million bitcoins outstanding of potential 21 million. Valuation of cryptocurrency is in its infancy and these approaches provide a wide variety of outcomes. This should not be considered a price target but rather an approach to thinking about valuation.

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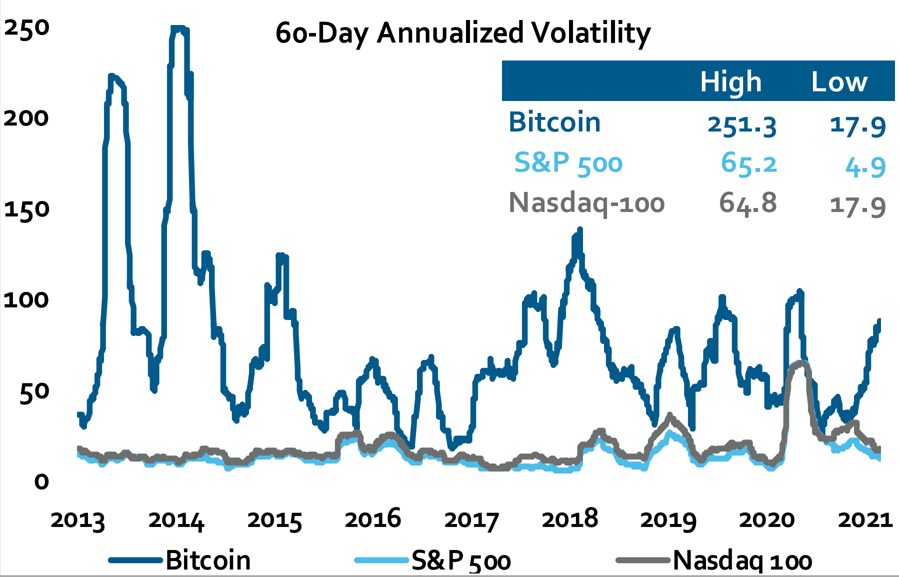
Risks Are Both Familiar and Unique

In addition to unique risks such as **software** breaks, **encryption** failures, potential coding errors, vulnerability to **ESG** investment mandates, and potential shifting attitudes of **governments** toward the asset class, cryptocurrencies also face familiar risks such as volatility and liquidity risk.

Data as of February 24, 2021

Crypto Volatility Is at Least Three Times That of Stocks

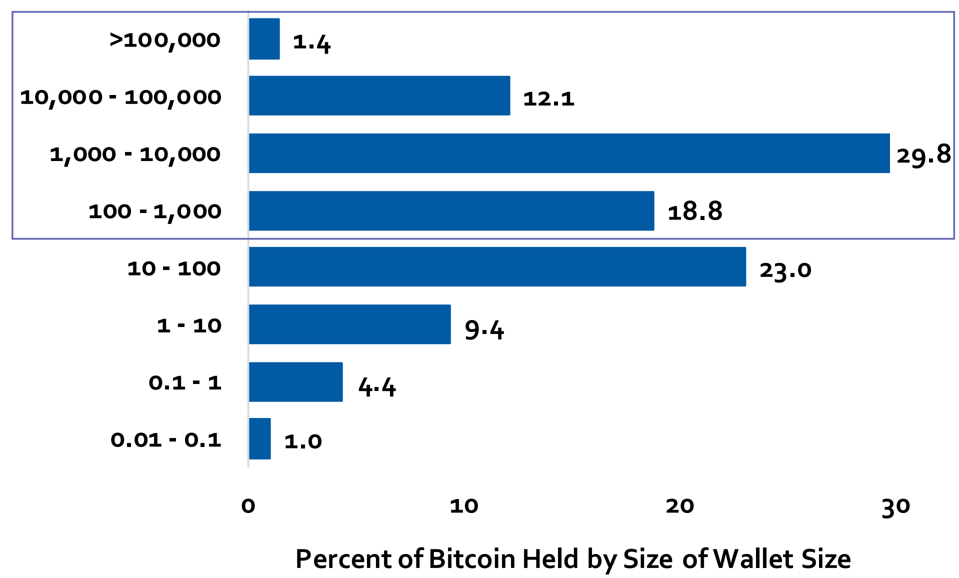
Bitcoin has experienced four crashes of more than 80% since 2011 and 16 crashes greater than 30%. Even during 2020, a time period when Bitcoin appreciated tenfold from the March trough through its most recent high in February 2021, average monthly volatility was more than two to three times that of the S&P 500 and Nasdaq Composite.



Data as of February 11, 2021

How Bitcoin Ownership Is Concentrated by Wallet Size

Although daily trading volume is deepening, actual liquidity growth may stall out as bitcoin addresses—or "wallets"—that hold more than $1 million worth of the cryptocurrency have been rising. If buy-and-hold strategies continue to dominate at the same time that bitcoin supply creation from new mining is decelerating, availability or trading liquidity could suffer.



Source: Bloomberg, BTC.com, Morgan Stanley & Co. Research, Morgan Stanley Wealth Management Global Investment Office

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Bitcoin Energy Footprints

Bitcoin Annualized Total Footprints

CARBON FOOTPRINT	ELECTRICAL ENERGY	ELECTRONIC WASTE
37.07 Mt CO_2 Comparable to the carbon footprint of **New Zealand**.	**78.04 TWh** Comparable to the power consumption of **Chile**.	**10.74 kt** Comparable to the e-waste generation of **Luxembourg**.

