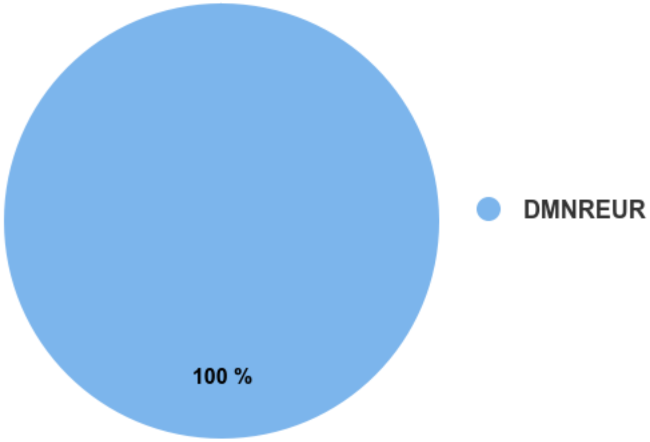
## Report Parameters

| | |
|---|---|
| **Start Date** | 01/01/2001 |
| **End Date** | 11/30/2018 |
| **Initial Balance** | $50,000 |
| **Periodic Adjustment** | None |
| **Rebalancing** | Rebalance annually |
| **Reinvest Dividends** | Yes |

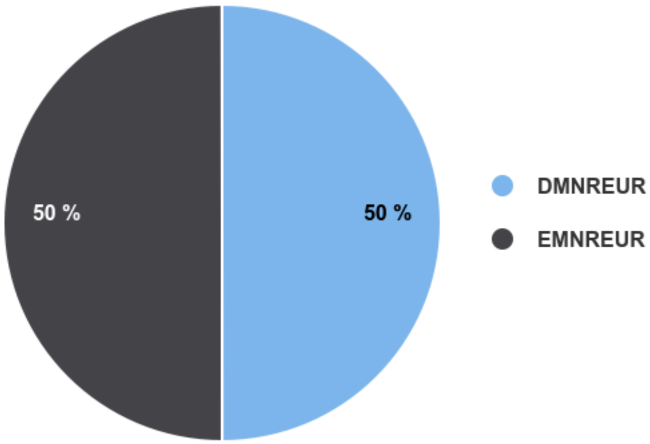
## Portfolio 1

| Ticker | Name | Allocation |
|---|---|---|
| DMNREUR | msci world nr eur | 100.00% |



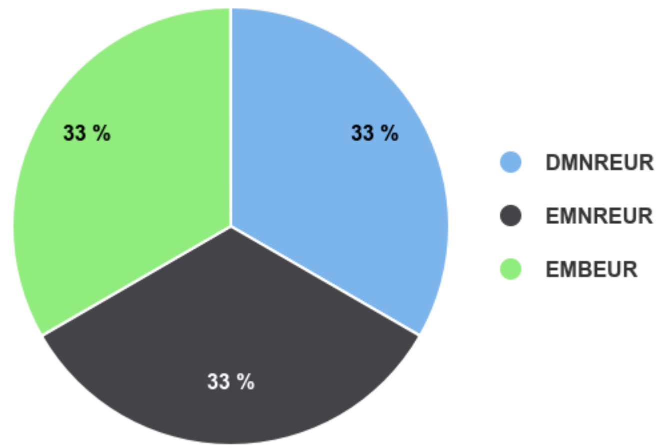

## Portfolio 2

| Ticker | Name | Allocation |
|---|---|---|
| DMNREUR | msci world nr eur | 50.00% |
| EMNREUR | msci em nr eur | 50.00% |



