

# Managed Volatility:

## MARKET-LIKE RETURNS FOR LESS RISK?

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Finance theory suggests that to get more return from an investment one needs to take on additional risk. For students and practitioners of finance alike, this equilibrium is basic, as simple as the idea that the more you brush your teeth the fewer cavities you will develop. According to Modern Portfolio Theory (MPT), and the Capital Asset Pricing Model (CAPM) in particular, if investors hold the market portfolio (widely represented by the MSCI World Index, FTSE All-Share Index, S&P 500 Index, or local index equivalents), the risk of individual securities will be diversified away. You can thereby pocket the equity risk premium at the lowest risk level, giving you the optimal risk/return trade-off. Whatever your risk tolerance, you can adjust your risk level by holding a combination of cash and the market portfolio (index) or, alternatively, leverage up the market portfolio. You can therefore go to bed at night comfortable in the knowledge that you are holding the most efficient portfolio from a risk/return perspective, whatever the direction of the market. Or can you? The answer, according to research undertaken by the Lazard Global Quantitative Equity team, other practitioners, and academics, seems to be an overwhelming “no.”

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## Theoretical backbone or just unidentified risk?

Contrary to what MPT and CAPM would suggest, there is ample evidence to support the view that portfolios of risky stocks underperform portfolios of low-volatility stocks, as illustrated in Exhibit 1. This new understanding is supported by Lazard research as well as academic studies and is consistent across global regions, countries, sectors, and styles.

Furthermore, this conclusion is not dependent on how you measure volatility—short-term, long-term, absolute, or stock-specific volatility. To varying degrees, low-volatility stocks outperform any combination of cash and the market portfolio on a risk-adjusted basis over time. Equity investors, on average, overpay for risky stocks. Why would this be the case?

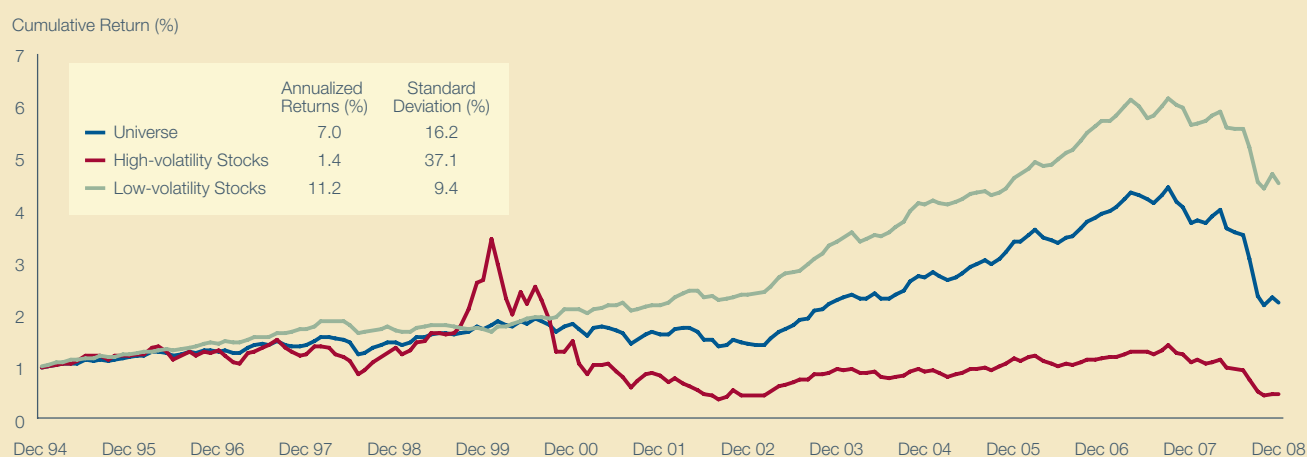
Active managers, including those managing hedge funds, will generally have an incentive to prefer high-beta stocks (beta being a stock's sensitivity to the market) that outperform the benchmark in rising markets, as the equity risk premium is generally positive. This has the effect of overpricing high-risk stocks and neglecting lower-volatility stocks. High performance in rising markets attracts future inflows of assets for above-average performing asset managers, who can thereby maximize their profit opportunities in up markets. As argued by Blitz and van Vliet (2007),<sup>1</sup> when market returns diminish, as in the current market environment, attracting assets on a

relative basis is more difficult, resulting in an asymmetric payoff in up and down markets for asset managers.