Single Transaction Footprints

CARBON FOOTPRINT	ELECTRICAL ENERGY	ELECTRONIC WASTE
331.68 kgCO_2 Equivalent to the carbon footprint of **735,121** VISA transactions or **55,280** hours of watching YouTube.	**698.28 kWh** Equivalent to the power consumption of an average U.S. household over **23.93** days.	**96.11 grams** Equivalent to the weight of **1.48** 'C'-size batteries or **2.09** golf balls

Source: Digiconomist, Bitcoin Energy Consumption Index, Morgan Stanley Wealth Management Global Investment Office

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The Bottom Line: Time to Get Educated

As of March 17, 2021

Proceed with Caution...

The embrace of cryptocurrency as an asset class should not be misconstrued as a recommendation for any one coin. Like other new emergent technologies before it, first movers may not turn out to be the best or most long-lasting movers. Certainly, Bitcoin is currently dominant in cryptocurrencies, capturing roughly two-thirds of current asset class market capitalization, but the ways in which crypto can be used continue to evolve at record speed. From our vantage point, coin trading remains in its infancy. Issues around finding true price discovery and best execution are still to be addressed. We have yet to be convinced there and, therefore, advise clients to proceed with caution.

And Get Educated

Our recommendation is that investors get educated and consider how and whether to get exposure to this bourgeoning asset class in their portfolio. We suggest investors become familiar with the unique crypto terminology, with use cases, investment arguments, valuation regimes, investment product alternatives and risk. For those qualified* investors ready to gain exposure, we suggest starting with publicly traded products—preferably ones that are multiasset and potentially accessing the growth opportunities through a venture capital/private equity investment in the blockchain ecosystem.

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Source: Morgan Stanley Wealth Management Global Investment Office

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Important Information

Buying, selling, and transacting in Bitcoin or other digital assets, and related funds and products, is highly speculative and <u>may result in a loss of the entire investment</u>. Risks and considerations include but are not limited to:

- Bitcoin and other digital assets have only been in existence for a short period of time and historical trading prices for Bitcoin and other digital assets have been highly volatile. The price of Bitcoin and other digital assets could decline rapidly, and ***<u>investors could lose their entire investment</u>***.
- Certain digital asset funds and products, including Bitcoin funds and products, allow investors to invest on a more frequent basis than investors may withdraw from the fund or product, and interests in such funds or products are generally not freely transferrable. This means that, particularly given the volatility of digital assets, including Bitcoin, an investor will have to bear any losses with respect to its investment for an extended period of time and will not be able to react to changes in the price of the digital asset once invested (for example, by seeking to withdraw) as quickly as when making the decision to invest. Such digital asset funds and products, including Bitcoin funds and products, are intended only for persons who are able to bear the economic risk of investment and who do not need liquidity with respect to their investments.
- Given the volatility in the price of Bitcoin and other digital assets, the net asset value of a fund or product that invests in such assets at the time an investor's subscription for interests in the fund or product is accepted may be significantly below or above the net asset value of the product or fund at the time the investor submitted subscription materials.
- Certain digital assets, apart from Bitcoin, are not intended to function as currencies but are intended to have other use cases. These other digital assets may be subject to some or all of the risks and considerations set forth herein, as well as additional risks applicable to such other digital assets. Buyers, sellers and users of such other digital assets should thoroughly familiarize themselves with such risks and considerations before transacting in such other digital assets.
- The price of Bitcoin and other digital assets may be negatively impacted by future legal and regulatory developments, including but not limited to increased regulation of Bitcoin or such other digital assets. Any such developments may make Bitcoin or such other digital assets less valuable, impose additional burdens and expenses on a fund or product investing in such assets or impact the ability of such a fund or product to continue to operate, which may materially decrease the value of an investment therein.
- Due to the new and evolving nature of digital currencies and the absence of comprehensive guidance, many significant aspects of the tax treatment of digital assets including Bitcoin are uncertain. Prospective investors should consult their own tax advisors concerning the tax consequences to them of the purchase, ownership and disposition of Bitcoin and other digital assets, directly or indirectly through a fund or product, under U.S. federal income tax law, as well as the tax law of any relevant state, local or other jurisdiction.
- Over the past several years, certain Bitcoin exchanges have experienced failures or interruptions in service due to fraud, security breaches, operational problems or business failure. Such events in the future could impact any fund's or product's ability to transact in Bitcoin if the fund or product relies on an impacted exchange and may also materially decrease the price of Bitcoin, thereby impacting the value of your investment, regardless of whether the fund or product relies on such an impacted exchange.
- Although any digital asset product, including a Bitcoin-related product, and its service providers have in place significant safeguards against loss, theft, destruction and inaccessibility, there is nonetheless a risk that some or all of a product's digital asset, including Bitcoin, could be permanently lost, stolen, destroyed or inaccessible by virtue of, among other things, the loss or theft of the "private keys" necessary to access a product's digital asset, including Bitcoin.
- Investors in funds or products investing or transacting in Bitcoin and/or other digital assets may not benefit to the same extent (or at all) from "airdrops" with respect to, or "forks" in, the Bitcoin (or other relevant digital asset's) blockchain, compared to investors who hold Bitcoin (or such other relevant digital asset) directly instead of through a fund or product. Additionally, a "fork" in the Bitcoin blockchain could materially decrease the price of Bitcoin.
- Digital assets such as Bitcoin or other digital asset product is/are not legal tender, and is not backed by any government, corporation or other identified body, other than with respect to certain digital currencies that certain governments are or may be developing now or in the future (of which Bitcoin is ***not*** one). No law requires companies or individuals to accept digital currency as a form of payment (except, potentially, with respect to digital currencies developed by certain governments where such acceptance may be mandated). Instead, other than as described in the preceding sentences, Bitcoin's and other digital asset products' use is limited to businesses and individuals that are willing to accept them. If no one were to accept digital currencies, Bitcoin and other virtual currency products would very likely become worthless.
- Platforms that buy and sell Bitcoin or other digital assets can be hacked, and some have failed. In addition, like the platforms themselves, digital wallets can be hacked, and are subject to theft and fraud. As a result, like other investors have, you can lose some or all of your holdings of digital assets, including Bitcoin.
- Unlike US banks and credit unions that provide certain guarantees of safety to depositors, there are no such safeguards provided to digital assets, such as Bitcoin, held in digital wallets by their providers or by regulators.
- Due to the anonymity Bitcoin and other digital assets offer, it has known use in illegal activity, including drug dealing, money laundering, human trafficking, sanction evasion and other forms of illegal commerce. Abuses could impact legitimate consumers and speculators; for instance, law enforcement agencies could shut down or restrict the use of platforms and exchanges, limiting or shutting off entirely the ability to use or trade Bitcoin or other digital asset products.
- Bitcoin and other digital assets may not have an established track record of credibility and trust. Further, any performance data relating to Bitcoin, Bitcoin-related products or other digital asset products may not be verifiable as pricing models are not uniform.
- Investors should be aware of the potentially increased risks of transacting in digital assets, including Bitcoin, relating to the risks and considerations, including fraud, theft, and lack of legitimacy, and other aspects and qualities of digital assets, before transacting in such assets.
- The exchange rate of Bitcoin or other virtual currency products versus the USD historically has been very volatile and the exchange rate could drastically decline. For example, the exchange rate of Bitcoin versus the USD has in the past dropped more than 50% in a single day. Bitcoin may be affected by such volatility as well.
- Digital asset exchanges have limited operating and performance histories and are not regulated with the same controls or customer protections available to more traditional exchanges transacting equity, debt, and other assets and securities. There is no assurance that a person/exchange who currently accepts a digital asset as payment will continue to do so in the future.
- The regulatory framework of digital assets is evolving, and in some cases uncertain, and digital assets themselves may not be governed and protected by applicable securities regulators and securities laws, including, but not limited to, Securities Investor Protection Corporation coverage, or other regulatory regimes.
- Morgan Stanley Smith Barney LLC or its affiliates (collectively, "Morgan Stanley") may currently, or in the future, offer or invest in digital asset products, services or platforms. The proprietary interests of Morgan Stanley may conflict with your interests.
- The foregoing list of considerations and risks are not and do not purport to be a complete enumeration or explanation of the risks involved in an investment in the any product or fund investing or trading in Bitcoin and/or other digital assets.

