ReSolve
ASSET MANAGEMENT

ADAPTIVE STRATEGIES DESIGNED TO THRIVE IN CHANGING ENVIRONMENTS

A Visual History of Momentum + Mean Variance Optimization

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General information regarding hypothetical performance and simulated results. Past results are not necessarily indicative of future results. It is expected that the simulated performance will periodically change as a function of both refinements to our simulation methodology and the underlying market data. These results are based on simulated or hypothetical performance results that have certain inherent limitations. Unlike the results in an actual performance record, these results do not represent actual trading. Also, because these trades have not actually been executed, these results may have under- or over-compensated for the impact, if any, of certain market factors, such as lack of liquidity. Simulated or hypothetical trading programs in general are also subject to the fact that they are designed with the benefit of hindsight. No representation is being made that any account or fund will or is likely to achieve profits or losses similar to those being shown. The results do not include other costs of managing a portfolio (such as custodial fees, legal, auditing, administrative or other professional fees). The information in this presentation has not been reviewed or audited by an independent accountant or other independent testing firm. More detailed information regarding the manner in which the charts were calculated is available on request. Any actual fund or account that ReSolve manages will invest in different economic conditions, during periods with different volatility and in different securities than those incorporated in the hypothetical performance charts shown. There is no representation that any fund or account will perform as the hypothetical or other performance charts indicate.

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Benchmark Disclaimer The Equal Weight Global Benchmark is an equal weight portfolio rebalanced monthly consisting as they became available of: iShares MSCI Japan ETF,PowerShares DB Commodity Index Tracking Fund, iShares MSCI Emerging Markets ETF, SPDR Gold Trust ETF, iShares 7-10 Year Treasury Bond ETF,iShares 20+ Year Treasury Bond ETF,S&P Europe BMI (Dec 2003 -March 2005)/Vanguard FTSE Europe ETF (March 2005 on), Vanguard Total Stock Market ETF, Cohen & Steers Global Realty Shares Inc. Class ISPDR (Dec 2003 -March 2005)/Dow Jones Global Real Estate (May 2008 forward).

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About the Data presented

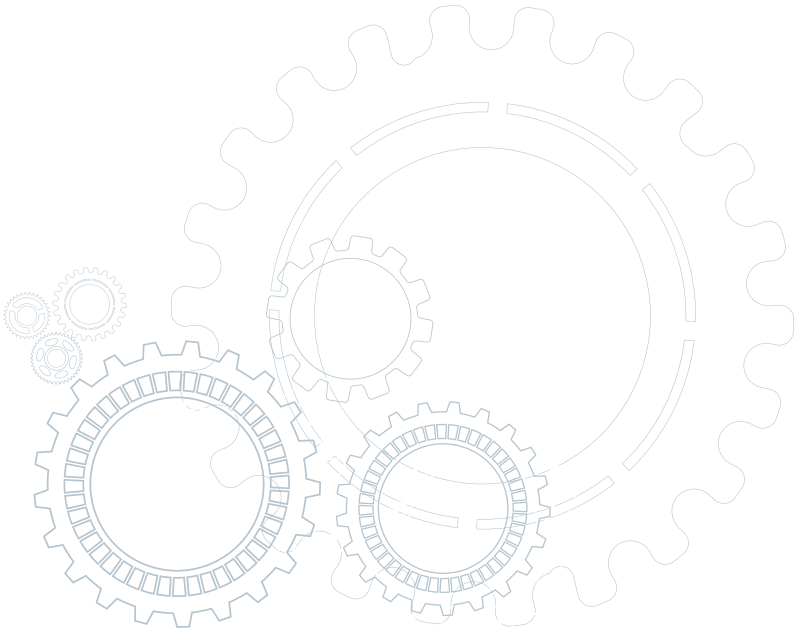
- All market indices presented are in US Dollars
- The reference strategy, Multi-Asset Momentum (12% Volatility Target), is based on hypothetical performance produced using the method described in the whitepaper “Adaptive Asset Allocation: A Primer” by Butler, Philbrick, Gordillo, and Varadi (2015) published in SSRN* scaled to an annual volatility target of 12%.
  - Constituent asset classes are Benchmarks for this presentation are created using asset class data from CSI Data, MSCI, Ken French, Deutsche Bank, and S&P Dow Jones Indices covering the following assets: U.S. Stocks (VTI + VFINX + CRSP Total Market), European Stocks (VGK + IEV + S&P Europe BMI), Japanese Stocks (EWJ + MSCI Japan Index), Emerging Stocks (VWO + S&P Emerging BMI), US REITs (IYR + CSRSX), International REITs (RWX + EGLRX), Commodities (DBC + Deutsche Bank Liquid Commodity Index TR), Gold (GLD + Gold Spot), Intermediate Treasuries (IEF + S&P US Treasury 7-10 Year TR), Long Treasuries (TLT + S&P US Treasury Bond 20+ Year Index TR).
  - Top half of assets sorted on average of 1, 3, 6, 9 and 12 month (daily equivalents of 21, 63, 126, 189 and 252 days) total-return momentum and weighted using Mean Variance Optimization.
  - Portfolios are rebalanced every 20 days, with 1/20th of the portfolio turning over on each day, such that the portfolio targets a 12% annualized volatility. Covariance is estimated using an Exponentially Weighted Moving Average as described in the RiskMetrics 2006 Methodology˅.
- We will visually analyze and get acquainted with the character of Multi-Asset Momentum across time, market regimes and volatility regimes.
- The goal is to help investors to ride out the inevitable ebb and flow of Multi-Asset Momentum by reminding ourselves that there is a lot of intermediate-term pain involved to be successful over time.

