STANDARD
&POOR'S

Setting the Standard

The S&P Equal Weight Index
Uses, Properties and Historical Simulations

Standard & Poor's

David M. Blitzer
1-212-438-3907
david_blitzer@sandp.com

Srikant Dash
1-212-438-3012
srikant_dash@sandp.com

Rydex Global Advisors

Ludwig Chincarini
Mike Dellapa
1-301-296-5409
lchincarini@rydexfunds.com

Media Contacts

Lynn Cohn
1-212-438-1650
lynn_cohn@sandp.com

Anna Haglund
1-301-296-5194
ahaglund@rydexfunds.com

- Standard & Poor's, in collaboration with Rydex Global Advisors, has created the S&P Equal Weight Index in response to the market's need for an official equally weighted index with the same constituents as the S&P 500.

- The Equal Weight Index's quarterly rebalancing process balances representation and investability, while providing additional benefits, such as coinciding with S&P 500 quarterly share adjustments and derivative contract cycles.

- The Equal Weight Index has a lower concentration of individual stocks, much higher market capitalization turnover, and different sector exposures than the S&P 500 does.

- The Equal Weight Index has relatively higher exposure to the value and small stock premiums than the S&P 500 does. It also exhibits higher volatility.

- Simulated returns over the past 13 years show that comparative returns and volatilities of the two indices might differ during market cycles. This provides an opportunity to design spread or hedging strategies.

Executive Summary

The capitalization-weighted S&P 500 is clearly a measure of the investment opportunity set of large-cap U.S. equity market. However, an equally weighted investment strategy might require that its performance be measured against an equally weighted index.

The S&P Equal Weight Index (S&P EWI) will provide an opportunity to:
- invest in the performance of these 500 leading companies in equal measure; and
- make size, style, and sector bets relative to the S&P 500.

Standard & Poor's has created the S&P EWI in response to the market's need for an official equally weighted index with the same constituents as the S&P 500.
- Index calculation is done according to the divisor-based methodology of the S&P 500.
- The quarterly rebalancing process balances representation and investability, while providing additional benefits, such as coinciding with S&P 500 quarterly share adjustments.
- Quarterly rebalancing also coincides with derivative contract cycles and results in the index giving an arithmetic average return of S&P 500 stocks between two rebalancing periods. This will facilitate the creation of derivatives and structured products around the index.

The S&P EWI has different properties from the S&P 500.
- It has a lower concentration of individual stocks than the S&P 500 does.
- It has different sector exposures and a slower rate of change in sector weightings.
- Annualized market capitalization turnover was 29%, versus 5% in the S&P 500, from January 1990 to October 2002.

These different characteristics result in different risk-return profiles for the equally weighted index. We simulated performance of the S&P EWI relative to the S&P 500 during the past 13 years and found no conclusive evidence regarding the outperformance of one index over the other. However, it showed that comparative returns and volatilities of the two indices might differ during market cycles. This provides an opportunity to design spread or hedging strategies.

An attribution and correlation analysis showed that the S&P EWI has a higher exposure to the value premium than S&P 500. It is also intriguing that even within a large-cap universe such as the S&P 500, the S&P EWI had a positive loading on the size premium. In other words, changing the weighting scheme of the large-cap index gave it a minor small-stock bias.

The Official S&P Equal Weight Index

The S&P 500 is one of the best-known and most-benchmarked indices in the world. The index is a capitalization-weighted benchmark of the large-cap U.S. equity market. However, there are benchmarking, investing and trading situations that require an equally weighted version of the index. Since all Standard & Poor's index constituents and index changes are publicly disclosed, different organizations have come up with their own versions of an equally weighted S&P 500. Standard & Poor's, in collaboration with Rydex Global Advisors, has created the S&P 500 Equal Weight Index (S&P EWI) in response to the market's need for an official equally weighted index with the same constituents as the S&P 500. The S&P EWI will have the following features:

- Index calculation and dissemination by Standard & Poor's
- Index calculation done according to the divisor-based methodology of the S&P 500
- Rebalancing done to coincide with share adjustments of the S&P 500
- Constituent changes incorporated into the index as, and when, they are incorporated to the S&P 500
- Index methodology publicly available in the Standard & Poor's publication, "The S&P 500 Equal Weight Index: Structure and Methodology."

Potential Uses of the S&P EWI

Performance Measurement

Indices are used as benchmarks, either for evaluating manager performance or for estimating the efficacy of investment strategies. It is important to specify whether a population parameter is equally weighted or capitalization-weighted before deciding on a benchmark. The capitalization-weighted S&P 500 is clearly a measure of the investment opportunity set of the large-cap U.S. equity market, which is also capitalization-weighted. However, an equally weighted investment strategy might require that its performance be measured against an equally weighted index. Block and French (2002) show that actively managed fund portfolios are more equally weighted than capitalization-weighted, and, therefore, suggest the inclusion of an equally weighted index in a model used for performance measurement. For example, the average large-cap U.S equity fund delivered an annualized return of -2.6% for the five years preceding the third quarter of 2002, compared to the S&P 500's annualized return of -1.6%. The comparison looks much worse for funds if one considers that an equally weighted S&P 500 delivered a return of +0.98%.

Size Spread Bets

A capitalization-weighted index will have a weight distribution that reflects the market, with a few stocks having a greater percent weight.[1] A size spread strategy of going long on the S&P 500 and short on the S&P EWI would, therefore, involve taking long positions on a few large stocks and short positions on a greater number of smaller stocks. The nature of the size bets that this strategy entails is shown in Exhibit 1, using a chosen sample date of March 16, 1998.

---

[1] The individual stock and sector concentration of the S&P 500 tracks the concentration of individual stocks and sectors in the market. For more details, see, "The Tale of An Index in Bull and Bear Markets - S&P 500 from 1997 to 2002," Standard & Poor's, 2002, available at www2.standardandpoors.com/spf/pdf/index/090502.pdf.