Investors also have different risk/return objectives, a fact illustrated by the recent movement from the benchmark-relative returns of traditional active managers to the hedge funds' total returns (relative to risk) perspective. In general, hedge funds seek to maximize Sharpe ratios (excess return relative to cash, divided by portfolio risk), whereas traditional long-only managers are judged by benchmark-relative information ratios (excess return above benchmark, divided by benchmark relative risk). These differing return and risk objectives can cause structural mispricings in the market, where lower-risk stocks may suffer from periods of neglect, offering opportunities for bargain hunters.

Perhaps unsurprisingly, many investors are unable to forecast the risk and returns of stocks due to their own behavioral biases. Investors tend to overemphasize the upside opportunities present in the equity market by chasing risky stocks that are perceived to offer the highest return potential. The holdings concentration in some of these portfolios gives investors the perception that they may have a good chance of catching a future star performer. Unfortunately, in many cases all they end up doing is overpaying for the underlying securities, thereby limiting their upside and losing out on the diversification benefits present in the broad equity market.

**EXHIBIT 1: LOW-VOLATILITY VS. HIGH-VOLATILITY STOCKS**



Sources: Lazard Asset Management, FactSet

Investment universe = S&P/Citigroup Broad Market Index.

This chart shows simulated performance and does not reflect performance of any portfolio managed by Lazard. Volatility = standard deviation of stock returns. Investment universe is divided into volatility deciles, with low-volatility stocks representing the bottom (lowest) decile, or 10%, and high-volatility stocks representing the top (highest) decile, or 10%. Standard deviation measures the dispersion or “spread” of individual observations around their mean. Standard deviation of returns measures a fund's historical volatility, where a higher number is evidence of greater volatility (i.e., higher risk). Past performance is not a reliable indicator of future results. This information is for illustrative and comparative purposes only. Please see last page for important information regarding simulated performance.

Several academics have studied this phenomenon over varying time horizons and geographical regions. The pioneers of this research are widely agreed to be Haugen and Baker (1991), whose U.S.-focused research principally concluded that, due to investor restrictions on short selling, tax situations, and return and risk expectations, it is possible to construct many portfolios that dominate the market portfolio in terms of risk-adjusted returns.<sup>2</sup> As pointed out by later research, this could potentially be explained by the presence of additional unidentified risk sources in the low-volatility portfolio. Ang et al. (2006) also documented this effect while researching a broad universe of U.S. stocks.<sup>3</sup> They concluded that the effect could not be attributed to an illiquidity risk premium typically associated with small-cap value stocks. This was also confirmed by Blitz and van Vliet (2007), who controlled for illiquidity and found the results to still be intact: low-volatility stocks attract higher risk-adjusted returns, even when controlling for value and size.<sup>1</sup> Another point addressed by Roll (1992),<sup>4</sup> later confirmed by Jorion (2003),<sup>5</sup> is that the focus on relative tracking error by institutional investors does not address the fact that two managers with identical levels of benchmark-relative risk may have widely different levels of absolute risk. It is therefore possible to construct portfolios that have lower risk with higher return expectations if you move away from referring to an index or the market portfolio.

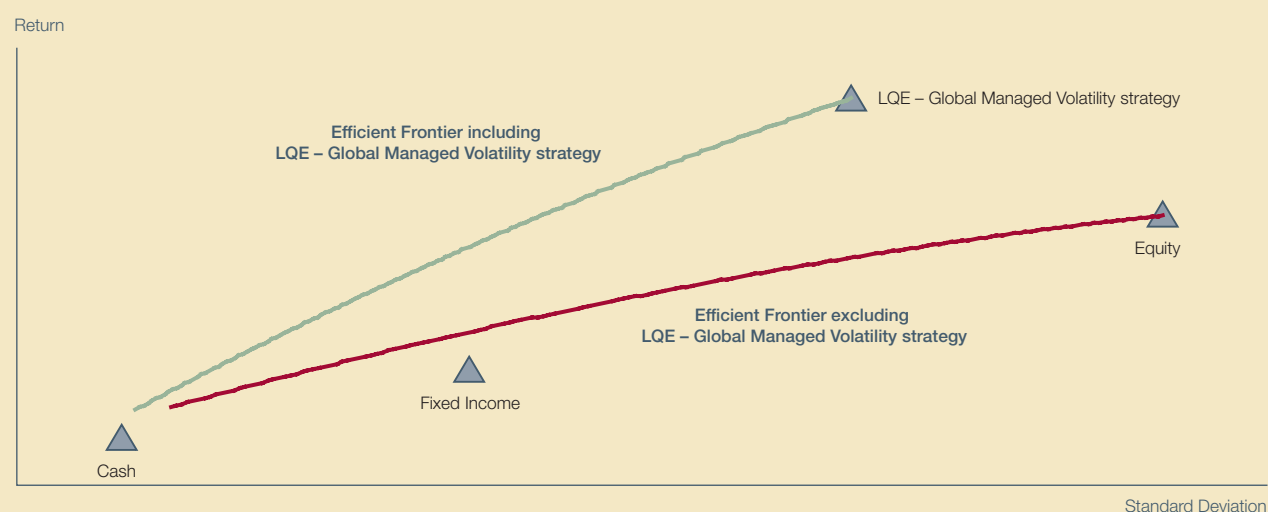
The strength of the academic evidence has prompted benchmark providers, such as MSCI Barra, to calculate their own minimum-variance indices. The MSCI World Minimum Volatility Index, launched in 2008, experienced approximately 30% lower volatility than the MSCI World Index over the simulated period (1995-2007), with a 50% improvement in the Sharpe ratio.