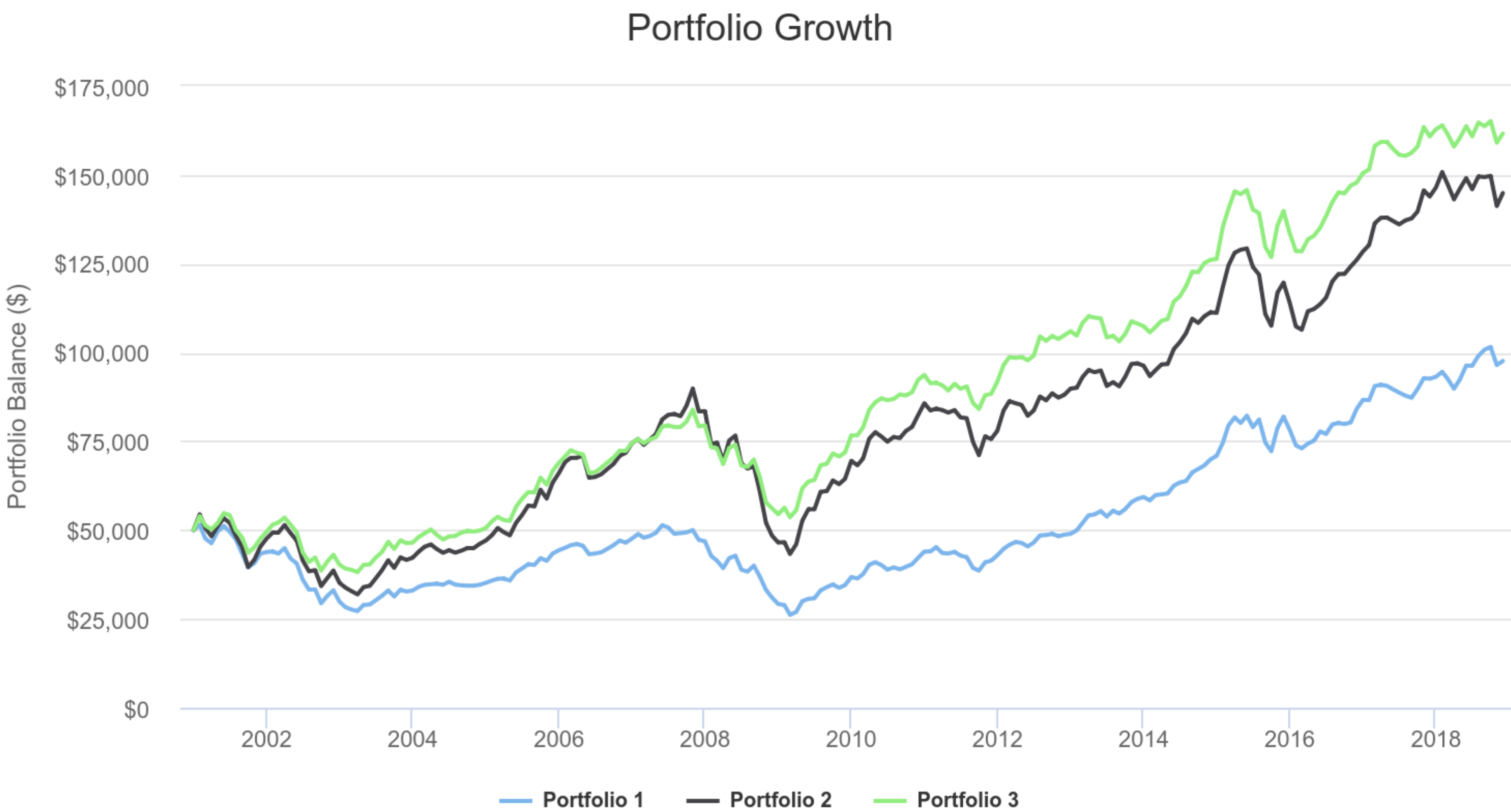
## Portfolio 3

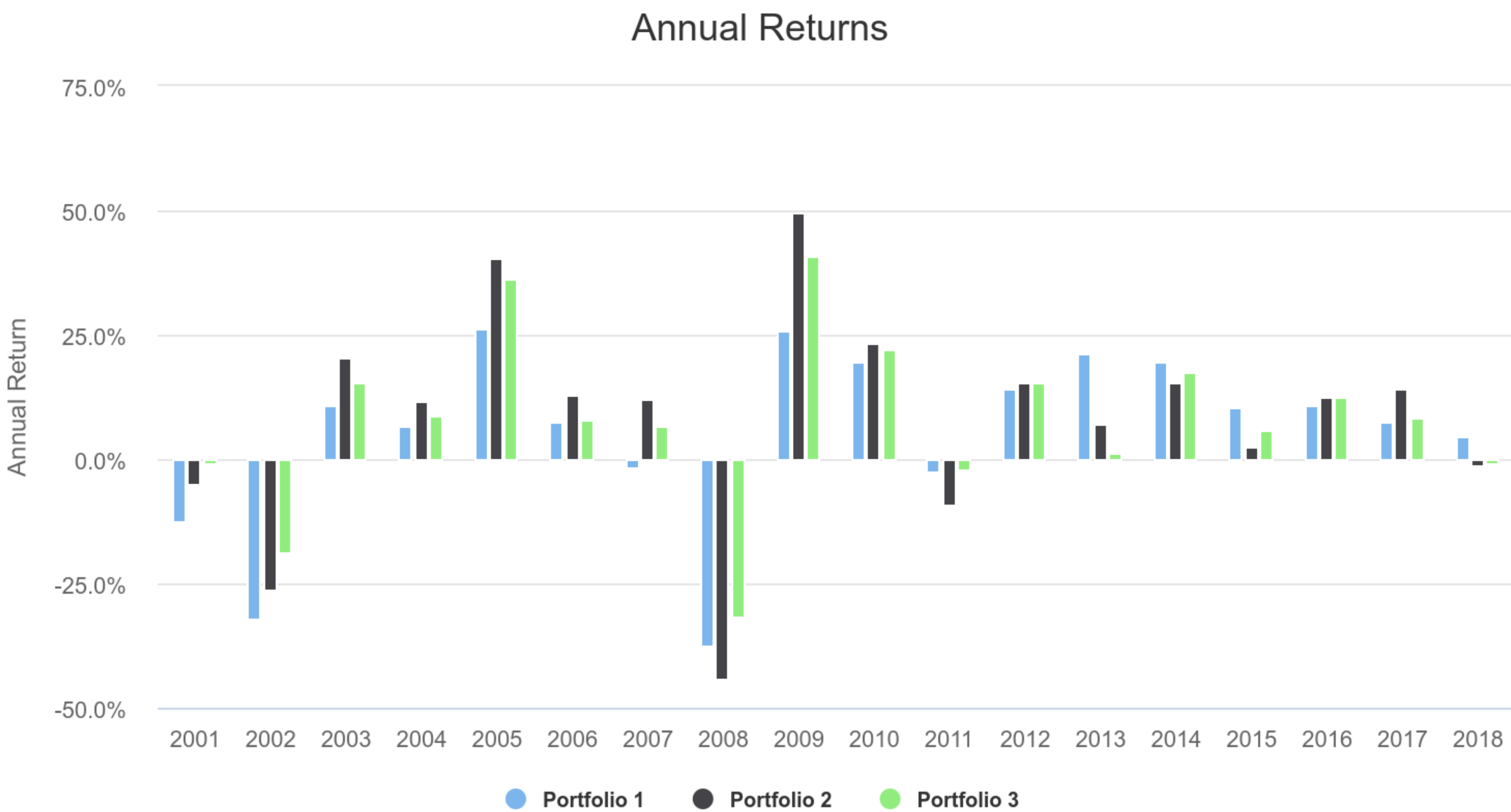
| Ticker | Name | Allocation |
|---|---|---|
| DMNREUR | msci world nr eur | 33.34% |
| EMNREUR | msci em nr eur | 33.33% |
| EMBEUR | emerging markets bonds | 33.33% |




## Portfolio Performance

| Metric | Portfolio 1 | Portfolio 2 | Portfolio 3 |
|---|---|---|---|
| Start Balance | $50,000 | $50,000 | $50,000 |
| End Balance | $97,600 | $144,860 | $161,611 |
| End Balance (inflation adjusted) | $67,380 | $100,007 | $111,572 |
| CAGR | 3.80% | 6.12% | 6.77% |
| CAGR (inflation adjusted) | 1.68% | 3.94% | 4.58% |
| Stdev | 13.47% | 15.56% | 12.25% |
| Best Year | 26.17% | 49.41% | 40.76% |
| Worst Year | -37.67% | -44.30% | -31.48% |
| Max. Drawdown | -49.17% | -51.83% | -36.07% |
| Sharpe Ratio | 0.24 | 0.37 | 0.49 |
| Sortino Ratio | 0.33 | 0.52 | 0.70 |
| US Stock Market Correlation | 0.82 | 0.80 | 0.68 |


Portfolio Growth
$175,000
$150,000
$125,000
$100,000
$75,000
$50,000
$25,000
$0
Portfolio Balance ($)
2002
2004
2006
2008
2010
2012
2014
2016
2018
Portfolio 1
Portfolio 2
Portfolio 3


Annual Returns
75.0%
50.0%
25.0%
0.0%
-25.0%
-50.0%
Annual Return
2001
2002
2003
2004
2005
2006
2007
2008
2009
2010
2011
2012
2013
2014
2015
2016
2017
2018
Portfolio 1
Portfolio 2
Portfolio 3