* Social Science Research Network. Link to whitepaper here: https://papers.ssrn.com/sol3/papers.cfm?abstract_id=2328254
˅ See MSCI working document https://www.msci.com/documents/10199/d0905614-2771-46dc-b000-1a033146586a

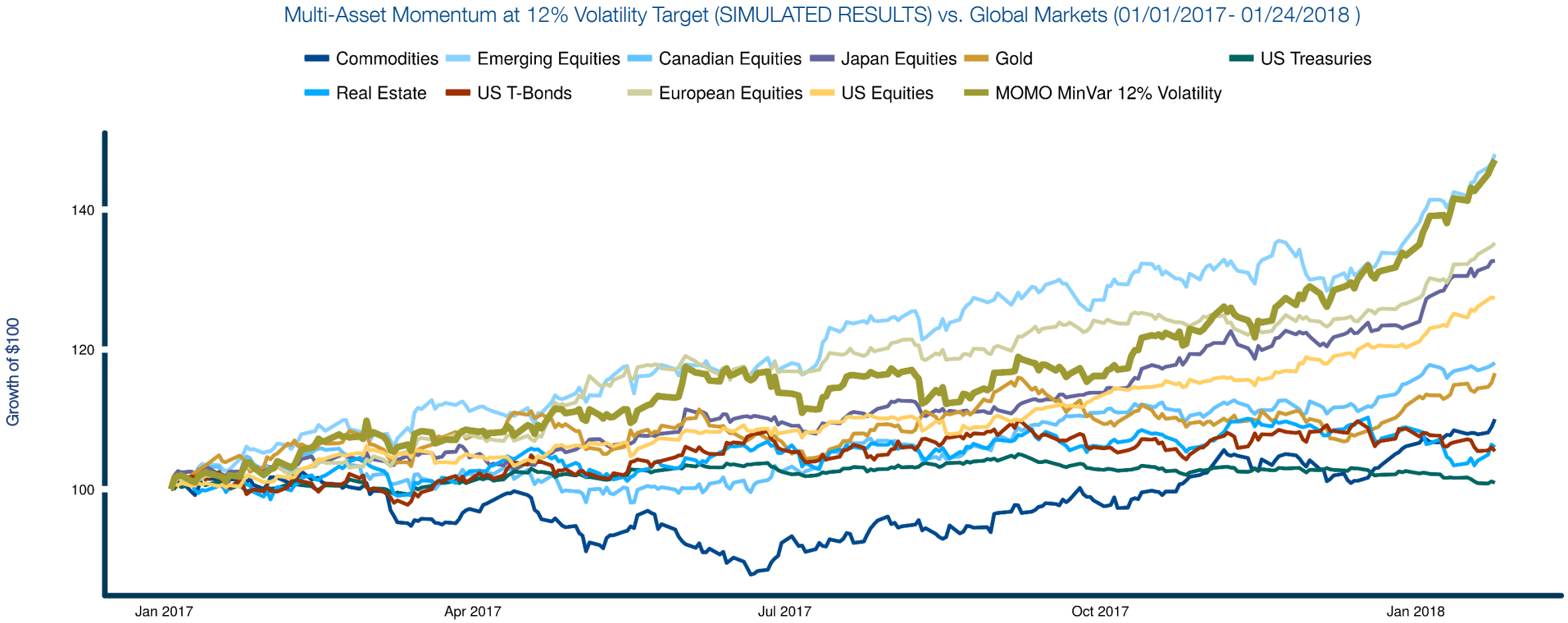
Understanding The Character Of Multi-Asset Momentum

Where Multi-Asset Momentum tends to thrive

- Stable volatility regimes.
- Large asset class dispersion.
- Clear trends from a handful of asset classes



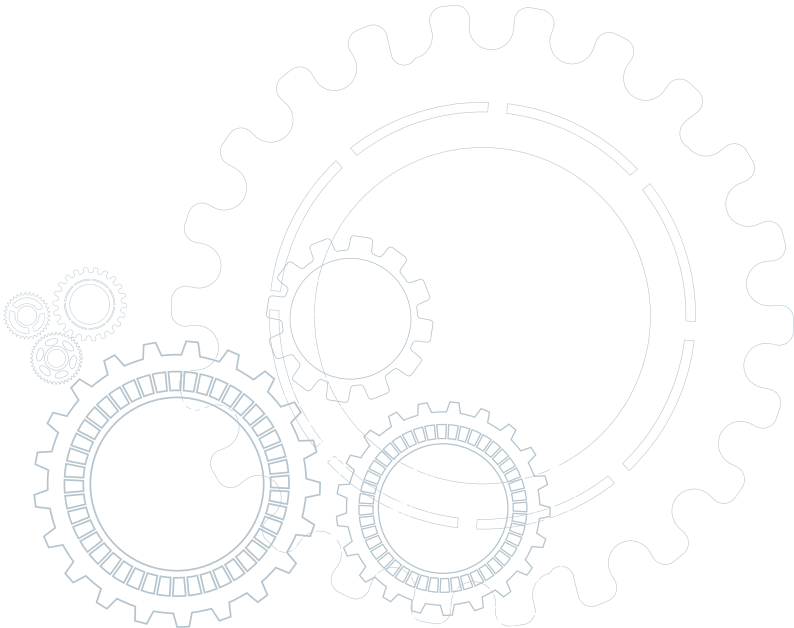
Multi-Asset Momentum is designed to produce its best returns in the presence of clear and stable trends, exemplified by the latter part of 2017 into early 2018.