### Asset allocation and the problem with cap-weighted benchmarks

The market portfolio is simply an aggregation of the consensus views in the market. If the market on average believes that TMT stocks in 1999 should be valued and thereby represented at an index weight of 36% of the MSCI World Index, this is what one gets when buying the market portfolio or when benchmarking a portfolio relative to the market portfolio. Index managers or active managers will construct portfolios in line with or relative to the market portfolio. These capitalization-weighted indices are periodically subject to severe dislocations due to investor sentiment. Examples include energy stocks in the 1970s, Japan in the 1980s, technology in the 1990s, and financials in the early part of this decade.

In a 2005 paper on mean-variance efficiency, Harry Markowitz demonstrated that because of limited shorting, and in the absence of risk-free borrowing (a central assumption of

**EXHIBIT 2: EFFICIENT FRONTIER INCLUDING LQE – GLOBAL MANAGED VOLATILITY STRATEGY**



Sources: Lazard Asset Management, Bloomberg, FactSet

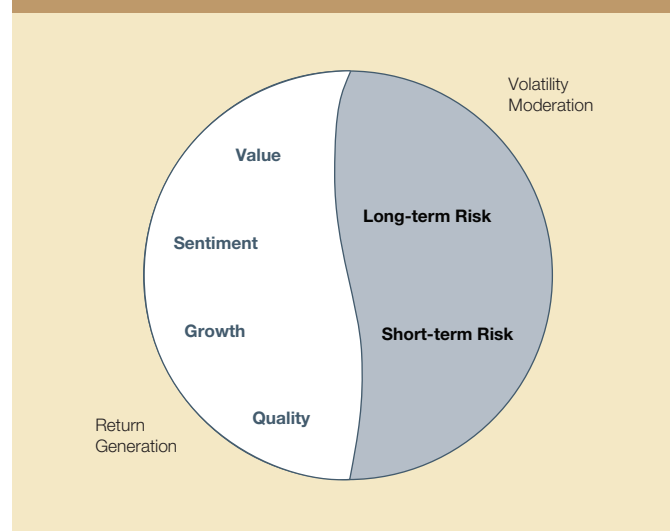
This chart shows simulated performance. Equities = MSCI World Index Hedged in U.S. \$; Fixed Income = Barclays Capital Global Aggregate Bond Index; Cash = Citigroup BIG Treasury Bill (3-month). Past performance is not a reliable indicator of future results. This information is for illustrative and comparative purposes only. Please see last page for important information regarding simulated performance.

CAPM), the market portfolio is not the mean-variance efficient portfolio, even if the market is efficient.<sup>6</sup> Markowitz concludes this paper with “Now, 40 years later, in the face of the empirical problems with the implications of the model, we should be cognizant of the consequences of varying its convenient but unrealistic assumptions. In particular, we should be cognizant of what more realistic assumptions concerning investment constraints imply about how we should invest, value assets, and adjust for risk.”

## Beyond low-volatility portfolios

Investing in low-volatility equities is a strategy that offers the potential for higher risk-adjusted excess returns when compared to most passive or active strategies. A natural by-product of investing in low-risk stocks is that the strategy reduces participation in down markets, but makes it more difficult to outperform in sharply rising markets. One option for increasing returns would be to leverage the equity investment. The other route, which is used in the Lazard Quantitative Equity (LQE) – Global Managed Volatility strategy, is to add value by selecting low-volatility stocks that are expected to outperform the market. Lazard’s research concluded that there are greater opportunities for generating excess returns in this lower-risk part of the market, as it is often neglected. Exhibit 2 illustrates the effect of adding the LQE – Global Managed Volatility strategy to a balanced mix of equity and fixed income and the potential risk and return benefits of this strategy.