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Global Investment Manager Analysis (GIMA) Focus List, Approved List and Tactical Opportunities List; Watch Policy. GIMA uses two methods to evaluate investment products in applicable advisory programs: **Focus** (and investment products meeting this standard are described as being on the Focus List) and **Approved** (and investment products meeting this standard are described as being on the Approved List). In general, Focus entails a more thorough evaluation of an investment product than Approved. Sometimes an investment product may be evaluated using the Focus List process but then placed on the Approved List instead of the Focus List. Investment products may move from the Focus List to the Approved List, or vice versa. GIMA may also determine that an investment product no longer meets the criteria under either process and will no longer be recommended in investment advisory programs (in which case the investment product is given a "Not Approved" status). GIMA has a '**Watch**" policy and may describe a Focus List or Approved List investment product as being on "Watch" if GIMA identifies specific areas that (a) merit further evaluation by GIMA and (b) may, but are not certain to, result in the investment product becoming "Not Approved." The Watch period depends on the length of time needed for GIMA to conduct its evaluation and for the investment manager or fund to address any concerns. Certain investment products on either the Focus List or Approved List may also be recommended for the **Tactical Opportunities List** based in part on tactical opportunities existing at a given time. The investment products on the Tactical Opportunities List change over time. For more information on the Focus List, Approved List, Tactical Opportunities List and Watch processes, please see the applicable Form ADV Disclosure Document for Morgan Stanley Wealth Management. Your Financial Advisor or Private Wealth Advisor can also provide upon request a copy of a publication entitled "Manager Selection Process."

The **Global Investment Committee** is a group of seasoned investment professionals who meet regularly to discuss the global economy and markets. The committee determines the investment outlook that guides our advice to clients. They continually monitor developing economic and market conditions, review tactical outlooks and recommend model portfolio weightings, as well as produce a suite of strategy, analysis, commentary, portfolio positioning suggestions and other reports and broadcasts.

The GIC Asset Allocation Models are not available to be directly implemented as part of an investment advisory service and should not be regarded as a recommendation of any Morgan Stanley investment advisory service. The GIC Asset Allocation Models do not represent actual trading or any type of account or any type of investment strategies and none of the fees or other expenses (e.g. commissions, mark-ups, mark-downs, advisory fees, fund expenses) associated with actual trading or accounts are reflected in the GIC Asset Allocation Models which, when compounded over a period of years, would decrease returns.

Adverse Active AlphaSM 2.0 is a patented screening and scoring process designed to help identify high-quality equity and fixed income managers with characteristics that may lead to future outperformance relative to index and peers. While highly ranked managers performed well as a group in our Adverse Active Alpha model back tests, not all of the managers will outperform. Please note that this data may be derived from back-testing, which has the benefit of hindsight. In addition, highly ranked managers can have differing risk profiles that might not be appropriate for all investors. Our view is that Adverse Active Alpha is a good starting point and should be used in conjunction with other information. Morgan Stanley Wealth Management's qualitative and quantitative investment manager due diligence process are equally important factors for investors when considering managers for use through an investment advisory program. Factors including, but not limited to, manager turnover and changes to investment process can partially or fully negate a positive Adverse Active Alpha ranking. Additionally, highly ranked managers can have differing risk profiles that might not be appropriate for all investors.