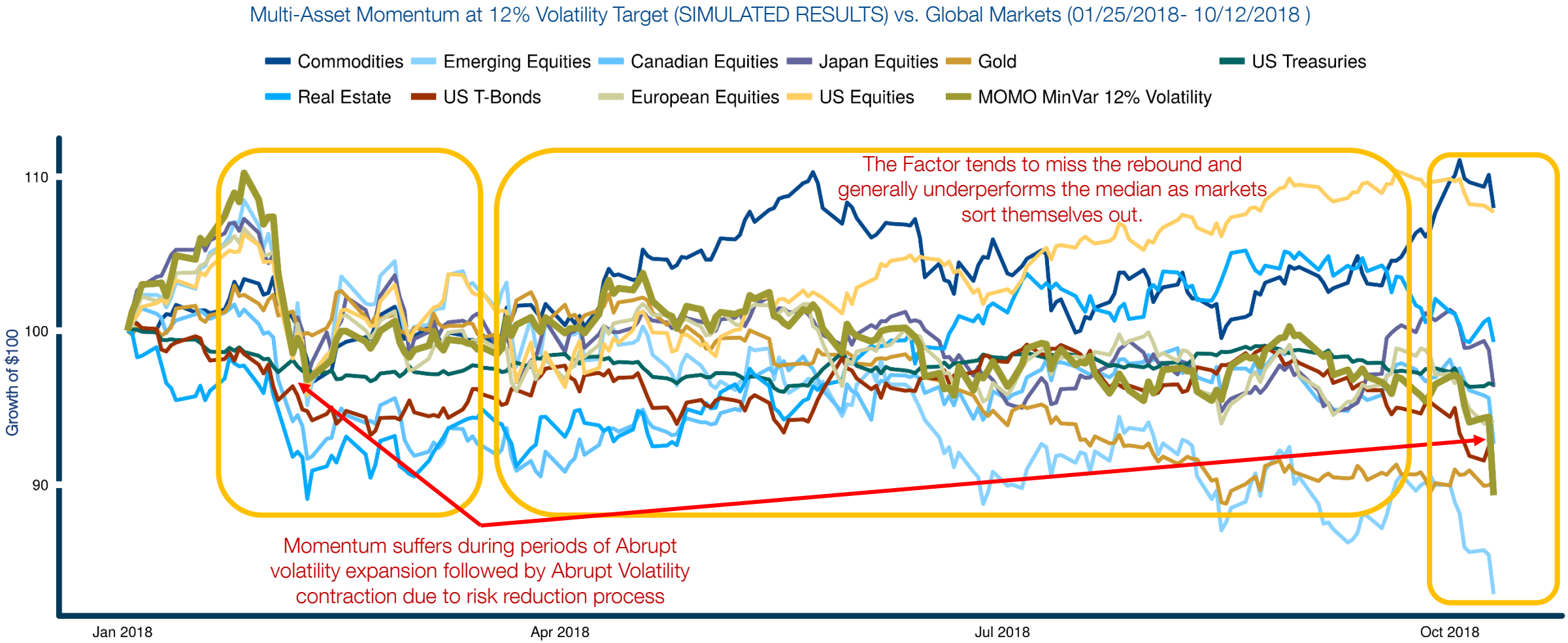
Source: Calculations by ReSolve Asset Management. Data from CSI Data. Gross. PAST PEROFRMANCE IS NOT INDICATIVE OF FUTURE RESULTS. The MOMO MinVar at 12% Volatility strategy is derived from Butler, Philbrick, Gordillo, Varadi (2015), "Adaptive Asset Allocation: A Primer" published in SSRN scaled to 12% annual volatility target and updated through the more recent period deducting a 1.45% fee. This HYPOTHETICAL PERFORMANCE does not represent the return to an actual fund or trading account that an investor could directly participate in. These results show the growth of $100 assuming the purchase and sales of securities were executed at their daily closing price. Profits are reinvested and the simulation does not reflect any transaction costs of buying and selling securities. For Illustrative purposes only. Hypothetical data has inherent limitations, some of which are described in the disclosures. Benchmark index returns are shown in US Dollars. Please read Benchmark Disclaimer at the end of this presentation for constituent information

When Multi-Asset Momentum tends to suffer.

- Abrupt volatility spikes followed by mean reversion.
- Low asset class dispersion.
- A lack of clear trends from a handful of asset classes.



Multi-Asset Momentum has struggled from the January 2018 cycle peak in the face of two large and abrupt volatility expansions and broken trends.