Exhibit 1: Spread Bet on Long S&P 500, Short S&P Equal Weight
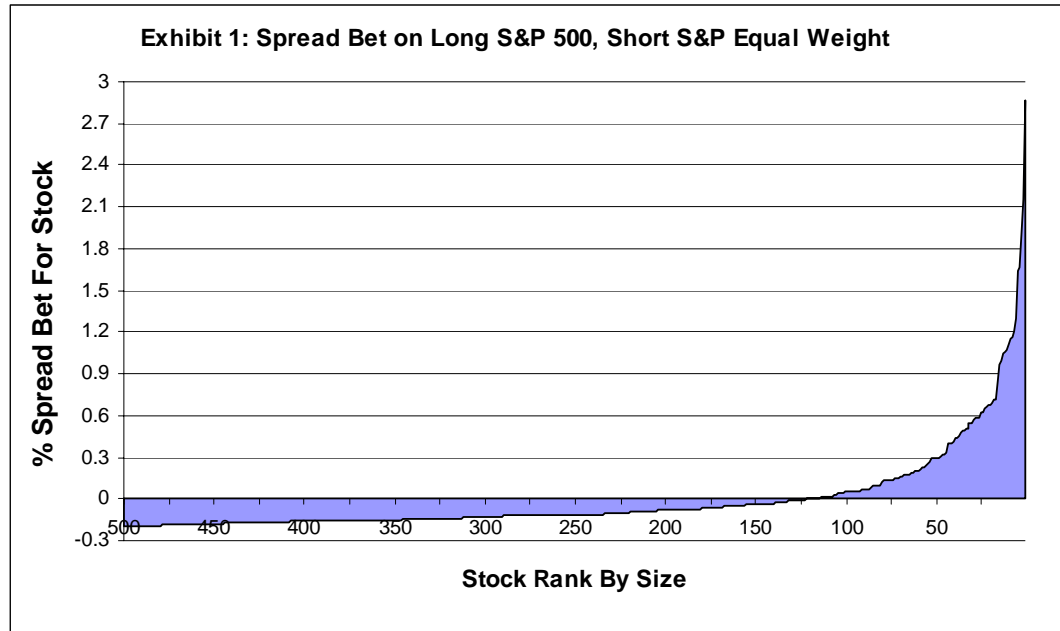
Source: Rydex Global Advisors, Standard & Poor's.

Sector Spread Bets

Since the weight distribution of individual stocks will vary between the two indices, so will the sector weights. Therefore, a sector spread strategy using the two indices would involve taking sector bets proportional to the difference in sector weights in both indices. Exhibit 2 shows the sector bets taken on a long S&P 500, short S&P EWI position using a chosen sample date of March 16, 1998.

Exhibit 2: Sector Bet on Long S&P 500, Short S&P 500 Equal Weight
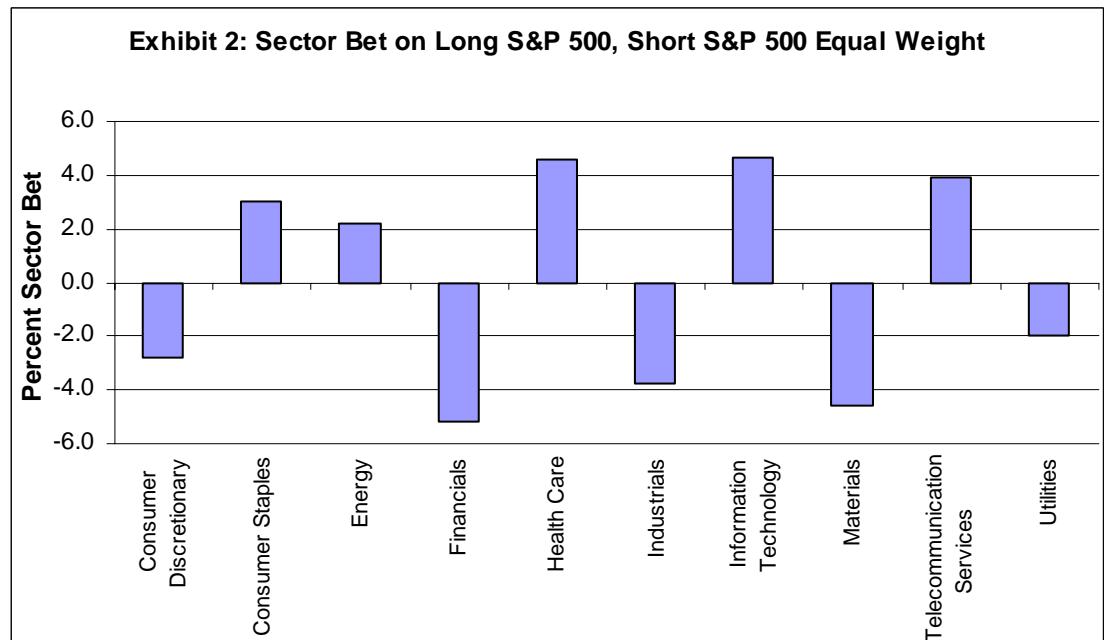
Source: Rydex Global Advisors, Standard & Poor's.

Investment Vehicle

The S&P 500 was created to be an index of leading companies in leading industries. An S&P 500 index fund provides an opportunity to invest in about 80% of the investable opportunity set available to U.S. equity investors. The S&P EWI will provide an opportunity to invest -- in equal measure -- in the performance of these 500 leading companies. The investment costs and risk-return characteristics of both investment vehicles will differ, as shown below. Since the S&P EWI is the size-neutral version of the S&P 500, the relative performances of these indices will vary with the size premium in different market cycles. The long-run effects of this are discussed in a separate section.

S&P EWI returns shown below are for backtested total return indices from January 1990 to December 2002; turnover is the annual average market capitalization turnover from January 1992 to October 2002.

|	Annualized Return	Annualized Volatility	Correlation of Monthly Returns	Average Annual Turnover
S&P 500	9.68%	15.27%	92.54%	4.97%
S&P EWI	10.48%	16.04%		29.13%
Implications	• The S&P EWI investment vehicle offers trading or investment opportunities because of sector or size differences between the two indices. • Long-run monthly return data do not show a significant difference in means (t-test) or that the returns come from different distributions (Kolmogorov-Smirnov test). The volatilities are also not statistically different (F-test).			Investment costs will be higher due to the higher turnover of the S&P EWI.