The proprietary **Value Score** methodology considers an active investment strategies' value proposition relative to its costs. From a historical quantitative study of several quantitative markers, Value Score measures perceived forward-looking benefit and computes (1) "fair value" expense ratios for most traditional investment managers across 40 categories and (2) managers' perceived "excess value" by comparing the fair value expense ratios to actual expense ratios. Managers are then ranked within each category by their excess value to assign a Value Score. Our analysis suggests that greater levels of excess value have historically corresponded to attractive subsequent performance.

For more information on the ranking models, please see *Adverse Active AlphaSM 2.0: Scoring Active Managers According to Potential Alpha* and *Value Score: Scoring Fee Efficiency by Comparing Managers' "Fair Value" and Actual Expense Ratios*. The whitepapers are available from your Financial Advisor or Private Wealth Advisor. ADVERSE ACTIVE ALPHA is a registered service mark of Morgan Stanley and/or its affiliates. U.S. Pat. No. 8,756,098 applies to the Adverse Active Alpha system and/or methodology.

Additionally, highly ranked managers can have differing risk profiles that might not be appropriate for all investors. For more information on AAA, please see the Adverse Active Alpha Ranking Model and Selecting Managers with Adverse Active Alpha whitepapers. The whitepaper are available from your Financial Advisor or Private Wealth Advisor. ADVERSE ACTIVE ALPHA is a registered service mark of Morgan Stanley and/or its affiliates. U.S. Pat. No. 8,756,098 applies to the Adverse Active Alpha system and/or methodology.

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Strategy May Be Available as a Separately Managed Account or Mutual Fund Strategies are sometimes available in Morgan Stanley Wealth Management investment advisory programs both in the form of a separately managed account ("SMA") and a mutual fund. These may have different expenses and investment minimums. Your Financial Advisor or Private Wealth Advisor can provide more information on whether any particular strategy is available in more than one form in a particular investment advisory program. In most Morgan Stanley Wealth Management investment advisory accounts, fees are deducted quarterly and have a compounding effect on performance. For example, on an advisory account with a 3% annual fee, if the gross annual performance is 6.00%, the compounding effect of the fees will result in a net performance of approximately 3.93% after one year, 1 after three years, and 21.23% after five years. **Conflicts of Interest:** GIMA's goal is to provide professional, objective evaluations in support of the Morgan Stanley Wealth Management investment advisory programs. We have policies and procedures to help us meet this goal. However, our business is subject to various conflicts of interest. For example, ideas and suggestions for which investment products should be evaluated by GIMA come from a variety of sources, including our Morgan Stanley Wealth Management Financial Advisors and their direct or indirect managers, and other business persons within Morgan Stanley Wealth Management or its affiliates. Such persons may have an ongoing business relationship with certain investment managers or mutual fund companies whereby they, Morgan Stanley Wealth Management or its affiliates receive compensation from, or otherwise related to, those investment managers or mutual funds. For example, a Financial Advisor may suggest that GIMA evaluates an investment manager or fund in which a portion of his or her clients' assets are already invested. While such a recommendation is permissible, GIMA is responsible for the opinions expressed by GIMA. See the conflicts of interest section in the applicable Form ADV Disclosure Document for Morgan Stanley Wealth Management for a discussion of other types of conflicts that may be relevant to GIMA's evaluation of managers and funds. In addition, Morgan Stanley Wealth Management, MS & Co., managers and their affiliates provide a variety of services (including research, brokerage, asset management, trading, lending and investment banking services) for each other and for various clients, including issuers of securities that may be recommended for purchase or sale by clients or are otherwise held in client accounts , and managers in various advisory programs. Morgan Stanley Wealth Management, managers, MS & Co., and their affiliates receive compensation and fees in connection with these services. Morgan Stanley Wealth Management believes that the nature and range of clients to which such services are rendered is such that it would be inadvisable to exclude categorically all of these companies from an account .

Morgan Stanley charges each fund family we offer a mutual fund support fee, also called a "revenue-sharing payment," on client account holdings in fund families according to a tiered rate that increases along with the management fee of the fund so that lower management fee funds pay lower rates than those with higher management fees.

Overlay Managers or Executing Sub-Managers ("managers") in some of Morgan Stanley's Separately Managed Account ("SMA") programs may affect transactions through broker-dealers other than Morgan Stanley or our affiliates. If your manager trades with another firm, you may be assessed costs by the other firm in addition to Morgan Stanley's fees. Those costs will be included in the net price of the security, not separately reported on trade confirmations or account statements. Certain managers have historically directed most, if not all, of their trades to outside firms. Information provided by managers concerning trade execution away from Morgan Stanley is summarized at: www.morganstanley.com/wealth/investmentsolutions/pdfs/adv/sotresponse.pdf. For more information on trading and costs, please refer to the ADV Brochure for your program(s), available at www.morganstanley.com/ADV, or contact your Financial Advisor/Private Wealth Advisor.

Consider Your Own Investment Needs: The model portfolios and strategies discussed in the material are formulated based on general client characteristics including risk tolerance. This material is not intended to be an analysis of whether particular investments or strategies are appropriate for you or a recommendation, or an offer to participate in any investment. Therefore, clients should not use this profile as the sole basis for investment decisions. They should consider all relevant information, including their existing portfolio, investment objectives, risk tolerance, liquidity needs and investment time horizon. Such a determination may lead to asset allocation results that are materially different from the asset allocation shown in this profile. Talk to your Financial Advisor about what would be an appropriate asset allocation for you, whether CGCM is an appropriate program for you.