## Risk and Return Metrics

| Metric | Portfolio 1 | Portfolio 2 | Portfolio 3 |
|---|---|---|---|
| Arithmetic Mean (monthly) | 0.39% | 0.60% | 0.61% |
| Arithmetic Mean (annualized) | 4.76% | 7.41% | 7.57% |
| Geometric Mean (monthly) | 0.31% | 0.50% | 0.55% |
| Geometric Mean (annualized) | 3.80% | 6.12% | 6.77% |
| Volatility (monthly) | 3.89% | 4.49% | 3.54% |
| Volatility (annualized) | 13.47% | 15.56% | 12.25% |
| Downside Deviation (monthly) | 2.82% | 3.14% | 2.40% |
| Max. Drawdown | -49.17% | -51.83% | -36.07% |
| US Market Correlation | 0.82 | 0.80 | 0.68 |
| Beta (*) | 0.76 | 0.85 | 0.57 |
| Alpha (annualized) | -1.11% | 0.72% | 2.98% |
| R Squared | 67.88% | 63.78% | 46.54% |
| Sharpe Ratio | 0.24 | 0.37 | 0.49 |
| Sortino Ratio | 0.33 | 0.52 | 0.70 |
| Treynor Ratio (%) | 4.35 | 6.85 | 10.43 |
| Calmar Ratio | 0.55 | 0.59 | 0.61 |
| Active Return | -2.90% | -0.59% | 0.06% |
| Tracking Error | 8.41% | 9.62% | 10.93% |
| Information Ratio | -0.35 | -0.06 | 0.01 |
| Skewness | -0.68 | -0.59 | -0.59 |
| Excess Kurtosis | 0.88 | 1.01 | 1.14 |
| Historical Value-at-Risk (5%) | -7.80% | -8.28% | -6.56% |
| Analytical Value-at-Risk (5%) | -6.01% | -6.76% | -5.27% |
| Conditional Value-at-Risk (5%) | -9.59% | -10.94% | -8.50% |
| Upside Capture Ratio (%) | 73.56 | 88.55 | 65.82 |
| Downside Capture Ratio (%) | 84.56 | 90.26 | 58.35 |
| Safe Withdrawal Rate | 4.46% | 6.78% | 7.47% |
| Perpetual Withdrawal Rate | 1.74% | 3.99% | 4.61% |
| Positive Periods | 134 out of 215 (62.33%) | 135 out of 215 (62.79%) | 133 out of 215 (61.86%) |
| Gain/Loss Ratio | 0.78 | 0.84 | 0.97 |

*(*) US stock market is used as the benchmark for calculations. Value-at-risk metrics are based on monthly values.*

## Portfolio 1 Returns

| Year | Jan | Feb | Mar | Apr | May | Jun | Jul | Aug | Sep | Oct | Nov | Dec | Total | Inflation | Balance |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| 2001 | 2.90% | -7.39% | -2.83% | 7.02% | 3.23% | -3.03% | -4.54% | -8.34% | -8.99% | 3.04% | 6.51% | 1.15% | -12.30% | 1.55% | $43,850 |
| 2002 | 0.23% | -1.25% | 3.46% | -6.46% | -3.33% | -11.21% | -7.77% | 0.15% | -11.71% | 7.14% | 4.92% | -9.83% | -32.04% | 2.38% | $29,800 |
| 2003 | -5.20% | -2.12% | -1.63% | 6.43% | 0.35% | 4.13% | 4.13% | 4.76% | -5.15% | 6.07% | -1.51% | 0.92% | 10.74% | 1.88% | $33,000 |
| 2004 | 3.18% | 1.62% | 0.43% | 0.43% | -0.86% | 2.46% | -2.26% | -0.58% | -0.29% | 0.00% | 0.73% | 1.59% | 6.52% | 3.26% | $35,150 |
| 2005 | 1.85% | 1.40% | 0.14% | -1.51% | 6.42% | 2.89% | 3.06% | -0.50% | 4.73% | -1.78% | 4.96% | 2.19% | 26.17% | 3.42% | $44,350 |
| 2006 | 1.47% | 1.67% | 0.66% | -0.98% | -5.26% | 0.46% | 0.81% | 2.29% | 2.23% | 2.84% | -1.28% | 2.48% | 7.33% | 2.54% | $47,600 |
| 2007 | 2.73% | -2.15% | 1.04% | 1.86% | 4.26% | -1.17% | -3.55% | 0.41% | 0.41% | 1.32% | -5.50% | -0.85% | -1.58% | 4.08% | $46,850 |
| 2008 | -8.86% | -3.04% | -5.07% | 7.12% | 1.66% | -9.23% | -1.42% | 4.44% | -7.62% | -10.28% | -6.49% | -5.81% | -37.67% | 0.09% | $29,200 |
| 2009 | -1.03% | -9.52% | 3.06% | 11.32% | 2.17% | 0.49% | 7.31% | 2.72% | 2.21% | -2.74% | 2.22% | 6.52% | 25.86% | 2.72% | $36,750 |
| 2010 | -0.95% | 3.30% | 7.05% | 1.74% | -1.95% | -3.24% | 1.67% | -1.39% | 1.80% | 1.89% | 4.46% | 4.15% | 19.59% | 1.50% | $43,950 |
| 2011 | 0.11% | 2.73% | -3.65% | -0.34% | 1.15% | -2.51% | -0.93% | -7.19% | -1.91% | 6.09% | 1.10% | 3.62% | -2.39% | 2.96% | $42,900 |
| 2012 | 4.20% | 2.57% | 1.74% | -0.54% | -2.16% | 2.42% | 4.30% | 0.21% | 0.72% | -1.43% | 0.93% | 0.51% | 14.10% | 1.74% | $48,950 |
| 2013 | 2.04% | 4.00% | 4.23% | 0.46% | 1.75% | -2.80% | 3.07% | -1.44% | 2.29% | 3.49% | 1.64% | 0.85% | 21.14% | 1.50% | $59,300 |
| 2014 | -1.60% | 2.57% | 0.33% | 0.42% | 3.65% | 1.44% | 0.63% | 3.84% | 1.43% | 1.49% | 2.49% | 1.43% | 19.56% | 0.76% | $70,900 |
| 2015 | 5.22% | 6.50% | 2.83% | -1.90% | 2.56% | -3.89% | 2.66% | -7.95% | -3.28% | 9.07% | 4.06% | -4.51% | 10.37% | 0.73% | $78,250 |
| 2016 | -5.62% | -1.15% | 1.85% | 1.08% | 3.46% | -0.90% | 3.50% | 0.50% | -0.37% | 0.56% | 4.79% | 2.97% | 10.73% | 2.07% | $86,650 |
| 2017 | -0.06% | 4.56% | 0.39% | -0.33% | -1.10% | -1.00% | -0.96% | -0.68% | 2.81% | 3.40% | -0.16% | 0.59% | 7.50% | 2.11% | $93,150 |
| 2018 | 1.50% | -2.12% | -2.97% | 2.95% | 4.16% | -0.05% | 2.91% | 1.77% | 0.74% | -5.02% | 1.19% | | 4.78% | 1.91% | $97,600 |