**EXHIBIT 3: PRIMARY INPUTS TO THE LQE – GLOBAL MANAGED VOLATILITY STRATEGY**



## How Lazard’s security selections add value

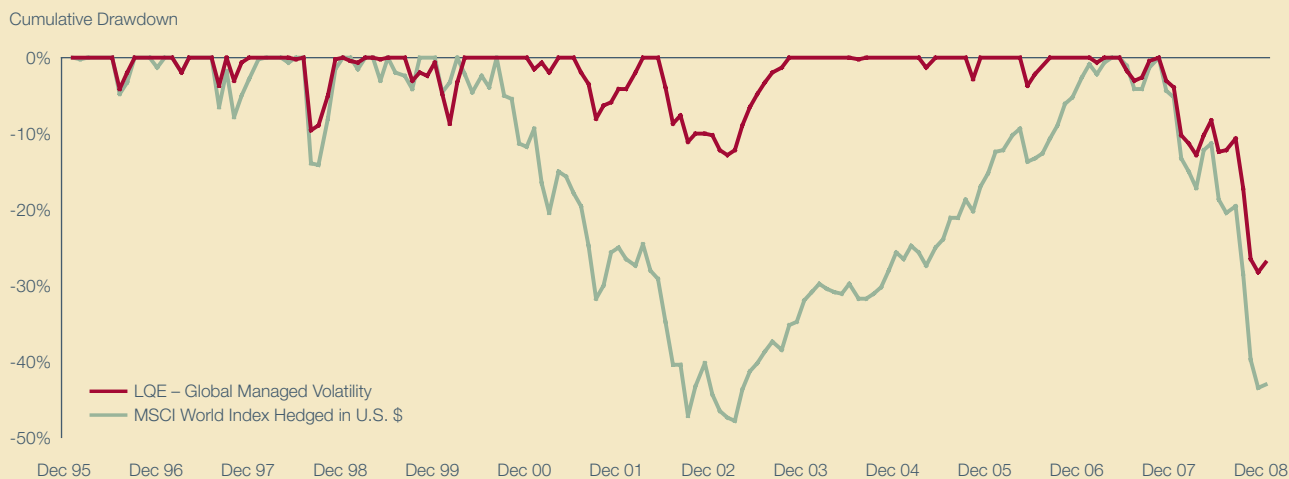
Building a managed volatility portfolio requires the ability to target attractive stocks with low volatility and desirable investment characteristics. A quantitative approach is best suited to meet this goal, for several reasons. First, it can be applied to a wide universe of stocks. It ensures a comprehensive and dispassionate examination of a company’s attractiveness and risk. It also provides the discipline and methodology to integrate multiple perspectives about a company along with measures of volatility to derive an optimal portfolio. Finally, it allows for systematic trade-off between stock attractiveness and volatility in an objective and unbiased manner.

Lazard’s stock selection process evaluates companies in a multi-dimensional context across a global opportunity set. Drawing upon public sources of information, it is possible to develop sophisticated perspectives on a broad universe of global stocks. Customized models analyze a company’s income and balance sheets, analysts’ expectations, and price history to provide comprehensive insight into the company’s valuation and future growth prospects.

Stocks are ranked using four factor families: growth, value, sentiment, and quality. Each of these families is made up of a series of proprietary models that have been tested and proven for their efficiency and independence in identifying return opportunities. This balance of insights is important in weighing the trade-off between a company’s growth prospects and the price that is being paid. Companies are purchased when gauged as being attractive on multiple perspectives. Combining stock ranks with measures of stock volatility enables the selection of stocks that have the potential to deliver strong equity returns at reduced levels of risk.

## Portfolio construction

The LQE – Global Managed Volatility strategy seeks to maximize expected return relative to expected volatility. Risk is controlled using proprietary measures that incorporate long- and short-term views. The combination of Lazard’s quantitative stock selection and risk models results in portfolios that may take advantage of return opportunities across borders and sectors without becoming too concentrated in any one country, sector, or stock. Exhibit 3 provides a summary view, depicting the primary inputs that are integrated in this process.