Source: Rydex Global Advisors, Standard & Poor's.

Properties of the S&P EWI

Stock Concentration

The S&P EWI clearly has less individual stock concentration than a capitalization-weighted index. This is because, as Exhibit 1 showed, the market capitalization distribution of stocks in the market is itself skewed.

The Herfindahl index is a commonly used measure of concentration that is calculated as the sum of squares of percent weight of each stock in a portfolio. Exhibit 3 plots the Herfindahl index for the market, the S&P 500, and the S&P EWI. The S&P EWI will always have a Herfindahl index of about 20, while the S&P 500 Herfindahl index will track the concentration of large-cap U.S. equities.

Exhibit 3: Concentration of Individual Stocks Measured By Herfindahl Index
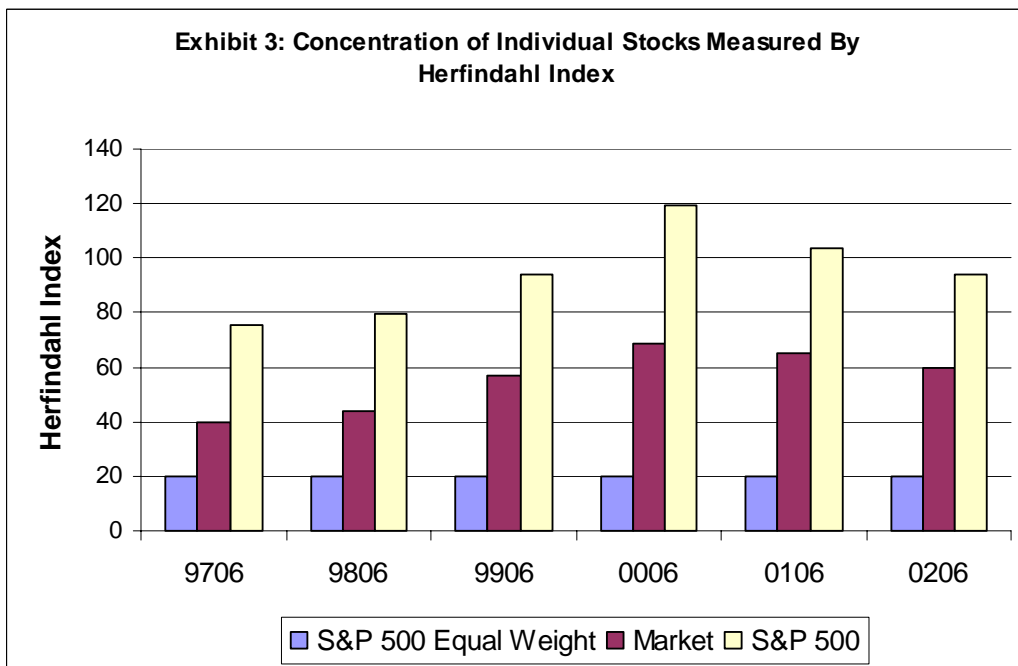
Source: Rydex Global Advisors, Standard & Poor's.

Sector Weightings

The S&P 500 is sector-representative, with sector weightings in the index reflecting those in the large-cap U.S. equity market. The S&P EWI has markedly different sector weights from the S&P 500, as shown in Exhibits 4 and 5.
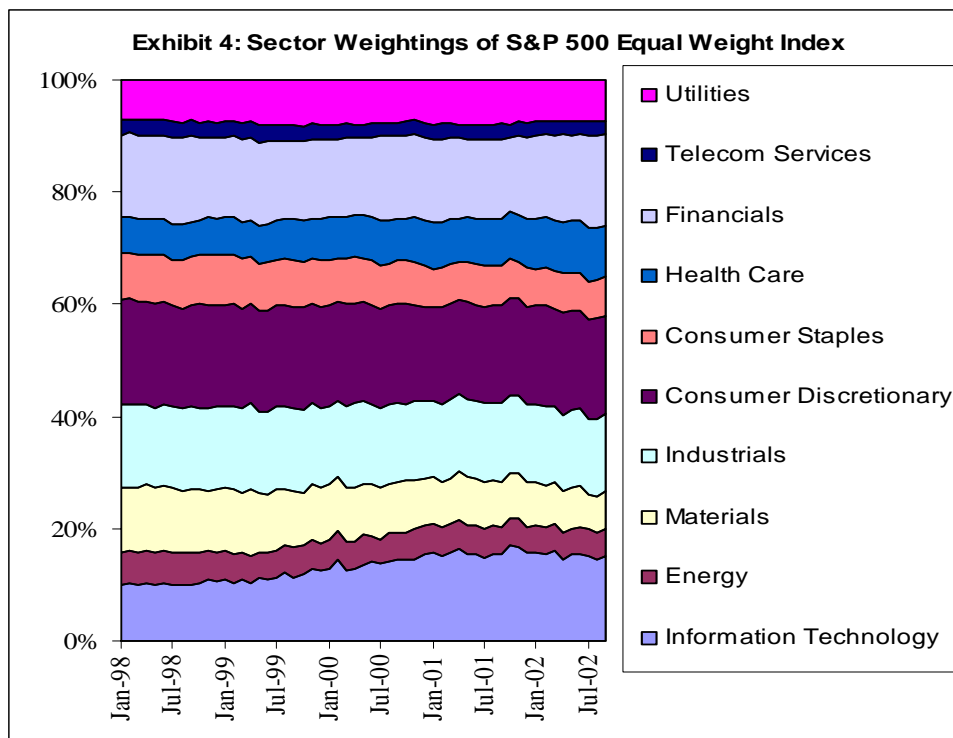
Exhibit 4: Sector Weightings of S&P 500 Equal Weight Index

Source: Rydex Global Advisors, Standard & Poor's.