## Portfolio 2 Returns

| Year | Jan | Feb | Mar | Apr | May | Jun | Jul | Aug | Sep | Oct | Nov | Dec | Total | Inflation | Balance |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| 2001 | 8.85% | -7.07% | -4.60% | 5.75% | 4.56% | -2.48% | -7.06% | -6.46% | -12.49% | 5.24% | 8.82% | 5.02% | -4.80% | 1.55% | $47,600 |
| 2002 | 3.57% | -0.04% | 4.33% | -4.41% | -4.28% | -11.90% | -7.36% | 0.86% | -11.57% | 6.64% | 5.73% | -9.07% | -26.24% | 2.38% | $35,108 |
| 2003 | -3.89% | -2.70% | -2.84% | 6.46% | 1.00% | 6.19% | 6.27% | 7.17% | -5.06% | 7.42% | -1.66% | 1.46% | 20.24% | 1.88% | $42,214 |
| 2004 | 4.14% | 3.06% | 1.44% | -2.82% | -2.35% | 1.66% | -1.56% | 1.30% | 1.61% | -0.04% | 2.71% | 2.06% | 11.51% | 3.26% | $47,073 |
| 2005 | 3.19% | 4.10% | -2.31% | -1.79% | 7.30% | 4.20% | 4.92% | -0.44% | 8.27% | -4.02% | 7.64% | 4.19% | 40.29% | 3.42% | $66,041 |
| 2006 | 4.72% | 1.68% | 0.02% | 1.00% | -8.88% | 0.34% | 1.20% | 2.27% | 2.06% | 3.40% | 1.13% | 3.80% | 12.76% | 2.54% | $74,469 |
| 2007 | 1.57% | -2.18% | 2.09% | 1.96% | 5.35% | 1.60% | 0.30% | -0.73% | 3.61% | 5.65% | -7.14% | 0.04% | 12.08% | 4.08% | $83,463 |
| 2008 | -11.22% | 0.74% | -7.20% | 8.57% | 1.85% | -10.23% | -2.10% | 1.02% | -10.45% | -14.53% | -6.96% | -4.01% | -44.30% | 0.09% | $46,493 |
| 2009 | 0.21% | -7.10% | 6.34% | 14.28% | 6.23% | -0.03% | 8.83% | 0.30% | 4.93% | -1.63% | 2.38% | 7.81% | 49.41% | 2.72% | $69,466 |
| 2010 | -1.74% | 2.74% | 8.02% | 2.36% | -1.55% | -1.89% | 1.76% | -0.42% | 2.64% | 1.47% | 4.20% | 4.04% | 23.35% | 1.50% | $85,684 |
| 2011 | -2.35% | 0.59% | -0.46% | -0.84% | 0.82% | -2.43% | -0.27% | -8.13% | -5.04% | 7.42% | -0.98% | 3.06% | -9.04% | 2.96% | $77,935 |
| 2012 | 7.32% | 3.16% | -0.66% | -0.56% | -3.57% | 1.80% | 4.68% | -1.21% | 2.27% | -1.37% | 0.92% | 1.97% | 15.26% | 1.74% | $89,825 |
| 2013 | 0.26% | 3.28% | 2.20% | -0.66% | 0.51% | -4.59% | 1.18% | -1.26% | 2.94% | 3.90% | 0.17% | -0.68% | 7.17% | 1.50% | $96,268 |
| 2014 | -3.04% | 1.75% | 1.77% | 0.09% | 4.39% | 1.88% | 2.46% | 3.86% | -1.06% | 1.75% | 0.97% | -0.12% | 15.47% | 0.76% | $111,156 |
| 2015 | 6.56% | 5.09% | 2.89% | 0.65% | 0.28% | -4.02% | -1.75% | -9.08% | -2.99% | 8.69% | 2.39% | -4.71% | 2.58% | 0.73% | $114,027 |
| 2016 | -5.88% | -0.86% | 4.90% | 0.54% | 1.21% | 1.66% | 3.94% | 1.74% | 0.01% | 1.72% | 1.50% | 1.86% | 12.61% | 2.07% | $128,411 |
| 2017 | 1.44% | 4.70% | 1.14% | 0.03% | -0.70% | -0.69% | 0.84% | 0.40% | 1.41% | 4.26% | -1.18% | 1.77% | 14.04% | 2.11% | $146,445 |
| 2018 | 2.96% | -2.34% | -2.82% | 2.13% | 2.00% | -2.09% | 2.46% | -0.11% | 0.23% | -5.67% | 2.57% | | -1.08% | 1.91% | $144,860 |