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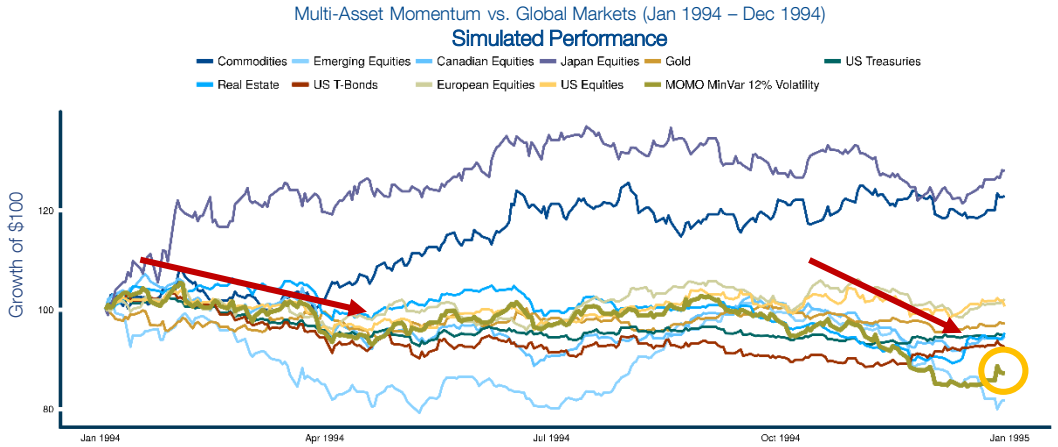
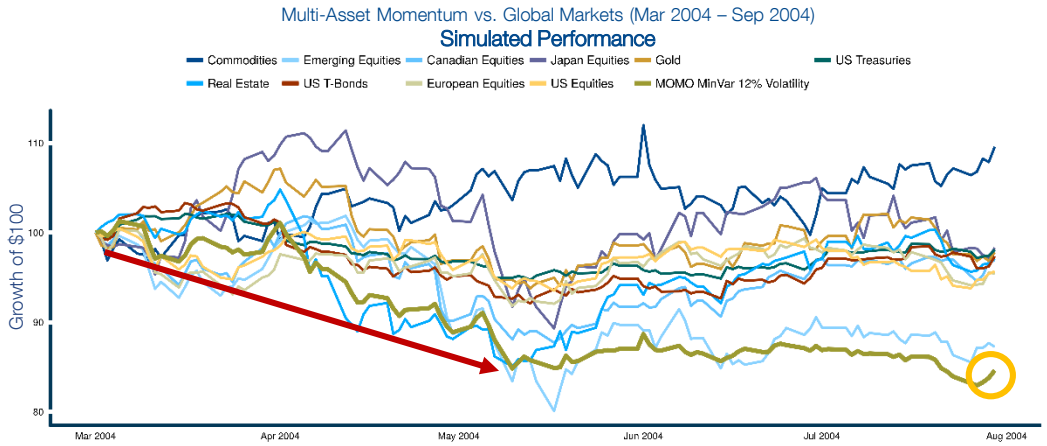
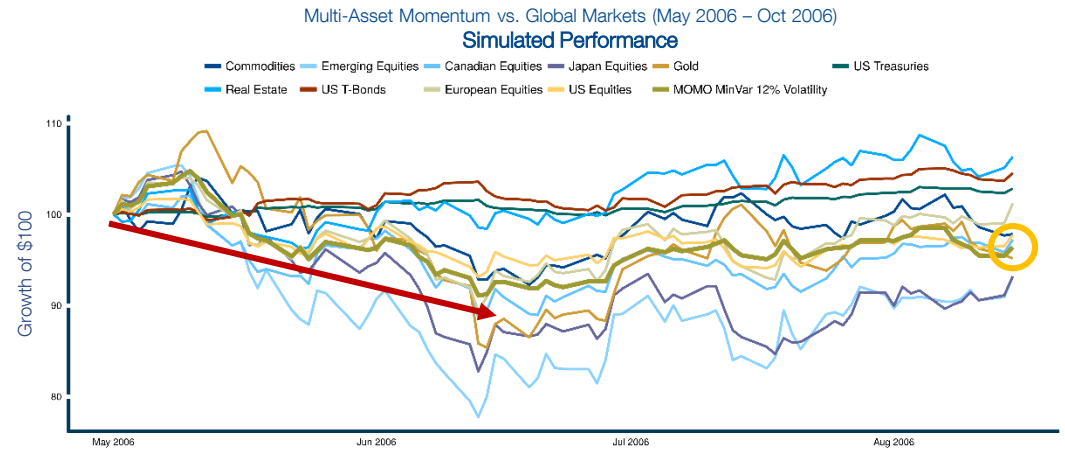
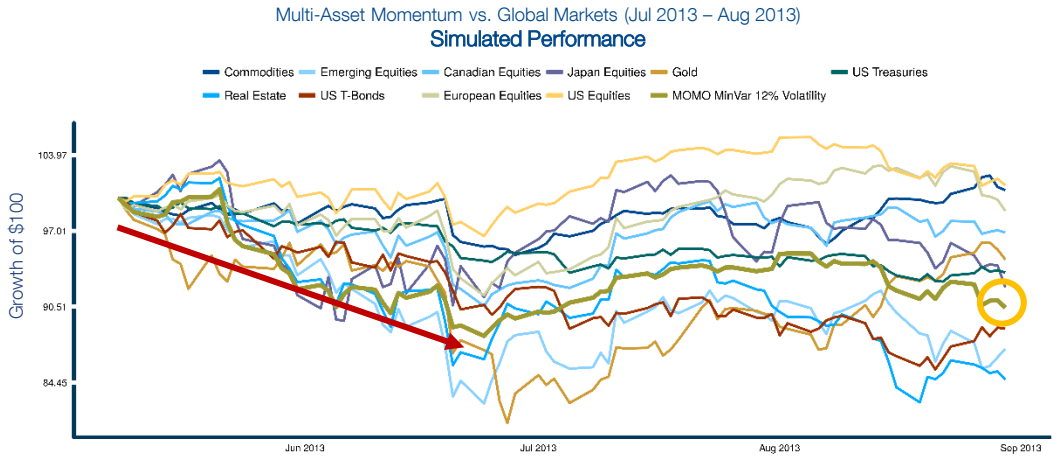
History Doesn’t
Repeat
But It
Often Rhymes

When favourable trend cycles end we typically see a volatility spike followed by low dispersion and trendless environment. This drives Multi-Asset Momentum to the bottom of the performance pile. This has happened several times before.









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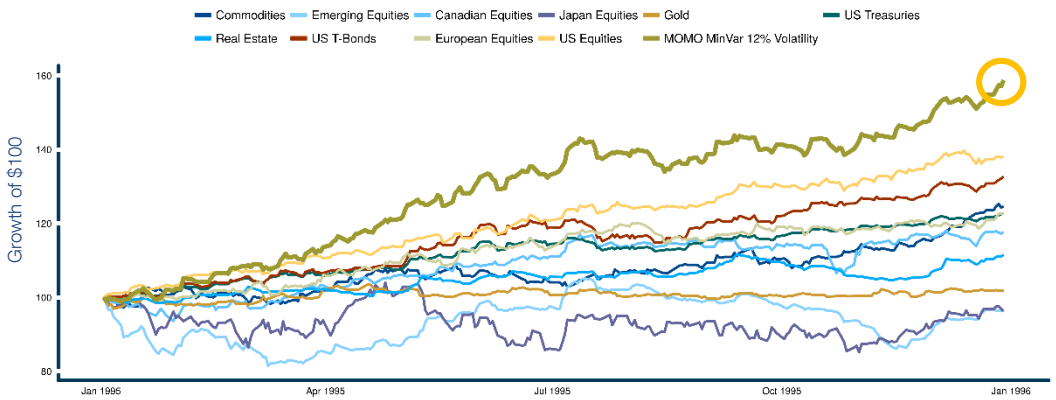
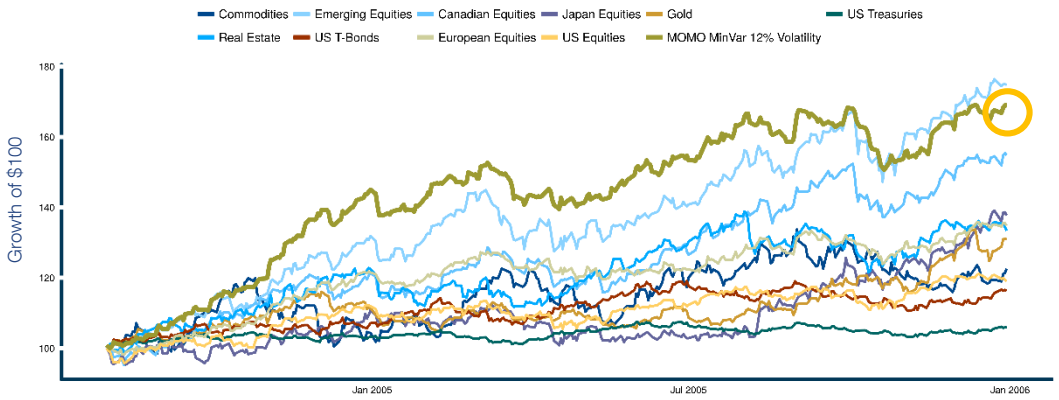
When the tumult ends, new trends emerge as investors form a consensus about new leaders and laggards. Historically, this has produced high dispersion and stable volatility, conditions that drove Multi-Asset Momentum toward the top of the performance boards over the following year.