Exhibit 5: Sector Weightings of S&P 500
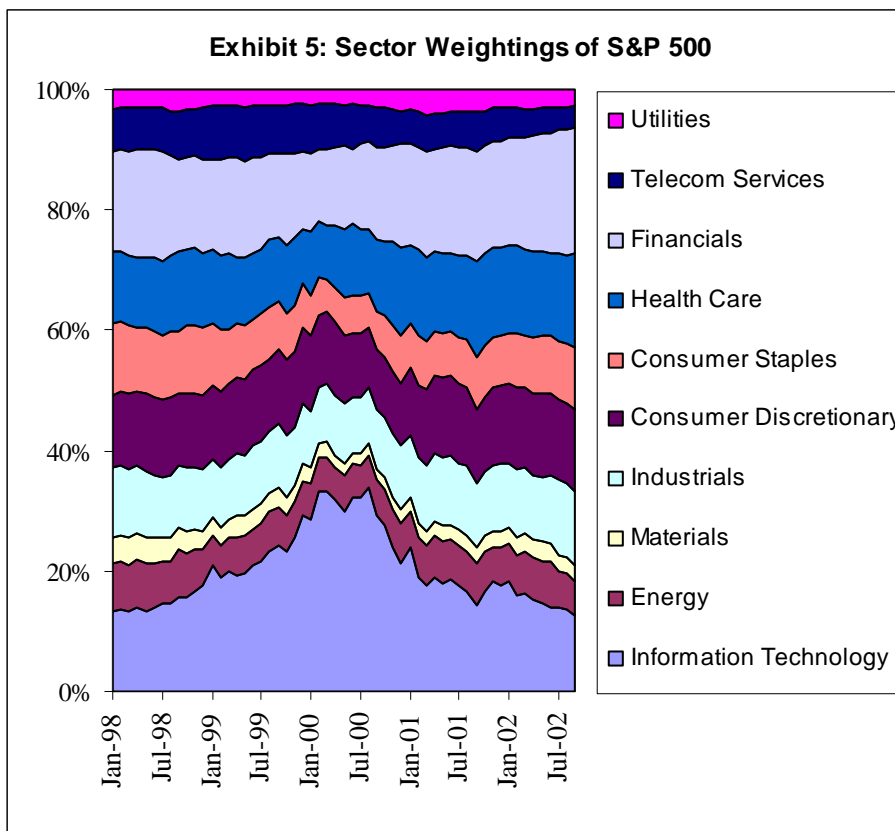
Source: Rydex Global Advisors, Standard & Poor's.

Exhibits 4 and 5 clearly demonstrate that the S&P EWI will be overweight/underweight in sectors vis-à-vis the market. This shows that holding the S&P EWI will involve placing active bets on sectors, as discussed previously. Of equal importance, the changes in sector concentration of a capitalization-weighted index such as the S&P 500 will track the changes in sector concentration in the market. The S&P EWI will have a more gradual change in sector concentration.

An interesting way to view the pace of change of sector concentration in an index is with a Dart Zone, as plotted in Exhibit 6. This Dart Zone shows the weighting of the technology sector for the two indices. Each circle represents a weight of 5%. A weighting that remains constant over time would be depicted as a perfect circle, while an index that undergoes changes in sector weightings over time would not look tidy. The graph shows that the simulated S&P EWI stays in a relatively clean shape, while the S&P 500 looks jagged. The implication of this is clear: The weights of sectors in the S&P EWI will be more stable across time than those of a capitalization-weighted index.

Exhibit 6: Changes in Sector Composition
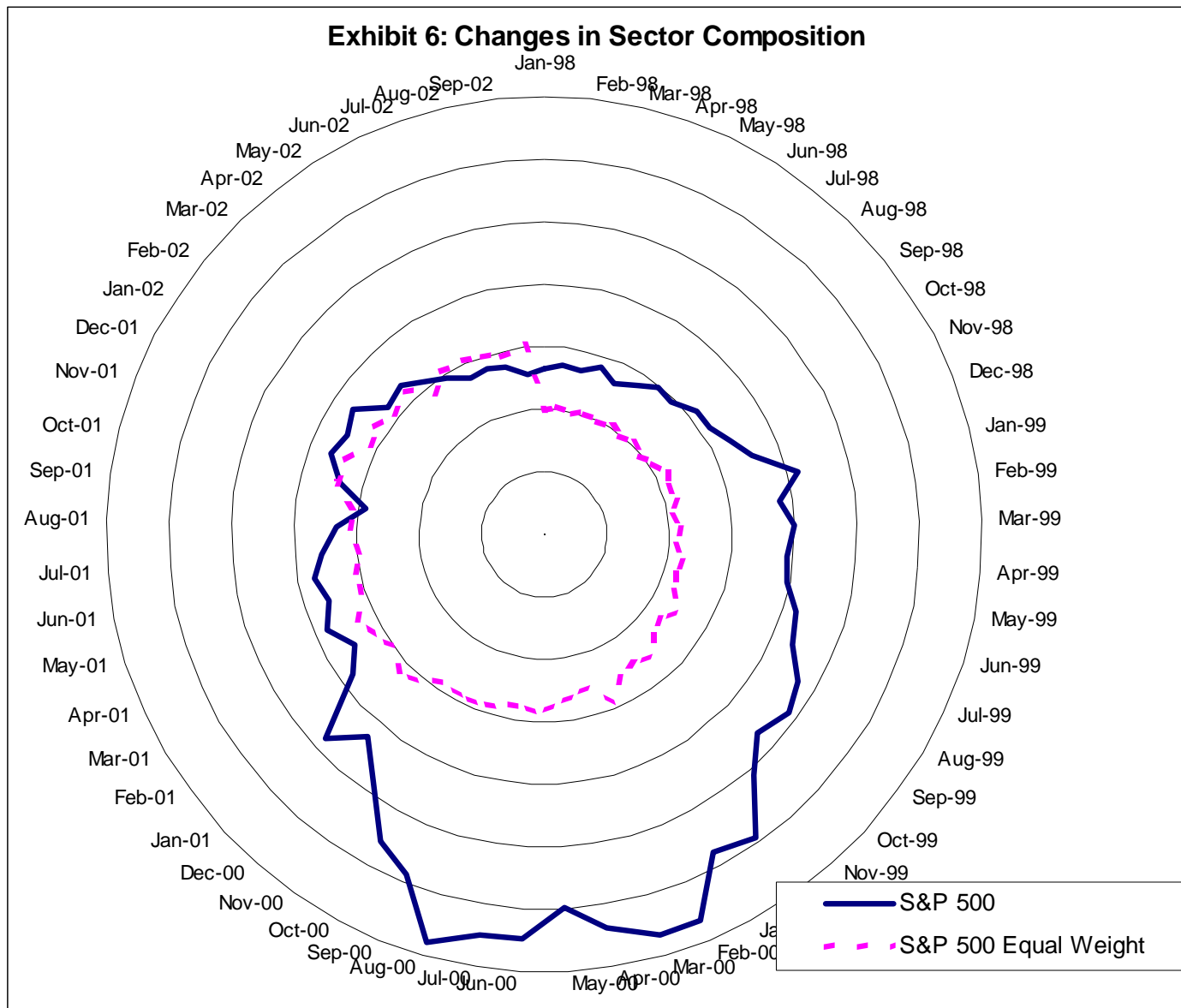
Source: Rydex Global Advisors, Standard & Poor's.