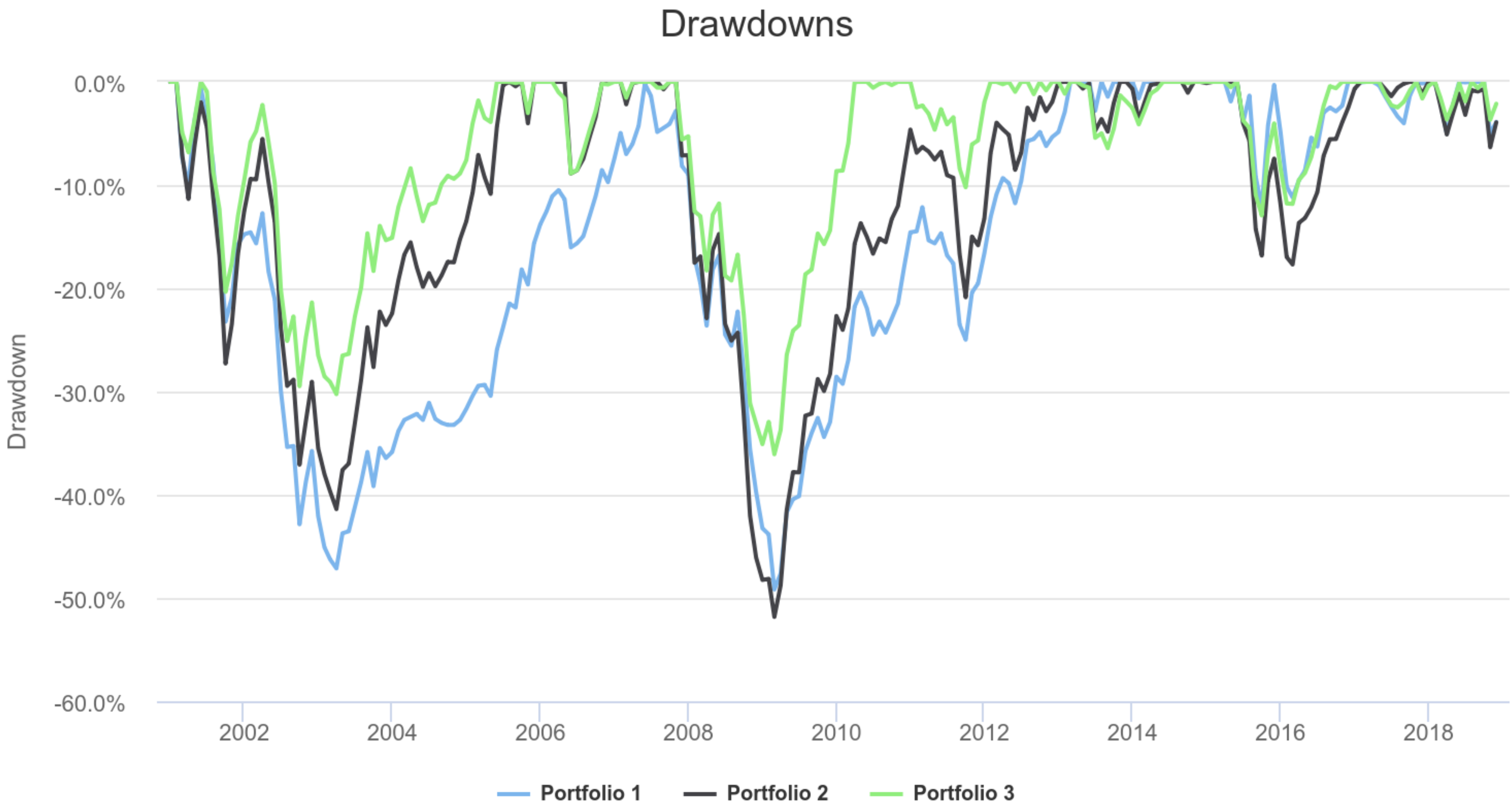
## Portfolio 3 Returns

| Year | Jan | Feb | Mar | Apr | May | Jun | Jul | Aug | Sep | Oct | Nov | Dec | Total | Inflation | Balance |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| 2001 | 7.83% | -4.92% | -2.02% | 3.38% | 5.39% | -0.94% | -7.87% | -3.94% | -9.14% | 3.52% | 5.47% | 3.99% | -1.00% | 1.55% | $49,499 |
| 2002 | 4.13% | 1.11% | 2.66% | -3.66% | -4.24% | -11.44% | -6.22% | 3.16% | -8.74% | 6.61% | 4.58% | -6.51% | -18.72% | 2.38% | $40,235 |
| 2003 | -2.79% | -0.75% | -1.66% | 5.36% | 0.22% | 4.90% | 3.63% | 6.57% | -4.27% | 5.35% | -1.61% | 0.27% | 15.47% | 1.88% | $46,460 |
| 2004 | 3.52% | 2.06% | 2.17% | -2.95% | -2.72% | 1.84% | 0.22% | 2.04% | 0.89% | -0.32% | 0.56% | 1.43% | 8.87% | 3.26% | $50,581 |
| 2005 | 3.84% | 2.32% | -1.72% | -0.40% | 7.50% | 4.06% | 3.10% | -0.12% | 6.87% | -3.03% | 6.16% | 3.39% | 36.27% | 3.42% | $68,925 |
| 2006 | 2.66% | 2.43% | -1.02% | -0.60% | -7.38% | 0.35% | 1.92% | 2.24% | 1.97% | 2.71% | -0.07% | 3.09% | 8.12% | 2.54% | $74,519 |
| 2007 | 1.46% | -1.55% | 1.48% | 0.78% | 3.95% | 0.39% | -0.56% | -0.00% | 1.95% | 4.17% | -5.60% | 0.34% | 6.65% | 4.08% | $79,475 |
| 2008 | -7.68% | -0.53% | -6.05% | 6.63% | 1.23% | -7.92% | -0.58% | 3.10% | -6.98% | -11.09% | -2.88% | -2.96% | -31.48% | 0.09% | $54,456 |
| 2009 | 3.32% | -4.67% | 3.68% | 11.00% | 3.16% | 0.69% | 6.47% | 0.56% | 4.26% | -1.19% | 1.58% | 6.71% | 40.76% | 2.72% | $76,650 |
| 2010 | 0.05% | 2.93% | 6.28% | 2.51% | 1.27% | -0.58% | 0.38% | 1.45% | -0.31% | 1.05% | 3.94% | 1.43% | 22.17% | 1.50% | $93,641 |
| 2011 | -2.47% | 0.18% | -0.79% | -1.61% | 2.08% | -1.50% | 0.71% | -5.14% | -1.98% | 4.63% | 0.40% | 3.91% | -1.99% | 2.96% | $91,781 |
| 2012 | 5.06% | 2.35% | -0.24% | 0.28% | -0.97% | 1.35% | 5.46% | -1.19% | 1.34% | -0.83% | 1.01% | 1.07% | 15.44% | 1.74% | $105,956 |
| 2013 | -1.15% | 3.34% | 1.82% | -0.35% | -0.20% | -4.90% | 0.46% | -1.52% | 2.03% | 3.38% | -0.59% | -0.67% | 1.36% | 1.50% | $107,399 |
| 2014 | -1.62% | 1.39% | 1.69% | 0.40% | 4.54% | 1.25% | 2.49% | 3.44% | -0.11% | 2.12% | 0.70% | 0.19% | 17.61% | 0.76% | $126,310 |
| 2015 | 7.19% | 3.71% | 3.51% | -0.53% | 0.78% | -3.75% | -0.75% | -6.79% | -2.23% | 7.05% | 2.98% | -4.47% | 5.75% | 0.73% | $133,573 |
| 2016 | -3.77% | -0.05% | 2.63% | 0.75% | 1.68% | 2.49% | 2.81% | 1.93% | -0.19% | 1.51% | 0.57% | 1.82% | 12.68% | 2.07% | $150,516 |
| 2017 | 0.65% | 4.39% | 0.70% | 0.00% | -1.26% | -1.02% | -0.22% | 0.57% | 1.13% | 3.47% | -1.61% | 1.26% | 8.18% | 2.11% | $162,834 |
| 2018 | 0.68% | -1.56% | -2.13% | 1.57% | 2.05% | -1.75% | 2.40% | -0.61% | 0.88% | -3.67% | 1.60% | | -0.75% | 1.91% | $161,611 |

## Portfolio Returns Based Style Analysis

| Style Category | Portfolio 1 | Portfolio 2 | Portfolio 3 |
|---|---|---|---|
| Large-cap Value | 18.36% | 0.00% | 0.00% |
| Large-cap Growth | 34.55% | 23.16% | 14.04% |
| Mid-cap Value | 0.00% | 0.86% | 3.76% |
| Mid-cap Growth | 5.41% | 16.55% | 17.83% |
| Small-cap Value | 0.00% | 0.00% | 0.00% |
| Small-cap Growth | 13.24% | 6.36% | 0.78% |
| Global ex-US Developed Markets | 0.00% | 0.00% | 0.00% |
| Emerging Markets | 0.00% | 27.17% | 14.44% |
| Corporate Bonds | 0.00% | 0.00% | 6.56% |
| Long-Term Treasuries | 0.00% | 0.00% | 2.36% |
| Intermediate-Term Treasuries | 0.00% | 0.00% | 0.00% |
| Short-Term Treasuries | 28.45% | 25.90% | 40.24% |
| R Squared | 63.26% | 68.72% | 47.62% |

*Style analysis is based on monthly returns from Apr 2005 to Nov 2018 and uses total portfolio return with monthly rebalancing.*