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Please consider the investment objectives, risks, fees, and charges and expenses of mutual funds, ETFs, closed end funds, unit investment trusts, and variable insurance products carefully before investing. The prospectus contains this and other information about each fund. To obtain a prospectus, contact your Financial Advisor or Private Wealth Advisor or visit the Morgan Stanley website at www.morganstanley.com. Please read it carefully before investing.

An investment in a money market fund is not insured or guaranteed by the Federal Deposit Insurance Corporation or any other government agency. Although the Fund seeks to preserve the value of your investment at $1.00 per share, it is possible to lose money by investing in the fund.

The type of mutual funds and ETFs discussed in this presentation utilizes nontraditional or complex investment strategies and/or derivatives. Examples of these types of funds include those that utilize one or more of the below noted investment strategies or categories or which seek exposure to the following markets: (1) commodities (e.g., agricultural, energy and metals), currency, precious metals; (2) managed futures; (3) leveraged, inverse or inverse leveraged; (4) bear market, hedging, long-short equity, market neutral; (5) real estate; (6) volatility (seeking exposure to the CBOE VIX Index). Investors should keep in mind that while mutual funds and ETFs may, at times, utilize nontraditional investment options and strategies, they should not be equated with unregistered privately offered alternative investments. Because of regulatory limitations, mutual funds and ETFs that seek alternative-like investment exposure must utilize a more limited investment universe. As a result, investment returns and portfolio characteristics of alternative mutual funds and ETFs may vary from traditional hedge funds pursuing similar investment objectives. Moreover, traditional hedge funds have limited liquidity with long "lock-up" periods allowing them to pursue investment strategies without having to factor in the need to meet client redemptions and ETFs trade on an exchange. On the other hand, mutual funds typically must meet daily client redemptions. This differing liquidity profile can have a material impact on the investment returns generated by a mutual fund or ETF pursuing an alternative investing strategy compared with a traditional hedge fund pursuing the same strategy.

Nontraditional investment options and strategies are often employed by a portfolio manager to further a fund's investment objective and to help offset market risks. However, these features may be complex, making it more difficult to understand the fund's essential characteristics and risks, and how it will perform in different market environments and over various periods of time. They may also expose the fund to increased volatility and unanticipated risks particularly when used in complex combinations and/or accompanied by the use of borrowing or "leverage."
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KEY ASSET CLASS CONSIDERATIONS AND OTHER RISKS

Investing in the markets entails the risk of market volatility. The value of all types of investments, including stocks, mutual funds, exchange-traded funds ("ETFs"), closed-end funds, and unit investment trusts, may increase or decrease over varying time periods. To the extent the investments depicted herein represent **international securities**, you should be aware that there may be additional risks associated with international investing, including foreign economic, political, monetary and/or legal factors, changing currency exchange rates, foreign taxes, and differences in financial and accounting standards. These risks may be magnified in **emerging markets and frontier markets**. **Small- and mid-capitalization companies** may lack the financial resources, product diversification and competitive strengths of larger companies. In addition, the securities of small- and mid-capitalization companies may not trade as readily as, and be subject to higher volatility than, those of larger, more established companies. The value of **fixed income securities** will fluctuate and, upon a sale, may be worth more or less than their original cost or maturity value. Bonds are subject to interest rate risk, call risk, reinvestment risk, liquidity risk, and credit risk of the issuer. **High yield bonds** are subject to additional risks such as increased risk of default and greater volatility because of the lower credit quality of the issues. In the case of **municipal bonds**, income is generally exempt from federal income taxes. Some income may be subject to state and local taxes and to the federal alternative minimum tax. Capital gains, if any, are subject to tax. **Treasury Inflation Protection Securities' (TIPS)** coupon payments and underlying principal are automatically increased to compensate for inflation by tracking the consumer price index (CPI). While the real rate of return is guaranteed, TIPS tend to offer a low return. Because the return of TIPS is linked to inflation, TIPS may significantly underperform versus conventional U.S. Treasuries in times of low inflation. There is no guarantee that investors will receive par if TIPS are sold prior to maturity. The returns on a portfolio consisting primarily of **environmental, social, and governance-aware investments ("ESG")** may be lower or higher than a portfolio that is more diversified or where decisions are based solely on investment considerations. Because ESG criteria exclude some investments, investors may not be able to take advantage of the same opportunities or market trends as investors that do not use such criteria. The companies identified and investment examples are for illustrative purposes only and should not be deemed a recommendation to purchase, hold or sell any securities or investment products. They are intended to demonstrate the approaches taken by managers who focus on ESG criteria in their investment strategy. There can be no guarantee that a client's account will be managed as described herein. **Options** and margin trading involve substantial risk and are not appropriate for all investors. Besides the general investment risk of holding securities that may decline in value and the possible loss of principal invested, **closed-end funds** may have additional risks related to declining market prices relative to net asset values (NAVs), active manager underperformance and potential leverage. Closed-end funds, unlike open-end funds, are not continuously offered. There is a one-time public offering and once issued, shares of closed-end funds are sold in the open market through a stock exchange. Shares of closed-end funds frequently trade at a discount from their NAV which may increase investors' risk of loss. The risk of loss due to this discount may be greater for investors expecting to sell their shares in a relatively short period after completion of the public offering. This characteristic is a risk separate and distinct from the risk that a closed-end fund's net asset value may decrease as a result of investment activities. NAV is total assets less total liabilities divided by the number of shares outstanding. At the time an investor purchases shares of a closed-end fund, shares may have a market price that is above or below NAV. Portfolios that invest a large percentage of assets in only one industry **sector** (or in only a few sectors) are more vulnerable to price fluctuation than those that diversify among a broad range of sectors.