## Market Capitalization Turnover and Liquidity Constraints

The S&P EWI has much higher market capitalization turnover than the S&P 500. Based on backhistory that Standard & Poor's built for this index from January 1990 to October 2002, annualized turnover was 29%, compared to 5% in the S&P 500. The S&P EWI also imposes on a fund manager operational constraints associated with relatively large holdings in stocks at the bottom of the index. These include liquidity pressures and trading difficulties. The liquidity pressures will be felt most for less liquid stocks undergoing significant weight changes at rebalancing.

Balancing Representation and Investability

The primary task of an index is to be representative of the market it seeks to represent. The S&P EWI is designed to track the equally weighted performance of the 500 constituents in the S&P 500. For this, each stock should have a weight of 20 basis points in the index. But as stock prices move in different directions, the weightings in the index will change. A more frequent rebalancing of the weights to 20 basis points will obviously result in greater market capitalization turnover, and excessive turnover can damage the index from an investment vehicle standpoint. Therefore, the rebalancing frequency has to achieve a balance between representation and investability.
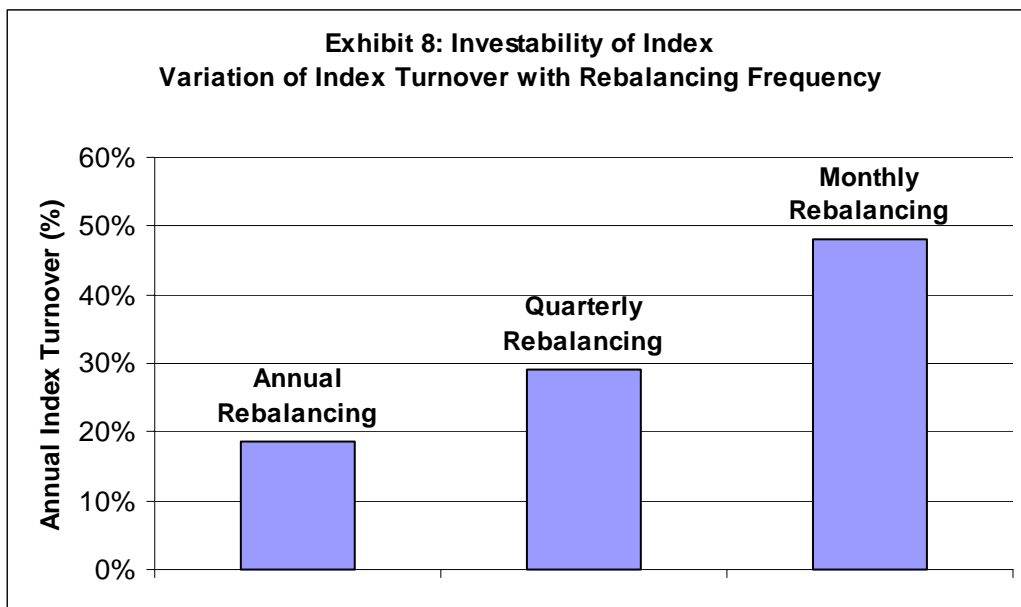
Representation

In looking at the issue of appropriate representation, we found that the longer the rebalancing period, the greater the deviation from equal weighting. Exhibit 7 shows how the simulated index's average deviation from equal weighting varies with rebalancing frequencies.

Exhibit 7: Representative Character of Index
Deviation from Equal Weighting with Rebalancing Frequencies
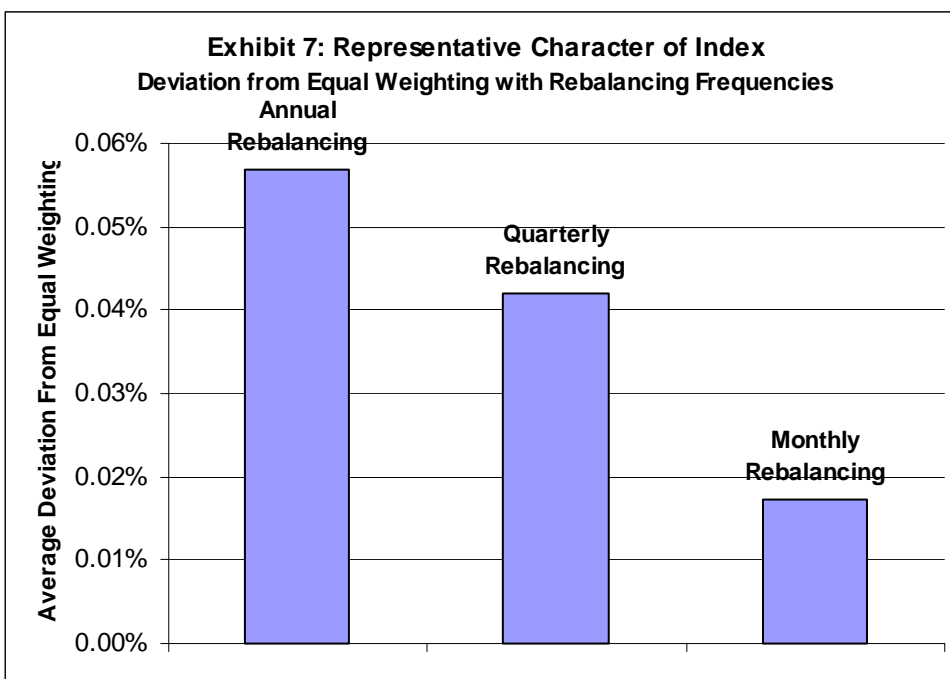
Source: Rydex Global Advisors, Standard & Poor's. Data for five years preceding Nov-02.