**EXHIBIT 4: CUMULATIVE DRAWDOWN OF MSCI WORLD INDEX HEDGED IN U.S. \$ VS. LQE – GLOBAL MANAGED VOLATILITY**

Sources: Lazard Asset Management, FactSet

This chart shows simulated performance. The inception of the LQE – Global Managed Volatility strategy simulated model is January 1996. Performance shown is presented gross of fees and net of transaction costs. Past performance is not a reliable indicator of future results. This information is for illustrative and comparative purposes only. Please see last page for important information regarding simulated performance.

This focus on absolute return and risk, not on tracking error relative to a benchmark, results in significant downside protection in down markets but reduces participation in strong up markets. As Exhibit 4 illustrates, our simulation has shown that the strategy typically has a lower maximum drawdown and shorter recovery periods than a traditional cap-weighted benchmark. Additionally, the strategy has a low correlation with other long-only managers and a predictably high tracking error (characteristically 8 -10%).

### Where does this approach fit in?

We think that our approach may appeal to any investor who would benefit from a less volatile return stream. The low volatility (in absolute terms) of the LQE – Global Managed Volatility strategy, combined with its low correlation with other equity strategies and other asset classes, makes it attractive to several market participants.

Investors who are concerned with balance sheet volatility, such as insurance companies, might consider this an interesting asset class as it may offer them a better way of matching asset and liability volatility. The growth in asset and liability matching by public and corporate pension plans through liability-driven investing (LDI) strategies should also be well aligned with the strategy. Finally, investors in hedge funds whose zero-beta strategies turned out to be a bit more than zero might find the risk/return characteristics of this strategy to

be more palatable than typical long-only traditional strategies or indeed hedge funds.

In our simulation, the LQE – Global Managed Volatility strategy outperformed the global equity market over time. Consequently, the strategy's investment horizon is more aligned with medium- to long-term investors than short-term investors. There are periods in the market when high risk is rewarded with high returns, as happened with growth stocks in the late-1990s or cheap credit in the mid-2000s. Investors will therefore have to overcome their behavioral biases throughout these typically relatively short-lived periods to be able to pocket the gains over the medium to longer term.

As shown in Exhibit 5, Lazard research assessed the impact of adding the LQE – Global Managed Volatility strategy to a multi-asset class portfolio over a ten-year period ending December 2007. The starting point was 60% equity, represented by the MSCI World Index, and 40% fixed income, represented by the Barclays Capital Global Aggregate Bond Index. LQE – Global Managed Volatility was added to the mix while still maintaining a 60% equity allocation. The results demonstrate significant improvements to both risk and return as the allocation to LQE – Global Managed Volatility increases. When the equity was split equally between LQE – Global Managed Volatility and the MSCI World Index, returns improved by approximately 35% while total risk declined by nearly 24%. This illustrates how adding the LQE – Global

**EXHIBIT 5: ASSET ALLOCATION IMPACT OF THE LQE – GLOBAL MANAGED VOLATILITY STRATEGY**

	Return (%)	Standard Deviation (%)	Sharpe Ratio	Tracking Error (%)
60% equity, 40% fixed income	5.7	8.9	0.6	—
30% LQE – Global Managed Volatility, 30% equity, 40% fixed income	7.7	6.8	1.1	3.0
60% LQE – Global Managed Volatility, 40% fixed income	9.7	5.5	1.8	5.9
60% LQE – Global Managed Volatility, 22% equity, 18% fixed income	10.1	8.7	1.2	3.8
10% LQE – Global Managed Volatility, 15% equity, 75% fixed income	5.7	2.8	2.0	6.9

Sources: Lazard Asset Management, FactSet  
 Period: December 1998 through December 2007

This chart shows simulated performance. Equity = MSCI World Index; Fixed Income = Barclays Capital Aggregate Bond Index. Past performance is not a reliable indicator of future results. This information is for illustrative and comparative purposes only. Please see last page for important information regarding simulated performance.

Managed Volatility strategy could allow investors to re-weight equity and fixed income exposures to better fit with their long-term investment objectives while providing tighter controls on total risk. Exhibit 6 illustrates the main characteristics of the LQE – Global Managed Volatility strategy versus a traditional global equity strategy.

We believe the merit of this strategy lies in its ability to reward investors with a journey, less like a roller-coaster but more like a merry-go-round, through the twists and turns of the equity markets. Not as “calm” as bonds (some of our bond colleagues would disagree after 2008!), but nevertheless not as nerve-racking as hedge funds or, as of late, the world equity markets. The only prerequisite to invest in this strategy is the ability not to envy your competitors, neighbors, colleagues, friends, or friend of friends in the short term; after all, short-term gains could potentially lead to long-term pain. Instead, the LQE – Global Managed Volatility strategy aims to provide investors with a comfortable night’s sleep with few or no cavities.