Alternative investments often are speculative and include a high degree of risk. Investors could lose all or a substantial amount of their investment. Alternative investments are appropriate only for eligible, long-term investors who are willing to forgo liquidity and put capital at risk for an indefinite period of time. They may be highly illiquid and can engage in leverage and other speculative practices that may increase the volatility and risk of loss. Alternative Investments typically have higher fees than traditional investments. Investors should carefully review and consider potential risks before investing. Certain of these risks may include but are not limited to: Loss of all or a substantial portion of the investment due to leveraging, short-selling, or other speculative practices; Lack of liquidity in that there may be no secondary market for a fund; Volatility of returns; Restrictions on transferring interests in a fund; Potential lack of diversification and resulting higher risk due to concentration of trading authority when a single advisor is utilized; Absence of information regarding valuations and pricing; Complex tax structures and delays in tax reporting; Less regulation and higher fees than mutual funds; Risks associated with the operations, personnel, and processes of the manager; and Risks associated with cybersecurity. As a diversified global financial services firm, Morgan Stanley Wealth Management engages in a broad spectrum of activities including financial advisory services, investment management activities, sponsoring and managing private investment funds, engaging in broker-dealer transactions and principal securities, commodities and foreign exchange transactions, research publication, and other activities. In the ordinary course of its business, Morgan Stanley Wealth Management therefore engages in activities where Morgan Stanley Wealth Management's interests may conflict with the interests of its clients , including the private investment funds it manages. Morgan Stanley Wealth Management can give no assurance that conflicts of interest will be resolved in favor of its clients or any such fund. All expressions of opinion are subject to change without notice and are not intended to be a forecast of future events or results. 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These limitations include survivorship bias (the returns of the indices may not be representative of all the hedge funds in the universe because of the tendency of lower performing funds to leave the index); heterogeneity (not all hedge funds are alike or comparable to one another, and the index may not accurately reflect the performance of a described style); and limited data (many hedge funds do not report to indices, and the index may omit funds, the inclusion of which might significantly affect the performance shown. The HFRI indices are based on information self-reported by hedge fund managers that decide on their own, at any time, whether or not they want to provide, or continue to provide, information to HFR Asset Management, L.L.C. Results for funds that go out of business are included in the index until the date that they cease operations. Therefore, these indices may not be complete or accurate representations of the hedge fund universe, and may be biased in several ways. Composite index results are shown for illustrative purposes and do not represent the performance of a specific investment. Individual funds have specific tax risks related to their investment programs that will vary from fund to fund. Clients should consult their own tax and legal advisors as Morgan Stanley Wealth Management does not provide tax or legal advice. Interests in alternative investment products are offered pursuant to the terms of the applicable offering memorandum , are distributed by Morgan Stanley Wealth Management and certain of its affiliates, and (1) are not FDIC-insured, (2) are not deposits or other obligations of Morgan Stanley Wealth Management or any of its affiliates, (3) are not guaranteed by Morgan Stanley Wealth Management and its affiliates, and (4) involve investment risks, including possible loss of principal. Morgan Stanley Wealth Management is a registered broker-dealer, not a bank. 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Investment products in this category may employ various investment strategies and techniques for both hedging and more speculative purposes such as short -selling, leverage, derivatives and options, which can increase volatility and the risk of investment loss. Alternative investments are not appropriate for all investors. As a diversified global financial services firm, Morgan Stanley Wealth Management engages in a broad spectrum of activities including financial advisory services, investment management activities, sponsoring and managing private investment funds, engaging in broker-dealer transactions and principal securities, commodities and foreign exchange transactions, research publication, and other activities. In the ordinary course of its business, Morgan Stanley Wealth Management therefore engages in activities where Morgan Stanley Wealth Management's interests may conflict with the interests of its clients , including the private investment funds it manages. Morgan Stanley Wealth Management can give no assurance that conflicts of interest will be resolved in favor of its clients or any such fund. Alternative investments involve complex tax structures, tax inefficient investing, and delays in distributing important tax information. Individual funds have specific risks related to their investment programs that will vary from fund to fund. Clients should consult their own tax and legal advisors as Morgan Stanley Wealth Management does not provide tax or legal advice.

A majority of Alternative Investment managers reviewed and selected by GIMA pay or cause to be paid an ongoing fee for distribution from their management fees to Morgan Stanley Wealth Management in connection with Morgan Stanley Wealth Management clients that purchase an interest in an Alternative Investment and in some instances pay these fees on the investments held by advisory clients. Morgan Stanley Wealth Management rebates such fees that are received and attributable to an investment held by an advisory client and retains the fees paid in connection with investments held by brokerage clients. Morgan Stanley Wealth Management has a conflict of interest in offering alternative investments because Morgan Stanley Wealth Management or our affiliates, in most instances, earn more money in your account from your investments in alternative investments than from other investment options.

It should be noted that the majority of hedge fund indexes are comprised of hedge fund manager returns. This is in contrast to traditional indexes, which are comprised of individual securities in the various market segments they represent and offer complete transparency as to membership and construction methodology. As such, some believe that hedge fund index returns have certain biases that are not present in traditional indexes. Some of these biases inflate index performance, while others may skew performance negatively. However, many studies indicate that overall hedge fund index performance has been biased to the upside. Some studies suggest performance has been inflated by up to 260 basis points or more annually depending on the types of biases included and the time period studied. Although there are numerous potential biases that could affect hedge fund returns, we identify some of the more common ones throughout this paper.