Investability

One of the key factors affecting the investability of an index is its turnover. Index funds are low-cost vehicles, and excessive turnover increases investment costs. Exhibit 8 shows how market capitalization turnover varies with annual, monthly and quarterly rebalancing frequencies.

**Exhibit 8: Investability of Index
Variation of Index Turnover with Rebalancing Frequency**

Source: Rydex Global Advisors, Standard & Poor's. Data for 10 years preceding Nov-02.

Quarterly Rebalancing

Standard & Poor's has arrived at a quarterly rebalancing procedure for the S&P EWI. Apart from striking a balance between representation and investability, this procedure has several practical advantages:

- **Consistency with the S&P 500:** The S&P EWI's rebalancing date will coincide with the date when S&P 500 quarterly share changes are made.
- **Consistency with listed derivative cycle:** The usual quarterly share adjustment date for the S&P 500 is the third Friday on the quarter-ending month. This is the triple-witching date, when listed index options, index futures and stock options expire.
- **Creation of structured products and derivatives:** Between two quarterly rebalancing dates, the S&P EWI will give the arithmetic average return for all 500 stocks in the S&P 500. Given the conventional quarterly cycle for most index derivatives, a quarterly rebalancing procedure will also enable the creation of a rich market of structured products and derivatives around the S&P EWI.

Contingent, or band-based, rebalancing was considered, but was not incorporated because of the following reasons:

- Full rebalance gives a pure arithmetic average of the returns of S&P 500 stocks.
- Indices should be simple to understand, with fund managers and traders having the flexibility to make their own decisions for specific situations.
- Bands would leave index funds open to gaming by traders. For example, suppose a 1 basis point band was established. If a stock were shorted down from .1905% to .1895%, a $10 billion fund family would end up with an unanticipated $1 million purchase of stock.

It is interesting to note that a review of market capitalization turnover numbers from 1992 to 2002 with quarterly rebalancing shows that the greatest difference in turnover for the S&P 500 and the S&P EWI occurred in 2000, the year in which the equally weighted index had the highest turnover. That year, annual market capitalization turnover for the S&P 500 and the

S&P EWI was 8.9% and 46.3%, respectively, resulting in a difference of 37.4%. The minimum difference of 17.1% occurred in 1996, which was also the year when the S&P EWI had the lowest turnover for the period under review.

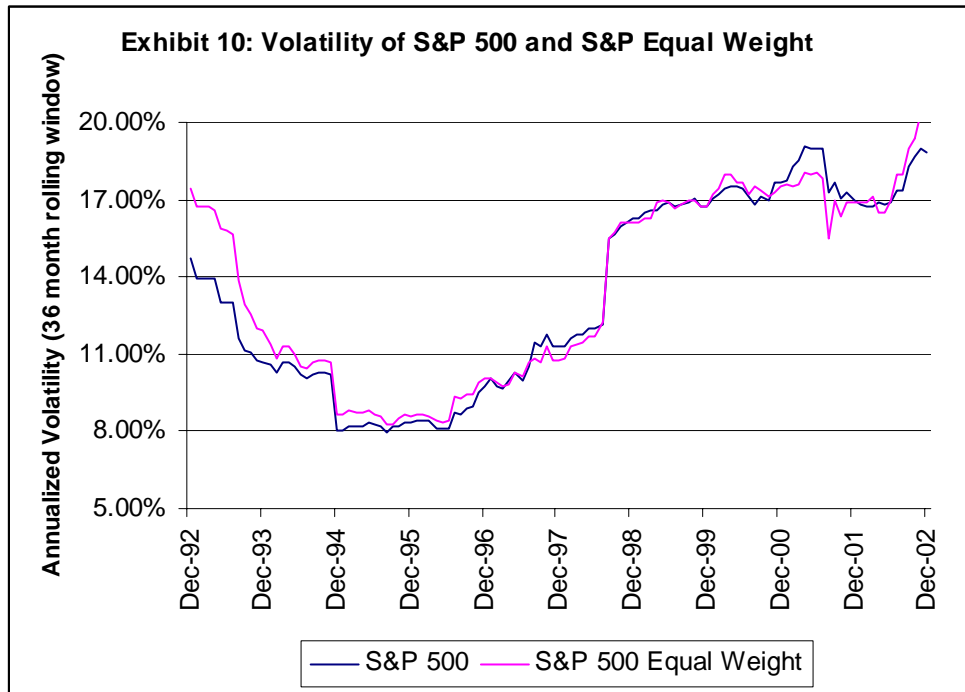## Historical Performance of the S&P EWI

Exhibit 9 illustrates the performance of the S&P EWI relative to the S&P 500. Readers should note that index returns should be compared over much longer horizons than shown here, and should cover different market and economic cycles. The S&P EWI was backtested from January 1990 to December 2002. A significant portion of this period experienced one of the biggest bull runs in history. Therefore, it is not surprising that S&P 500 beat the S&P EWI in 55.8% of the 52 quarters and 50.6% of the 156 months in the period. However, the S&P EWI outperformed the S&P 500 over all the different periods shown in Exhibit 9, because the equally weighted index has done significantly better in the bear market since mid-2000.