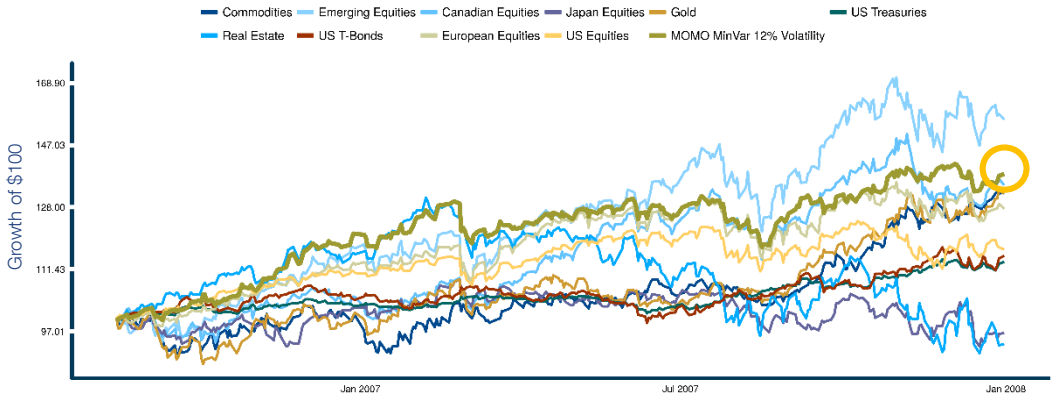
Multi-Asset Momentum vs. Global Markets (Jan 1995 – Dec 1995)



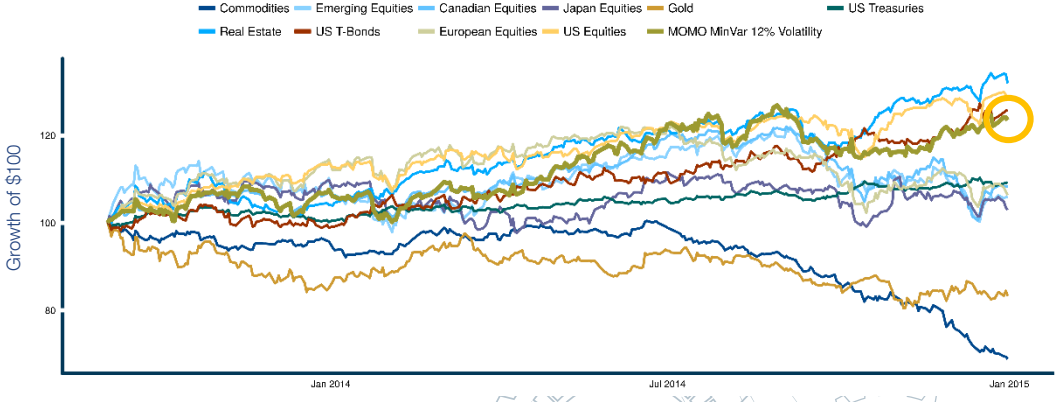
Multi-Asset Momentum vs. Global Markets (Jan 2005 – Dec 2005)



Multi-Asset Momentum vs. Global Markets (Jan 2007 – Dec 2007)



Multi-Asset Momentum vs. Global Markets (Oct 2013 – Aug 2014)



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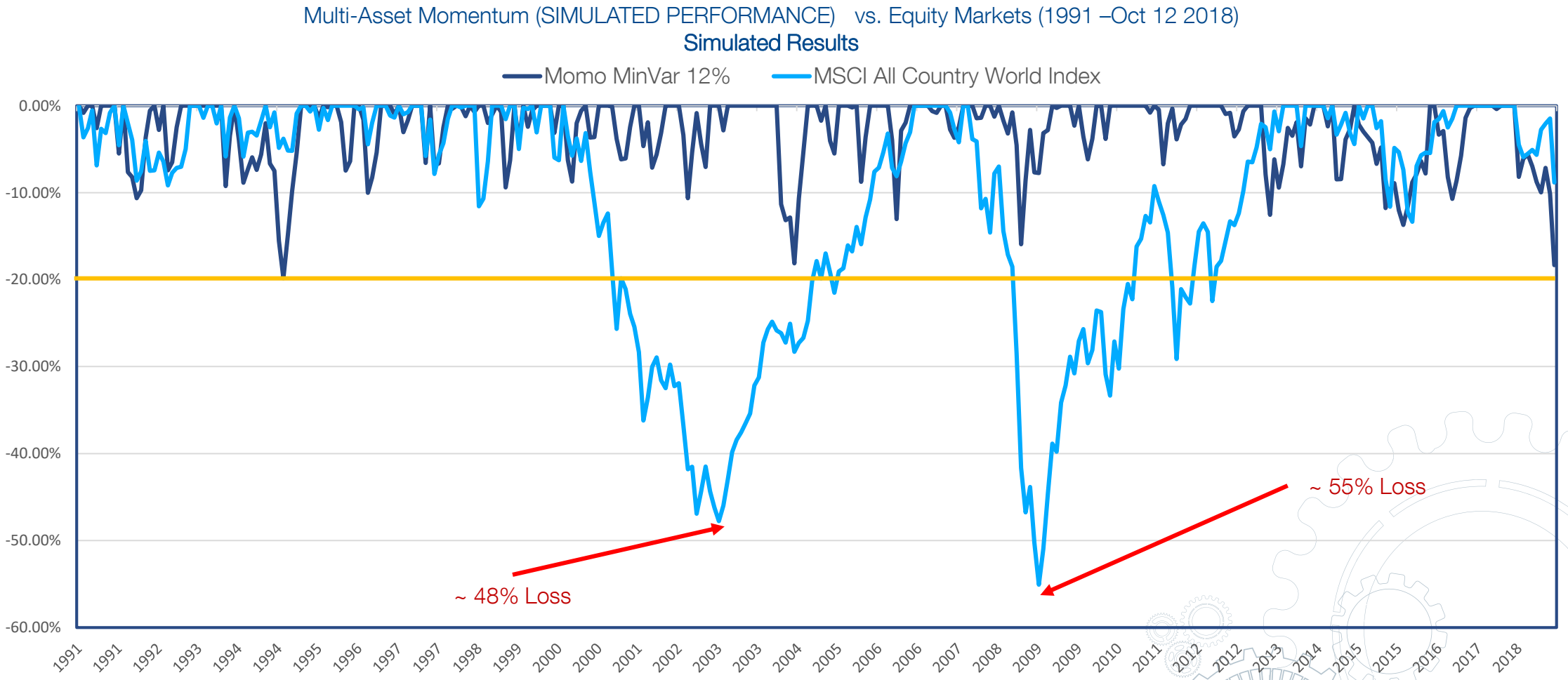
Note similarities in drawdown character between 1994, 2004 and 2018. Multi-Asset Momentum is NOT designed to protect against acute market meltdowns, but rather seeks to avoid large sustained wealth impairment from multi-year bear markets.