## Drawdowns for Historical Market Stress Periods

| Stress Period | Start | End | Portfolio 1 | Portfolio 2 | Portfolio 3 |
|---|---|---|---|---|---|
| Subprime Crisis | Nov 2007 | Mar 2009 | -47.70% | -51.83% | -36.07% |

## Drawdowns for Portfolio 1 (worst 10)

| Rank | Start | End | Length | Recovery By | Recovery Time | Underwater Period | Drawdown |
|---|---|---|---|---|---|---|---|
| 1 | Feb 2001 | Feb 2009 | 8 years 1 month | Feb 2013 | 4 years | 12 years 1 month | -49.17% |
| 2 | Jun 2015 | Sep 2015 | 4 months | Nov 2016 | 1 year 2 months | 1 year 6 months | -12.17% |
| 3 | Feb 2018 | Mar 2018 | 2 months | May 2018 | 2 months | 4 months | -5.02% |
| 4 | Oct 2018 | Oct 2018 | 1 month | | | | -5.02% |
| 5 | Apr 2017 | Aug 2017 | 5 months | Oct 2017 | 2 months | 7 months | -4.02% |
| 6 | Jun 2013 | Jun 2013 | 1 month | Jul 2013 | 1 month | 2 months | -2.80% |
| 7 | Apr 2015 | Apr 2015 | 1 month | May 2015 | 1 month | 2 months | -1.90% |
| 8 | Jan 2014 | Jan 2014 | 1 month | Feb 2014 | 1 month | 2 months | -1.60% |
| 9 | Aug 2013 | Aug 2013 | 1 month | Sep 2013 | 1 month | 2 months | -1.44% |
| 10 | Nov 2017 | Nov 2017 | 1 month | Dec 2017 | 1 month | 2 months | -0.16% |

## Drawdowns for Portfolio 2 (worst 10)

| Rank | Start | End | Length | Recovery By | Recovery Time | Underwater Period | Drawdown |
|---|---|---|---|---|---|---|---|
| 1 | Nov 2007 | Feb 2009 | 1 year 4 months | Jan 2013 | 3 years 11 months | 5 years 3 months | -51.83% |
| 2 | Feb 2001 | Mar 2003 | 2 years 2 months | Jul 2005 | 2 years 4 months | 4 years 6 months | -41.39% |
| 3 | Jun 2015 | Feb 2016 | 9 months | Jan 2017 | 11 months | 1 year 8 months | -17.70% |
| 4 | May 2006 | May 2006 | 1 month | Nov 2006 | 6 months | 7 months | -8.88% |
| 5 | Feb 2018 | Oct 2018 | 9 months | | | | -6.33% |
| 6 | Apr 2013 | Aug 2013 | 5 months | Oct 2013 | 2 months | 7 months | -4.82% |
| 7 | Oct 2005 | Oct 2005 | 1 month | Nov 2005 | 1 month | 2 months | -4.02% |
| 8 | Dec 2013 | Jan 2014 | 2 months | May 2014 | 4 months | 6 months | -3.70% |
| 9 | Feb 2007 | Feb 2007 | 1 month | Apr 2007 | 2 months | 3 months | -2.18% |
| 10 | May 2017 | Jun 2017 | 2 months | Sep 2017 | 3 months | 5 months | -1.39% |

## Drawdowns for Portfolio 3 (worst 10)

| Rank | Start | End | Length | Recovery By | Recovery Time | Underwater Period | Drawdown |
|---|---|---|---|---|---|---|---|
| 1 | Nov 2007 | Feb 2009 | 1 year 4 months | Apr 2010 | 1 year 2 months | 2 years 6 months | -36.07% |
| 2 | Jun 2001 | Mar 2003 | 1 year 10 months | May 2005 | 2 years 2 months | 4 years | -30.25% |
| 3 | Jun 2015 | Sep 2015 | 4 months | Oct 2016 | 1 year 1 month | 1 year 5 months | -12.95% |
| 4 | Jan 2011 | Sep 2011 | 9 months | Jan 2012 | 4 months | 1 year 1 month | -10.21% |
| 5 | Mar 2006 | May 2006 | 3 months | Dec 2006 | 7 months | 10 months | -8.87% |
| 6 | Feb 2001 | Mar 2001 | 2 months | May 2001 | 2 months | 4 months | -6.83% |
| 7 | Apr 2013 | Aug 2013 | 5 months | May 2014 | 9 months | 1 year 2 months | -6.43% |
| 8 | Oct 2018 | Oct 2018 | 1 month | | | | -3.67% |
| 9 | Feb 2018 | Mar 2018 | 2 months | Jul 2018 | 4 months | 6 months | -3.66% |
| 10 | Oct 2005 | Oct 2005 | 1 month | Nov 2005 | 1 month | 2 months | -3.03% |

## Portfolio Components

| Name | CAGR | Stdev | Best Year | Worst Year | Max DD | Sharpe Ratio | Sortino Ratio | US Mkt Correlation |
|---|---|---|---|---|---|---|---|---|
| msci world nr eur | 3.80% | 13.47% | 26.17% | -37.67% | -49.17% | 0.24 | 0.33 | 0.82 |
| msci em nr eur | 7.73% | 19.24% | 72.97% | -50.92% | -56.24% | 0.41 | 0.61 | 0.71 |
| emerging markets bonds | 6.89% | 10.41% | 28.22% | -10.27% | -20.73% | 0.56 | 0.90 | 0.08 |

## Monthly Correlations

| Name | msci world nr eur | msci em nr eur | emerging markets bonds | Portfolio 1 | Portfolio 2 | Portfolio 3 |
|---|---|---|---|---|---|---|
| msci world nr eur | - | 0.79 | 0.48 | 1.00 | 0.92 | 0.90 |
| msci em nr eur | 0.79 | - | 0.43 | 0.79 | 0.96 | 0.92 |
| emerging markets bonds | 0.48 | 0.43 | - | 0.48 | 0.47 | 0.68 |

## Portfolio Return Decomposition

| Name | Portfolio 1 | Portfolio 2 | Portfolio 3 |
|---|---|---|---|
| msci world nr eur | $47,600 | $41,227 | $34,084 |
| msci em nr eur | | $53,633 | $42,658 |
| emerging markets bonds | | | $34,869 |