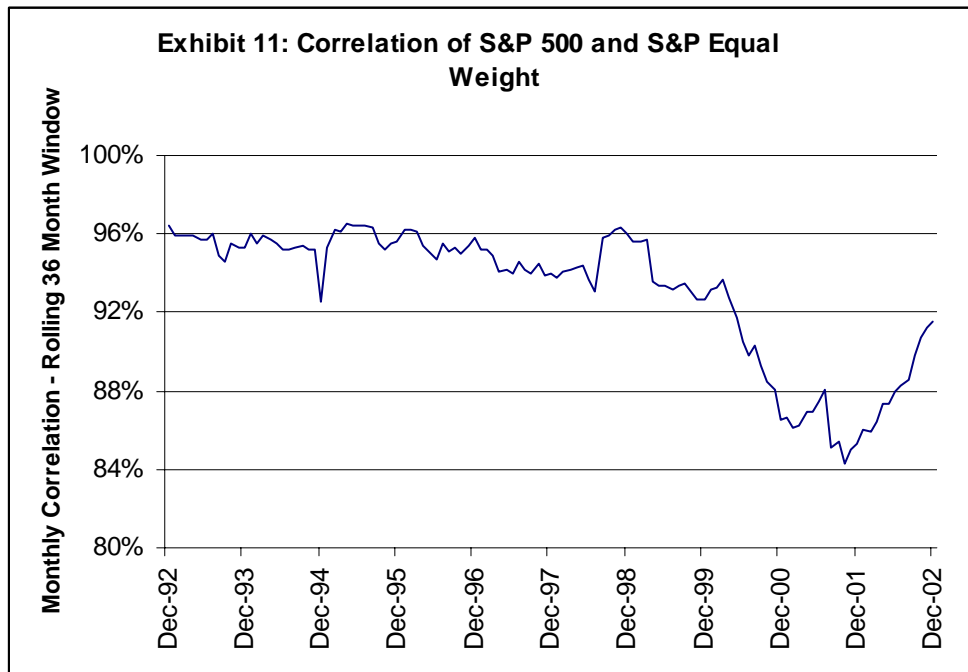| Exhibit 9: Annualized Returns of S&P 500 and S&P EWI through Dec-02		
	S&P 500	S&P EWI
1 Year	-22.1%	-18.2%
3 Year	-14.6%	-3.7%
5 Year	-0.6%	2.3%
10 Year	9.3%	10.2%
Since Jan-90	9.7%	10.5%

Source: Rydex Global Advisors, Standard & Poor's.

Exhibit 10 provides a historical perspective on the relative volatility of the two indices. The rolling three-year annualized standard deviation of the S&P EWI exceeded that of the S&P 500 by approximately 3% in 1992, but this gradually declined until 1995. The volatilities of the two indices remained virtually the same during the bull run from 1995 to 2000, but the divergence resurfaced following the bear market that began in mid-2000. The period from 2000 to 2002 also witnessed a decline in the correlation between the S&P EWI and S&P 500, as shown in Exhibit 11.

The above discussion provides no conclusive evidence regarding the outperformance of one index over the other. However, it shows that comparative returns and volatilities of the two indices may differ during market cycles. This provides an opportunity to design spread or hedging strategies.

Exhibit 10: Volatility of S&P 500 and S&P Equal Weight

Source: Rydex Global Advisors, Standard & Poor's.

Exhibit 11: Correlation of S&P 500 and S&P Equal Weight

Source: Rydex Global Advisors, Standard & Poor's.

Risk Factor Attribution

It may be of interest to investors how the differing weightings of the two indices change the factors or risk exposures of each. We quantified the equally weighted index's lower size exposure by using the procedures developed by Fama-French (1996).

We estimated the following regression of each index on the Fama-French factors:

$$r_{i,t} = \alpha_i + \beta_i (RMRF)_t + s_i (SMB)_t + h_i (HML)_t + \varepsilon_{i,t}$$

Where

$r_{i,t}$ represents the return to index I for period t,

$RMRF_t$ is the return to the market proxy minus the risk-free rate,[2]

SMB_t is the returns to the size factor,

HML_t is the returns of the value factor,

α_i is a constant term, and

$\varepsilon_{i,t}$ is an error term.

Exhibit 12 shows the exposures, or factor loadings, of the two indices to the Fama-French factors. Both indices have a market exposure near to 1. The model also explains the returns of both fairly well, as indicated by an R-square of 99% for the S&P 500 index and 93% for the S&P EWI.

Exhibit 12: Risk Factor Exposures (All coefficients are significant at a 5% value)		
	S&P 500	S&P EWI
Intercept	0.413	0.385
Market	1.009	1.060
Small Stock (SMB) Premium	-0.181	0.060
Value (HML) Premium	0.050	0.370

Based on monthly total returns data from Jan-90 to Dec-02.
Source: http://mba.tuck.dartmouth.edu/pages/faculty/ken.french/data_library.html.,
Standard & Poor's, Rydex Global Advisors, http://research.stlouisfed.org.

The size premium is indicative of the small-stock risk of the index, i.e., by how much index returns are driven by returns of small stocks in the universe. The S&P 500 had a negative loading on the SMB, or *size factor*, which is expected since it is a large-cap index. While the fact that the S&P EWI had greater exposure to the size premium is not a surprise, it is intriguing that even within a large-cap universe, such as the S&P 500, the S&P EWI had a *positive loading* on the size premium. This means a positive movement in small-cap stocks resulted in positive movement for the S&P EWI, despite the index consisting of large-cap

---

[2] We used Treasury Bill rates from the St. Louis Fed and Fama-French factor data from Ken French's website.

stocks. In other words, changing the weighting scheme of the large-cap index gave it a minor small-stock bias.