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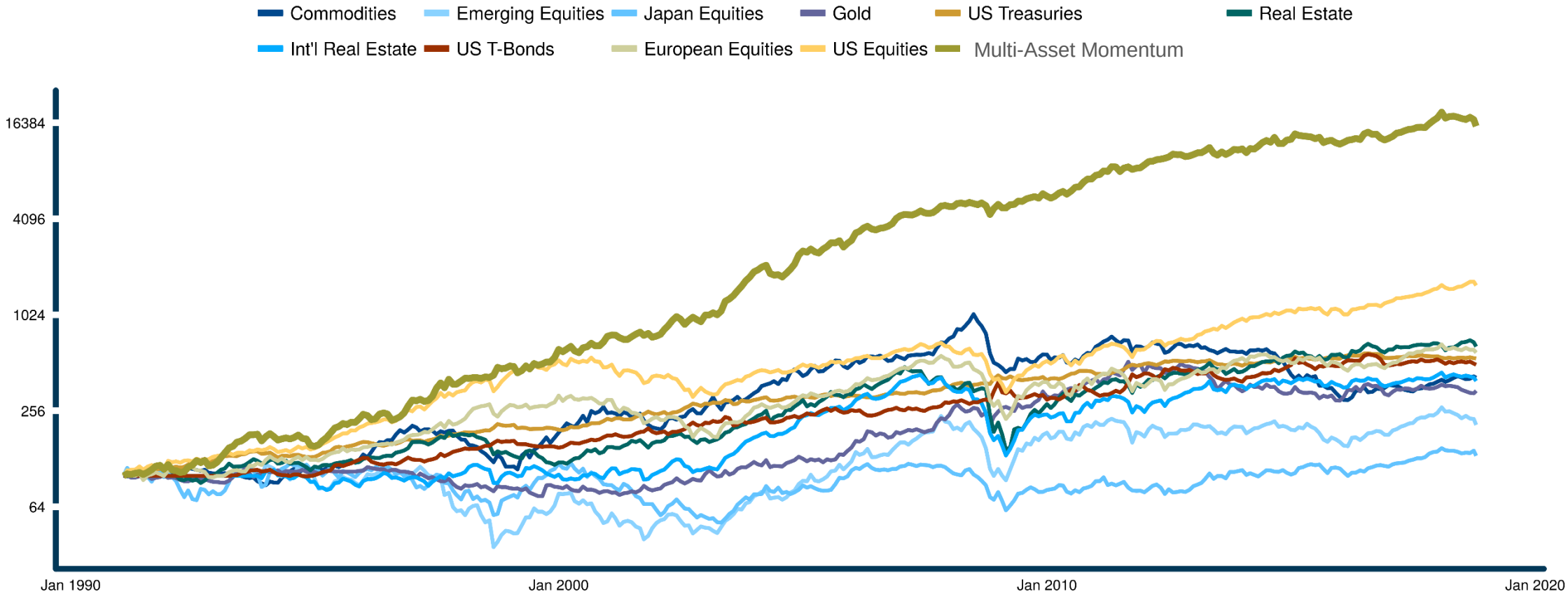
Taking Stock Through Long Term Thinking

We need to focus on the process long-term. Is it easy to visually identify the downturns in ’94, ‘04,’06,’13 and ’18 from this chart?

Momentum Factor at 12% Volatility vs. Global Markets (1991– Sept 2018)
Simulated Results