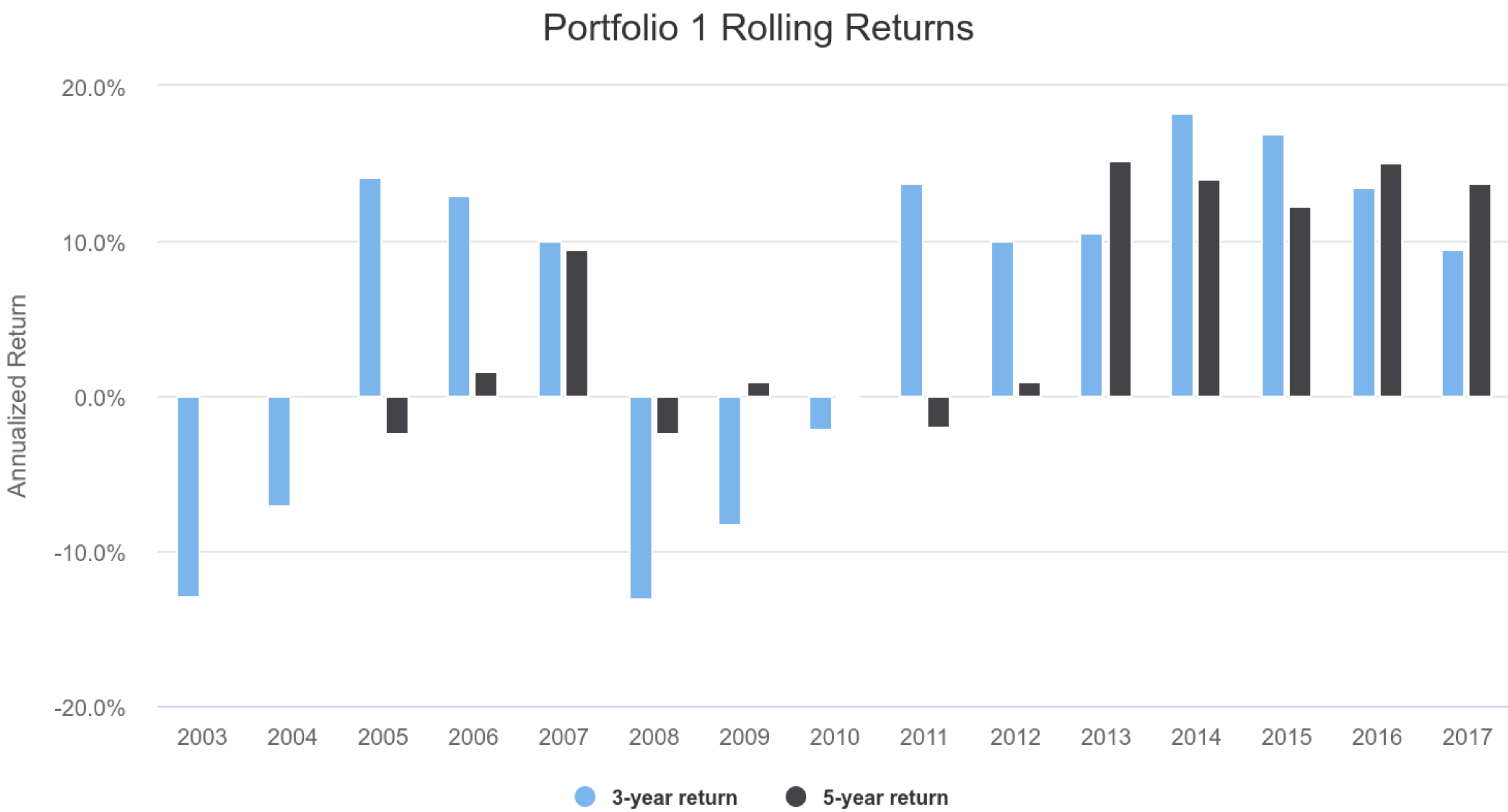
## Portfolio Risk Decomposition

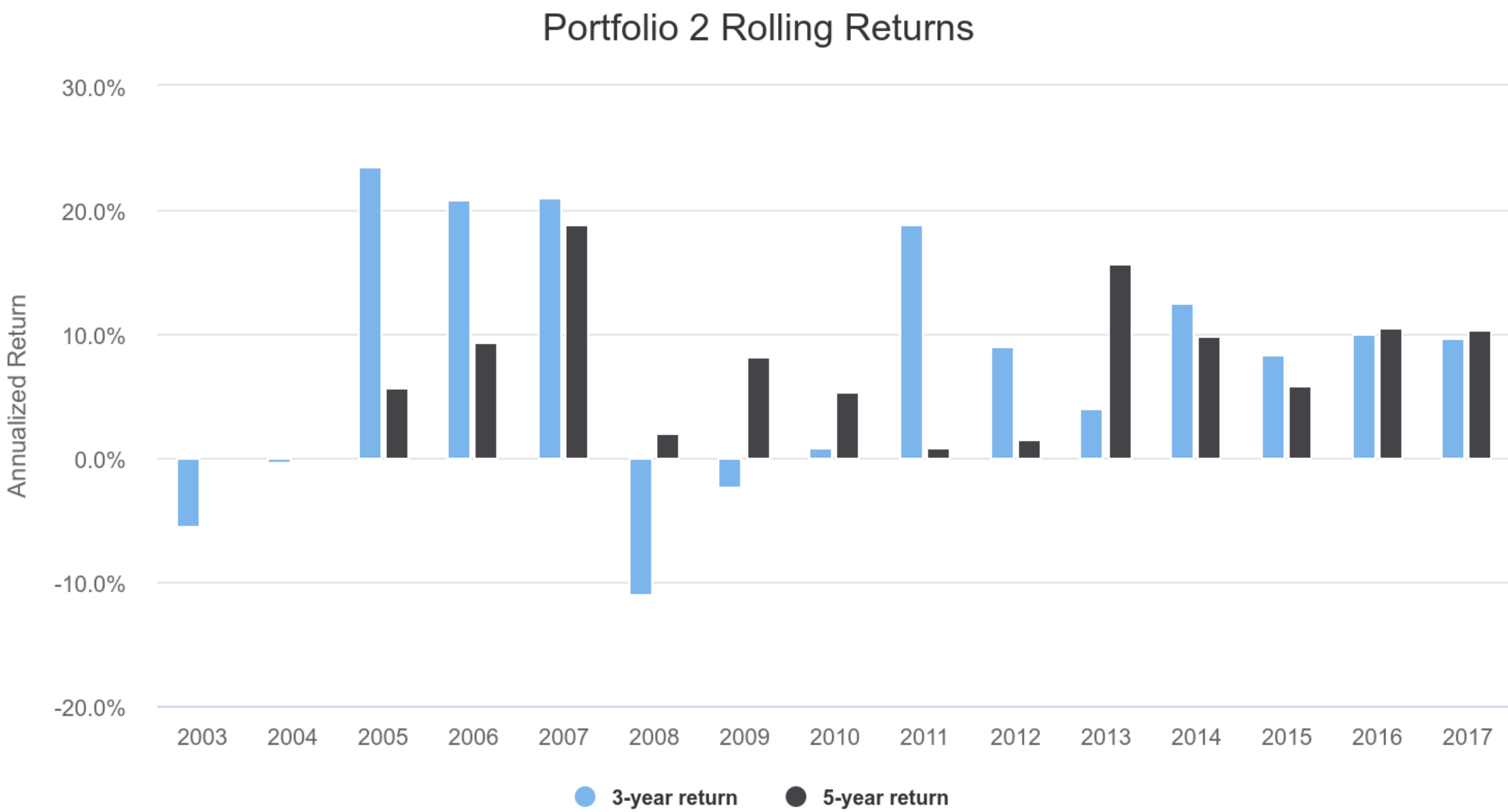
| Name | Portfolio 1 | Portfolio 2 | Portfolio 3 |
|---|---|---|---|
| msci world nr eur | 100.00% | 40.12% | 32.82% |
| msci em nr eur | | 59.88% | 47.99% |
| emerging markets bonds | | | 19.20% |