Finally, it is interesting that the S&P EWI had a substantially greater exposure to the *value premium* than the S&P 500 did. The value factor loading on the S&P EWI was 0.37, compared to 0.05 on the S&P 500. As shown in Exhibit 13, this manifested itself in a 96% correlation for the S&P EWI with the S&P 500 Barra Value Index. Its correlation with the S&P 500 Barra Growth Index was 82%, compared to an 81% correlation between the Value and Growth indices. This correlation analysis is further proof of the significant value premium of the S&P EWI.

Exhibit 13: Correlation With Style Indices

	S&P 500/BARRA Growth	S&P 500/BARRA Value	S&P 500	S&P 500 Equal Weight
S&P 500/BARRA Growth	100%			
S&P 500/BARRA Value	81%	100%		
S&P 500	96%	94%	100%	
S&P 500 Equal Weight	82%	96%	93%	100%

Source: Standard & Poor's, Barra, Rydex Global Advisors. Based on real and simulated monthly total returns data from Jan-90 to Dec-02.

This attribution analysis shows that investors who invest in the S&P EWI will have a relatively higher exposure to the market, a higher exposure to the size premium, and a higher exposure to the value premium than the S&P 500 does.

Conclusions

The capitalization-weighted S&P 500 is clearly a measure of the investment opportunity set of large-cap U.S. equity market, which is also capitalization-weighted. However, an equally weighted investment strategy might require that its performance be measured against an equally weighted index. The S&P EWI will provide an opportunity to invest, in equal measure, in the performance of these 500 leading companies, while providing opportunities for size and sector bets relative to the S&P 500.

Standard & Poor's, in collaboration with Rydex Global Advisors, has created the S&P EWI in response to the market's need for an official equally weighted index with the same constituents as the S&P 500. Index calculation is done according to the divisor-based methodology of the S&P 500. The quarterly rebalancing process balances representation and investability, while providing additional benefits, such as coinciding with S&P 500 quarterly share adjustments. It also coincides with derivative contract cycles and results in the index giving an arithmetic average return of S&P 500 stocks between two rebalancing periods. This will facilitate the creation of derivatives and structured products around the index.

The S&P EWI has a lower concentration of individual stocks than the S&P 500. It has different sector exposures and a slower rate of change in sector weightings. However, the simulated S&P EWI had annualized market capitalization turnover of 29%, compared to 5% in the S&P 500, from January 1990 to October 2002.

These different properties result in different risk-return profiles for the index. We simulated performance of the S&P EWI relative to the S&P 500 during the past 13 years. The simulation provided no conclusive evidence regarding the outperformance of one index over the other. However, it showed that comparative returns and volatilities of the two indices might differ during market cycles, which provides an opportunity to design spread or hedging strategies

An attribution and correlation analysis showed that the S&P EWI had a higher exposure to the value premium than S&P 500 did. It is also intriguing that even within a large-cap universe, such as the S&P 500, the S&P EWI had a positive loading on the size premium. This means a positive movement in small-cap stocks resulted in positive movement for the S&P EWI, despite the index consisting of large-cap stocks. In other words, changing the weighting scheme of the large-cap index gave it a minor small-stock bias.

References

1. Block, Stanley B. and French, Dan W., "The Effect of Portfolio Weighting on Investment Performance Evaluation: The Case of Actively Managed Mutual Funds," Journal of Economics and Finance, Spring 2002.
2. Fama, Eugene F. and French, Kenneth R., "Multifactor Explanations of Asset-Pricing Anomalies," *Journal of Finance*, March 1996.
3. Strongin, Steve, Petsch, Melanie, and Sharenow, Greg, "Beating Benchmarks," *Journal of Portfolio Management*, Summer 2000.

Disclaimer

This report is co-authored by Standard & Poor's, 55 Water Street, New York, NY 10041 and Rydex Global Advisors, Inc., 9601 Blackwell Road, Suite 500, Rockville, MD 20850. Standard & Poor's (S&P) is a division of The McGraw-Hill Companies, Inc. All rights reserved. Standard & Poor's and Rydex Global Advisors do not undertake to advise of changes in the information in this document. "S&P 500" is a registered trademark of The McGraw-Hill Companies, Inc.

These materials have been prepared solely for informational purposes based upon information generally available to the public from sources believed to be reliable. Standard & Poor's and Rydex Global Advisors make no representation with respect to the accuracy or completeness of these materials, whose content may change without notice. Standard & Poor's and Rydex Global Advisors disclaim any and all liability relating to these materials, and make no express or implied representations or warranties concerning the statements made in, or omissions from, these materials. No portion of this publication may be reproduced in any format or by any means including electronically or mechanically, by photocopying, recording or by any information storage or retrieval system, or by any other form or manner whatsoever, without the prior written consent of Standard & Poor's and Rydex Global Advisors.

Standard & Poor's Rydex Global Advisors do not guarantee the accuracy and/or completeness of the S&P 500 Equal Weight Index, any data included therein, or any data from which it is based, and Standard & Poor's and Rydex Global Advisors shall have no liability for any errors, omissions, or interruptions therein. Standard & Poor's and Rydex Global Advisors make no warranty, express or implied, as to results to be obtained from the use of the S&P 500 Equal Weight Index. Standard & Poor's makes no express or implied warranties, and expressly disclaims all warranties of merchantability or fitness for a particular purpose or use with respect to the S&P 500 Equal Weight Index or any data included therein. Without limiting any of the foregoing, in no event shall Standard & Poor's and Rydex Global Advisors have any liability for any special, punitive, indirect, or consequential damages (including lost profits), even if notified of the possibility of such damages.

Standard & Poor's does not sponsor, endorse, sell, or promote any investment fund or other vehicle that is offered by third parties and that seeks to provide an investment return based on the returns of the S&P 500 Equal Weight Index. There is no guarantee that the S&P 500 Equal Weight Index will continue to perform relative to the S&P 500 Index or U.S. stocks generally in a manner similar to the way it has performed in the past. A decision to invest in any such investment fund or other vehicle should not be made in reliance on any of the statements set forth in this document. Prospective investors are advised to make an investment in any such fund or vehicle only after carefully considering the risks associated with investing in such funds, as detailed in an offering memorandum or similar document that is prepared by or on behalf of the issuer of the investment fund or vehicle.