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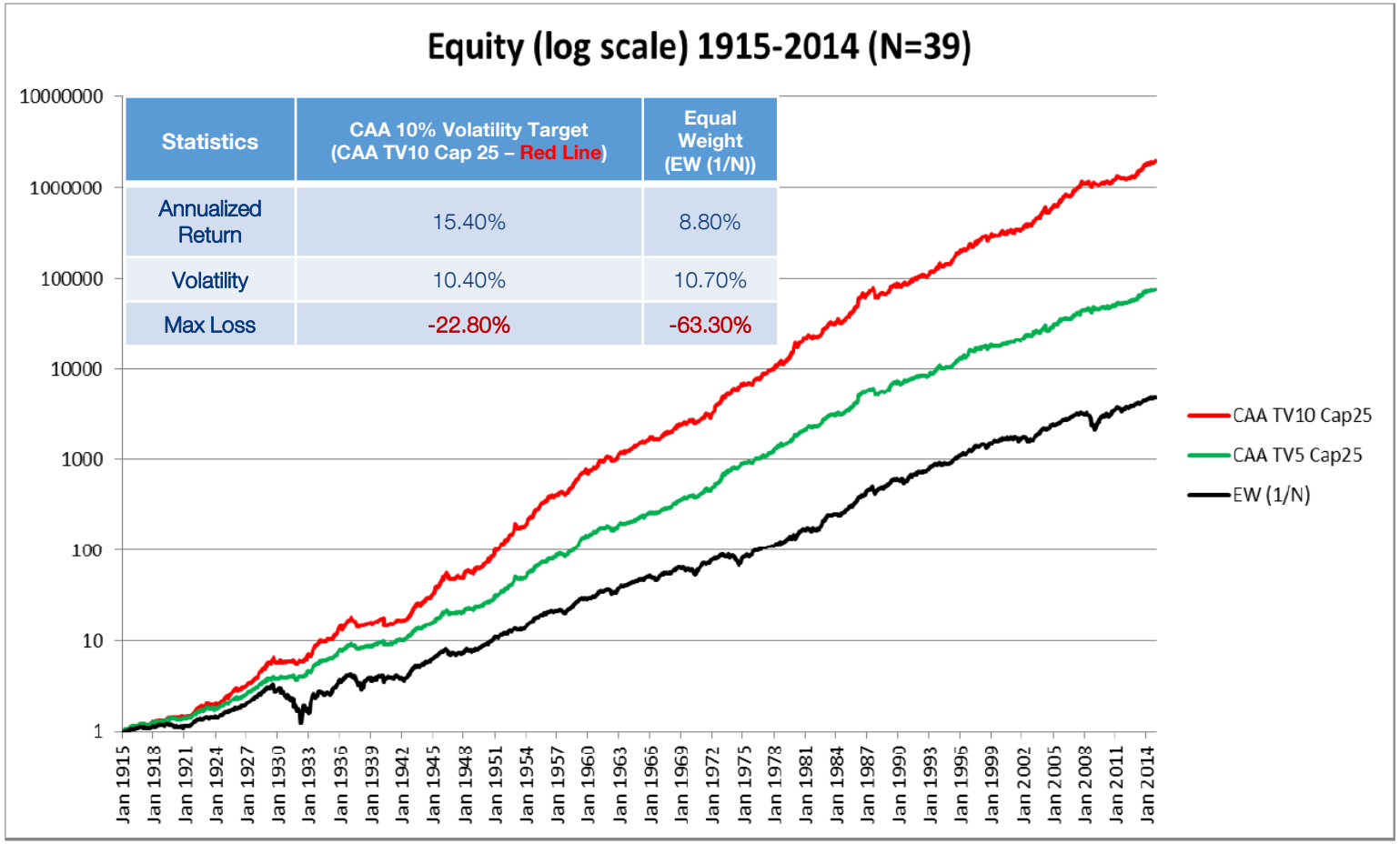
Keller, Butler and Kipnis validated a similar Multi-Asset Momentum strategy using monthly data back to 1915.

Hypothetical Results from “Momentum and Markowitz: A Golden Combination” (2014) Paper

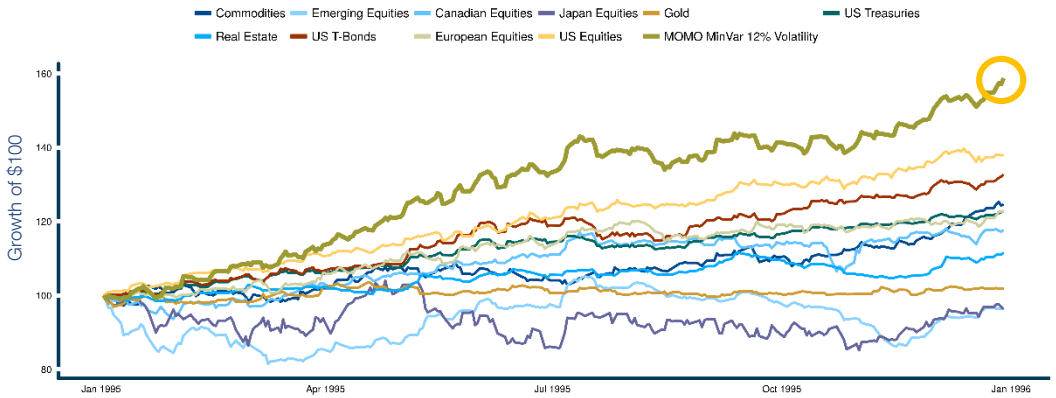


Statistics	CAA 10% Volatility Target (CAA TV10 Cap 25 – Red Line)	Equal Weight (EW (1/N))
Annualized Return	15.40%	8.80%
Volatility	10.40%	10.70%
Max Loss	-22.80%	-63.30%

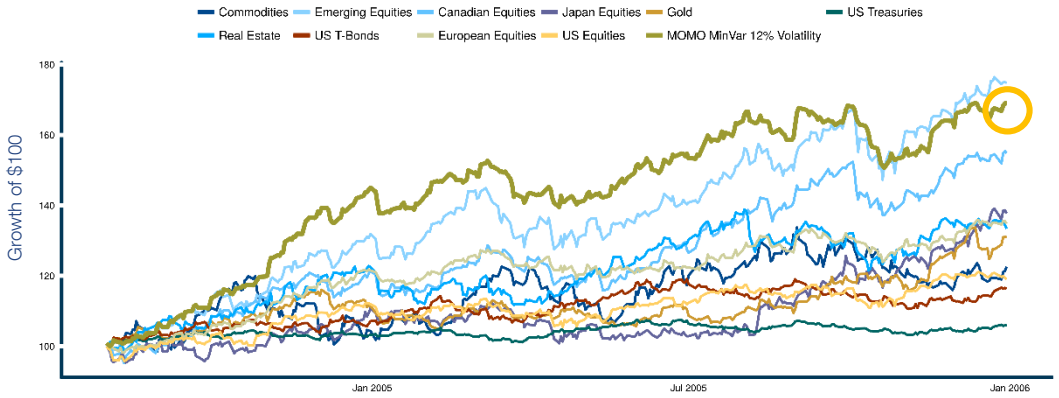
Source: Keller, Butler and Kipnis, “Momentum and Markowitz: A Golden Combination” (2014). Past results are not necessarily indicative of future results.. Please review the disclosures at the end for more information. This HYPOTHETICAL PERFORMANCE does not represent the return to an actual fund or trading account that an investor could directly participate in. These results show the growth of $1 assuming the purchase and sales of securities were executed at their monthly closing price. Profits are reinvested and the simulation does not reflect any transaction costs of buying and selling securities or management fees. For Illustrative purposes only. Hypothetical data has inherent limitations, some of which are described in the disclosures.

Periods of consolidation tend to end and transform into periods of persistent trends, high dispersion and stable volatility profiles which favors momentum.