**EXHIBIT 6: KEY CHARACTERISTICS OF THE LQE – GLOBAL MANAGED VOLATILITY STRATEGY**

	LQE – Global Managed Volatility Strategy	Traditional Global Equity Strategy
<b>Risk Assessment</b>	Standard deviation of total returns	Tracking error relative to MSCI
<b>Performance Measure</b>	Sharpe ratio	Information ratio
<b>Portfolio Constraints</b>	Unconstrained but with limits on sectors and capitalization	Multiple benchmark-driven constraints
<b>Beta</b>	0.5 – 0.8	Approximately 1.0
<b>Currency Hedging</b>	Recommended	Typically none

**NOTES:**

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- 1 Blitz, David C. and Pim van Vliet (2007), "The Volatility Effect: Lower Risk Without Lower Return," *Journal of Portfolio Management*, Fall 2007
  - 2 Haugen, Robert A., and Nardin L. Baker (1991), "The Efficient Market Inefficiency of Capitalization-weighted Stock Portfolios," *Journal of Portfolio Management*, Spring 1991
  - 3 Ang, Andrew, Robert J. Hodrick, Yuhang Xing and Xiaoyan Zhang (2006), "The Cross-section of Volatility and Expected Returns," *Journal of Finance*, Vol. LXI, No. 1, February 2006
  - 4 Roll, Richard (1992), "A Mean-Variance Analysis of Tracking Error," *Journal of Portfolio Management*, vol. 18, no. 4 (Summer 1992)
  - 5 Jorion, Philippe (2003), "Portfolio Optimization with Tracking-Error Constraints," *Financial Analysts Journal*, 59:5
  - 6 Markowitz, Harry M. (2005), "Market Efficiency: A Theoretical Distinction and So What?," *Financial Analysts Journal*, Vol. 61, No. 5

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Originally published in the United Kingdom on 23 February 2009. Republished for the United States on 2 March 2009. Revised and republished on 9 December 2009.

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An investment in bonds carries risk. If interest rates rise, bond prices usually decline. The longer a bond's maturity, the greater the impact a change in interest rates can have on its price. If you do not hold a bond until maturity, you may experience a gain or loss when you sell. Bonds also carry the risk of default, which is the risk that the issuer is unable to make further income and principal payments. Other risks, including inflation risk, call risk, and prepayment risk, also apply.

A quantitative investment strategy relies on quantitative models and quantitative filters, which, if incorrect, may adversely affect performance.

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The performance presented in this report is for the LQE – Global Managed Volatility strategy and is hypothetical performance for a product not yet offered by LAM (the "Simulated Model"). It is shown for illustrative and comparative purposes only. The Simulated Model's returns were constructed by utilizing LQE's global stock selection model to select stocks within MSCI World Index countries. The MSCI World Index is an unmanaged free float-adjusted market capitalization index that is designed to measure developed market equity performance within North America, Europe, Australia and the Far East. The stocks were screened for data availability and liquidity requirements and only those equity securities that satisfied these data and liquidity requirements were included.

Portfolio construction methodologies unique to the Simulated Model include limiting exposure to any one MSCI sector group to 20% of the total portfolio as well as a 1.5% maximum allocation to any one stock. The Simulated Model also incorporates a comprehensive and proprietary risk model that ensures market capitalization distribution and industry diversification. Additionally, the risk model employs measures to monitor and control both short and long term portfolio risk characteristics.

LAM did not manage the Simulated Model during the periods shown. The hypothetical performance presented herein includes historical financial data to show what decisions would have been made if the strategy were employed. Simulated performance results are shown for illustrative purposes only and do not represent actual trading or the impact of material economic factors on LAM's decision-making process for an actual LAM client account.

Exhibit 4 illustrates a time period shown from January 1996 through December 2008. The chart presented reflects performance information for the period in which information is available from Factset. The Simulated Model analyzes data from January 1996. Performance shown is presented gross of fees and net of transaction costs. Had such fees and expenses been reflected, performance would have been lower. It represents past performance and is not a reliable indicator of future results. The MSCI World Index Hedged in U.S. \$ is included for comparative purposes only. The MSCI World Index Hedged in U.S. \$ represents the performance of the MSCI World Index where currency exposures affecting index principal are hedged to the U.S. dollar. Source: Lazard Asset Management, MSCI, Factset

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