Self-selection bias results when certain manager returns are not included in the index returns and may result in performance being skewed up or down. Because hedge funds are private placements,

hedge fund managers are able to decide which fund returns they want to report and are able to opt out of reporting to the various databases. Certain hedge fund managers may choose only to report returns for funds with strong returns and opt out of reporting returns for weak performers. Other hedge funds that close may decide to stop reporting in order to retain secrecy, which may cause a downward bias in returns.
Survivorship bias results when certain constituents are removed from an index. This often results from the closure of funds due to poor performance, "blow ups," or other such events. As such, this bias typically results in performance being skewed higher. As noted, hedge fund index performance biases can result in positive or negative skew. However, it would appear that the skew is more often positive. While it is difficult to quantify the effects precisely, investors should be aware that idiosyncratic factors may be giving hedge fund index returns an artificial "lift" or upwards bias.

Hedge Funds of Funds and many funds of funds are private investment vehicles restricted to certain qualified private and institutional investors. They are often speculative and include a high degree of risk. Investors can lose all or a substantial amount of their investment. They may be highly illiquid, can engage in leverage and other speculative practices that may increase volatility and the risk of loss, and may be subject to large investment minimums and initial lockups. They involve complex tax structures, tax-inefficient investing and delays in distributing important tax information. Categorically, hedge funds and funds of funds have higher fees and expenses than traditional investments, and such fees and expenses can lower the returns achieved by investors. Funds of funds have an additional layer of fees over and above hedge fund fees that will offset returns. An investment in an **exchange-traded fund** involves risks similar to those of investing in a broadly based portfolio of equity securities traded on an exchange in the relevant securities market, such as market fluctuations caused by such factors as economic and political developments, changes in interest rates and perceived trends in stock and bond prices. An investment in a **target date portfolio** is subject to the risks attendant to the underlying funds in which it invests, in these portfolios the funds are the Consulting Group Capital Market funds. A target date portfolio is geared to investors who will retire and/or require income at an approximate year. The portfolio is managed to meet the investor's goals by the pre-established year or "target date." A target date portfolio will transition its invested assets from a more aggressive portfolio to a more conservative portfolio as the target date draws closer. An investment in the target date portfolio is not guaranteed at any time, including, before or after the target date is reached. **Managed futures** investments are speculative, involve a high degree of risk, use significant leverage, are generally illiquid, have substantial charges, subject investors to conflicts of interest, and are appropriate only for the risk capital portion of an investor's portfolio. Managed futures investments do not replace equities or bonds but rather may act as a complement in a well diversified portfolio. Managed Futures are complex and not appropriate for all investors. **Rebalancing** does not protect against a loss in declining financial markets. There may be a potential tax implication with a rebalancing strategy.

Asset allocation and diversification do not assure a profit or protect against loss in declining financial markets. Past performance is no guarantee of future results. Actual results may vary.

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Indices are unmanaged and investors cannot directly invest in them. They are not subject to expenses or fees and are often comprised of securities and other investment instruments the liquidity of which is not restricted. A particular investment product may consist of securities significantly different than those in any index referred to herein. Composite index results are shown for illustrative purposes only, generally do not represent the performance of a specific investment, may not, for a variety of reasons, be an appropriate comparison or benchmark for a particular investment and may not necessarily reflect the actual investment strategy or objective of a particular investment. Consequently, comparing an investment to a particular index may be of limited use.

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We may act in the capacity of a broker or that of an advisor. As your broker, we are not your fiduciary and our interests may not always be identical to yours. Please consult with your Private Wealth Advisor to discuss our obligations to disclose to you any conflicts we may from time to time have and our duty to act in your best interest. We may be paid both by you and by others who compensate us based on what you buy. Our compensation, including that of your Private Wealth Advisor, may vary by product and over time.

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

GLOBAL INVESTMENT COMMITTEE (GIC) ASSET ALLOCATION MODELS: The Asset Allocation Models are created by Morgan Stanley Wealth Management's GIC.

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FEES REDUCE THE PERFORMANCE OF ACTUAL ACCOUNTS: None of the fees or other expenses (e.g. commissions, mark-ups, mark-downs, fees) associated with actual trading or accounts are reflected in the GIC Asset Allocation Models. The GIC Asset Allocation Models and any model performance included in this presentation are intended as educational materials. Were a client to use these models in connection with investing, any investment decisions made would be subject to transaction and other costs which, when compounded over a period of years, would decrease returns. Information regarding Morgan Stanley's standard advisory fees is available in the Form ADV Part 2, which is available at www.morganstanley.com/adv. The following hypothetical illustrates the compound effect fees have on investment returns: For example, if a portfolio's annual rate of return is 15% for 5 years and the account pays 50 basis points in fees per annum, the gross cumulative five-year return would be 101.1% and the five-year return net of fees would be 96.8%. Fees and/or expenses would apply to clients who invest in investments in an account based on these asset allocations, and would reduce clients' returns. The impact of fees and/or expenses can be material.

Variable annuities are long-term investments designed for retirement purposes and may be subject to market fluctuations, investment risk, and possible loss of principal. All guarantees, including optional benefits, are based on the financial strength and claims-paying ability of the issuing insurance company and do not apply to the underlying investment options. Optional riders may not be able to be purchased in combination and are available at an additional cost. Some optional riders must be elected at time of purchase. Optional riders may be subject to specific limitations, restrictions, holding periods, costs, and expenses as specified by the insurance company in the annuity contract. If you are investing in a **variable annuity** through a tax-advantaged retirement plan such as an IRA, you will get no additional tax advantage from the variable annuity. Under these circumstances, you should only consider buying a variable annuity because of its other features, such as lifetime income payments and death benefits protection. Taxable distributions (and certain deemed distributions) are subject to ordinary income tax and, if taken prior to age 59½, may be subject to a 10% federal income tax penalty. Early withdrawals will reduce the death benefit and cash surrender value.