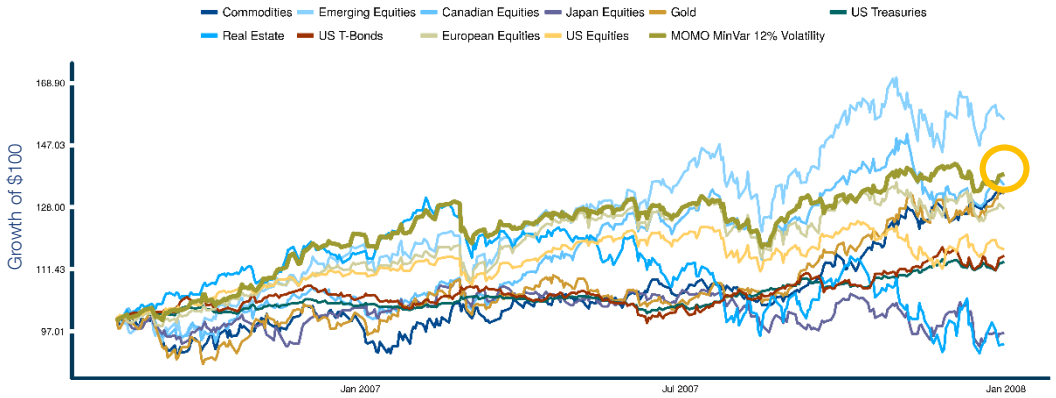
Multi-Asset Momentum vs. Global Markets (Jan 1995 – Dec 1995)



Multi-Asset Momentum vs. Global Markets (Jan 2005 – Dec 2005)



Multi-Asset Momentum vs. Global Markets (Jan 2007 – Dec 2007)



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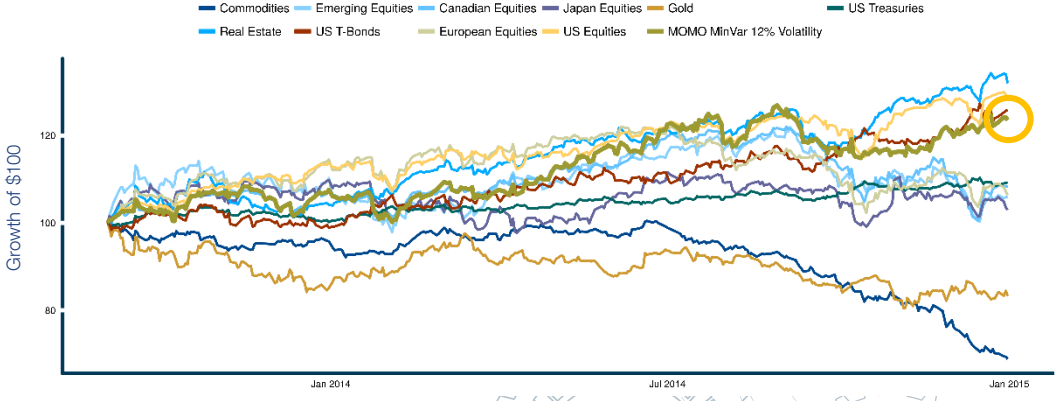

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General information regarding returns. Performance data prior to August, 2015 reflects the performance of accounts managed by Dundee Securities Ltd., which used the same investment decision makers, processes, objectives and strategies as ReSolve has used since it became registered and commenced operations in August, 2015. Records that document and support this past performance are available upon request. Performance is expressed in CAD, net of applicable management fees. Indicated returns of one year or more are annualized. Past performance is not indicative of future performance.

General information regarding the use of benchmarks. The benchmark is the Global Balanced Portfolio (USD), a custom benchmark that approximates the total returns to a globally diversified "60-40" balanced portfolio of US exchange-traded funds. This benchmark is constructed as follows: 60% Vanguard Total World Stock Index ETF (VT); 20% iShares Core U.S. Aggregate Bond ETF (AGG) and 20% SPiDeR Bloomberg Barclays International Treasury Bond ETF (BWX). This benchmark is rebalanced on the last business day of each month, using that day's closing trading prices for each constituent to determine the new constituent weights. The benchmark returns are calculated monthly and in US dollars. For periods prior to when these ETF's were available they have been extended using index data for the same ETF.

General information regarding hypothetical performance and simulated results. Past results are not necessarily indicative of future results. It is expected that the simulated performance will periodically change as a function of both refinements to our simulation methodology and the underlying market data. These results are based on simulated or hypothetical performance results that have certain inherent limitations. Unlike the results in an actual performance record, these results do not represent actual trading. Also, because these trades have not actually been executed, these results may have under- or over-compensated for the impact, if any, of certain market factors, such as lack of liquidity. Simulated or hypothetical trading programs in general are also subject to the fact that they are designed with the benefit of hindsight. No representation is being made that any account or fund will or is likely to achieve profits or losses similar to those being shown. The results do not include other costs of managing a portfolio (such as custodial fees, legal, auditing, administrative or other professional fees). The information in this presentation has not been reviewed or audited by an independent accountant or other independent testing firm. More detailed information regarding the manner in which the charts were calculated is available on request. Any actual fund or account that ReSolve manages will invest in different economic conditions, during periods with different volatility and in different securities than those incorporated in the hypothetical performance charts shown. There is no representation that any fund or account will perform as the hypothetical or other performance charts indicate.

General information regarding the simulation process. The hypothetical results shown are based on extensive models and calculations that are available for any potential investor to review before making a decision to invest.

Benchmark Disclaimer Benchmarks for this presentation are created using asset class data from CSI Data, MSCI, Ken French, Deutsche Bank, and S&P Dow Jones Indices covering the following assets: U.S. Stocks (VTI + VFINX + CRSP Total Market), European Stocks (VGK + IEV + S&P Europe BMI), Japanese Stocks (EWJ + MSCI Japan Index), Emerging Stocks (VWO + S&P Emerging BMI), US REITs (IYR + CSRSX), International REITs (RWX + EGLRX), Commodities (DBC + Deutsche Bank Liquid Commodity Index TR), Gold (GLD + Gold Spot), Intermediate Treasuries (IEF + S&P US Treasury 7-10 Year TR), Long Treasuries (TLT + S&P US Treasury Bond 20+ Year Index TR).

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