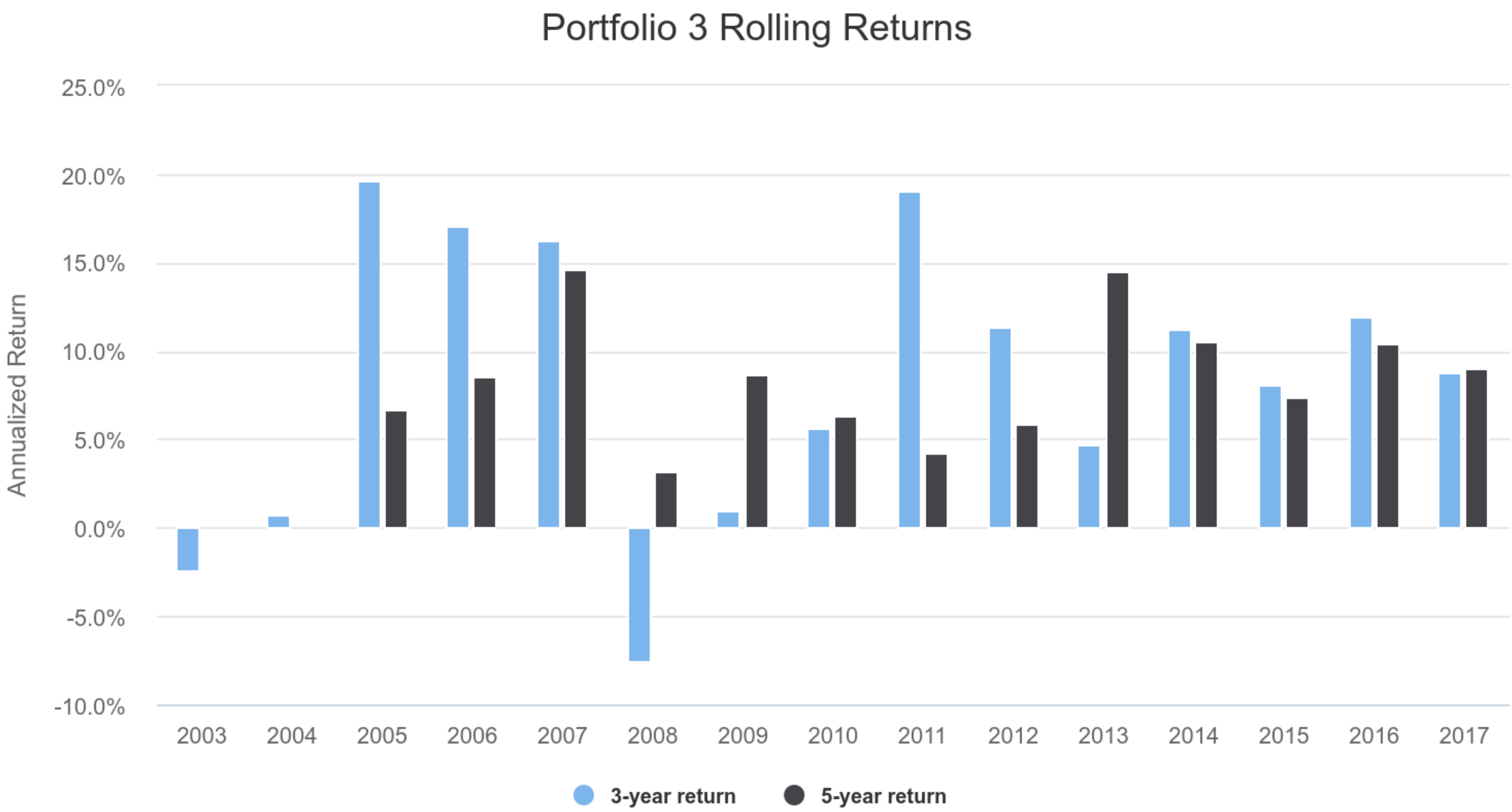
## Rolling Returns

| Roll Period | Portfolio 1 | | | Portfolio 2 | | | Portfolio 3 | | |
|---|---|---|---|---|---|---|---|---|---|
| | Average | High | Low | Average | High | Low | Average | High | Low |
| 1 year | 5.51% | 26.17% | -37.67% | 8.96% | 49.41% | -44.30% | 8.60% | 40.76% | -31.48% |
| 3 years | 5.74% | 18.23% | -13.00% | 7.95% | 23.44% | -11.04% | 8.36% | 19.65% | -7.55% |
| 5 years | 5.86% | 15.22% | -2.42% | 8.00% | 18.91% | 0.91% | 8.46% | 14.58% | 3.23% |
| 7 years | 4.88% | 15.12% | -5.64% | 7.17% | 13.67% | -0.34% | 7.99% | 13.68% | 1.37% |
| 10 years | 4.50% | 7.27% | -1.28% | 6.88% | 9.85% | 5.05% | 7.86% | 10.17% | 6.37% |
| 15 years | 5.19% | 7.89% | 3.03% | 7.49% | 9.99% | 5.65% | 8.08% | 9.77% | 6.77% |

*Result statistics are based on annualized rolling returns over full calendar year periods*


Portfolio 1 Rolling Returns
20.0%
10.0%
0.0%
-10.0%
-20.0%
Annualized Return
2003
2004
2005
2006
2007
2008
2009
2010
2011
2012
2013
2014
2015
2016
2017
3-year return
5-year return


Portfolio 2 Rolling Returns
30.0%
20.0%
10.0%
0.0%
-10.0%
-20.0%
Annualized Return
2003
2004
2005
2006
2007
2008
2009
2010
2011
2012
2013
2014
2015
2016
2017
3-year return
5-year return




**Disclosures:**

• Fairvalue ist ein unabhangiges Onlinemagazin fur Geldanleger, die langfristig Vermogen aufbauen, erhalten und vermehren wollen. Im Mittelpunkt stehen diversifizierte Anlagestrategien und deren praktische Umsetzung. Unsere Beitrage stutzen sich auf eigene quantitative Analysen und andere aktuelle Erkenntnisse der Finanzmarktforschung. Grunder und Herausgeber von Fairvalue ist der Finanzjournalist und Sachbuchautor Markus Neumann. Er war zuvor u. a. fur die Stiftung Warentest / Finanztest und das Verbraucherportal Finanztip tatig.