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

Master Limited Partnerships (MLPs) are limited partnerships or limited liability companies that are taxed as partnerships and whose interests (limited partnership units or limited liability company units) are traded on securities exchanges like shares of common stock. Currently, most MLPs operate in the energy, natural resources or real estate sectors. Investments in MLP interests are subject to the risks generally applicable to companies in the energy and natural resources sectors, including commodity pricing risk, supply and demand risk, depletion risk and exploration risk. Individual MLPs are publicly traded partnerships that have unique risks related to their structure. These include, but are not limited to, their reliance on the capital markets to fund growth, adverse ruling on the current tax treatment of distributions (typically mostly tax deferred), and commodity volume risk. The potential tax benefits from investing in MLPs depend on their being treated as partnerships for federal income tax purposes and, if the MLP is deemed to be a corporation, then its income would be subject to federal taxation at the entity level, reducing the amount of cash available for distribution to the fund which could result in a reduction of the fund's value. MLPs carry interest rate risk and may underperform in a rising interest rate environment. MLP funds accrue deferred income taxes for future tax liabilities associated with the portion of MLP distributions considered to be a tax-deferred return of capital and for any net operating gains as well as capital appreciation of its investments; this deferred tax liability is reflected in the daily NAV, and, as a result, the MLP fund's after-tax performance could differ significantly from the underlying assets even if the pre-tax performance is closely tracked.

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. **Physical precious metals** are non-regulated products. Precious metals are speculative investments, which may experience short-term and long term price volatility. The value of precious metals investments may fluctuate and may appreciate or decline, depending on market conditions. Unlike bonds and stocks, precious metals do not make interest or dividend payments. Therefore, precious metals may not be appropriate for investors who require current income. Precious metals are commodities that should be safely stored, which may impose additional costs on the investor.

REITs investing risks are similar to those associated with direct investments in real estate: property value fluctuations, lack of liquidity, limited diversification and sensitivity to economic factors such as interest rate changes and market recessions. Risks of **private real estate** include: illiquidity; a long-term investment horizon with a limited or nonexistent secondary market; lack of transparency; volatility (risk of loss); and leverage. Principal is returned on a monthly basis over the life of a **mortgage-backed security.** Principal prepayment can significantly affect the monthly income stream and the maturity of any type of MBS, including standard MBS, CMOs and Lottery Bonds. **Asset-backed securities** generally decrease in value as a result of interest rate increases, but may benefit less than other fixed-income securities from declining interest rates, principally because of prepayments.
Yields are subject to change with economic conditions. Yield is only one factor that should be considered when making an investment decision. **Credit ratings** are subject to change. **Duration**, the most commonly used measure of bond risk, quantifies the effect of changes in interest rates on the price of a bond or bond portfolio. The longer the duration, the more sensitive the bond or portfolio would be to changes in interest rates. The majority of $25 and $1000 par **preferred securities** are “callable” meaning that the issuer may retire the securities at specific prices and dates prior to maturity. Interest/dividend payments on certain preferred issues may be deferred by the issuer for periods of up to 5 to 10 years, depending on the particular issue. The investor would still have income tax liability even though payments would not have been received. Price quoted is per $25 or $1,000 share, unless otherwise specified. Current yield is calculated by multiplying the coupon by par value divided by the market price. The initial interest rate on a **floating-rate security** may be lower than that of a fixed-rate security of the same maturity because investors expect to receive additional income due to future increases in the floating security’s underlying reference rate. The reference rate could be an index or an interest rate. However, there can be no assurance that the reference rate will increase. Some floating-rate securities may be subject to call risk. The market value of **convertible bonds** and the underlying common stock(s) will fluctuate and after purchase may be worth more or less than original cost. If sold prior to maturity, investors may receive more or less than their original purchase price or maturity value, depending on market conditions. Callable bonds may be redeemed by the issuer prior to maturity. Additional call features may exist that could affect yield. Some $25 or $1000 **par preferred securities** are QDI (Qualified Dividend Income) eligible. Information on QDI eligibility is obtained from third party sources. The dividend income on QDI eligible preferreds qualifies for a reduced tax rate. Many traditional ‘dividend paying’ perpetual preferred securities (traditional preferreds with no maturity date) are QDI eligible. In order to qualify for the preferential tax treatment all qualifying preferred securities must be held by investors for a minimum period – 91 days during a 180 day window period, beginning 90 days before the ex-dividend date.
Companies paying **dividends** can reduce or cut payouts at any time.

Nondiversification: For a portfolio that holds a concentrated or limited number of securities, a decline in the value of these investments would cause the portfolio’s overall value to decline to a greater degree than a less concentrated portfolio. The **indices selected by Morgan Stanley Wealth Management** to measure performance are representative of broad asset classes. Morgan Stanley Wealth Management retains the right to change representative indices at any time. Because of their narrow focus, **sector investments** tend to be more volatile than investments that diversify across many sectors and companies.

Growth investing does not guarantee a profit or eliminate risk. The stocks of these companies can have relatively high valuations. Because of these high valuations, an investment in a growth stock can be more risky than an investment in a company with more modest growth expectations. **Value investing** does not guarantee a profit or eliminate risk. Not all companies whose stocks are considered to be value stocks are able to turn their business around or successfully employ corrective strategies which would result in stock prices that do not rise as initially expected .
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.
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