

# Constructing Risk-Based, Multi-Asset-Class Portfolio Indexes:

DOW JONES PORTFOLIO INDEXES

Research Report by:  
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The intent of this paper is to describe the structure of the Dow Jones Portfolio Indexes and the reasoning behind key methodological features.

Dow Jones Portfolio Indexes allocate blends of stocks, bonds and cash indexes to achieve two related but distinct objectives:

1. Portfolios that seek to hold risk level constant are represented by the Dow Jones Relative Risk Indexes. Allocations among stocks, bonds and cash are revised monthly to maintain five static levels of risk shown in Illustration 1:
  - a. conservative
  - b. moderately conservative
  - c. moderate
  - d. moderately aggressive
  - e. aggressive
2. Portfolios that adjust risk level according to the time remaining until a specified year are represented by the Dow Jones Target Date Indexes. Allocations to stocks, bonds and cash are modified monthly to achieve a decreasing level of risk (from aggressive to conservative) beginning 35 years (420 months) prior to Dec. 31 of the target year. The rate of monthly risk reduction follows a natural cosine curve, depicted in Illustration 2. Target years are in five-year increments.

The key element of construction for the Dow Jones Portfolio Indexes is the use of three Composite Major Asset Classes (CMACs) that represent stocks, bonds and cash. The cash CMAC consists of one index that tracks U.S. Treasury bills. The other two CMACs are subdivided into sub-asset-class indexes representing the generally recognized types of investments within the CMAC, such as U.S. Large Capitalization Growth Stocks or Mortgage-Backed Bonds. (See Illustration 3.) While the indexes representing these sub-asset classes are capitalization-weighted, the sub-asset classes are equally weighted within each CMAC, with rebalancing occurring at the beginning of each month. The resulting structure is neutral in terms of asset allocation. Any portfolio that gives

more weight to one sub-asset class over another necessarily requires underweighting at least one other, which constitutes a subjective asset allocation decision.

Deviating from the traditional capitalization-weighted structure of indexes was not undertaken casually. Capitalization weighting is hinged upon the idea that the market has determined relative values that are at least notionally associated with the comparative availability of and demand for the securities representing that asset. However, the equity sub-asset classes are notional groupings – small-cap value, for example – whose definitions vary from investor to investor. Therefore, the relative value of any one of these sub-asset classes at any given time cannot be directly equated to capitalization weighting, which is by definition the market's perception of the relative value of individual securities with finite shares outstanding. With no consensus definition of these sub-asset classes, there could be no number of shares outstanding for the market to consider when arriving at the market value of the securities relative to the sub-asset class. Thus, market capitalization cannot be viewed for sub-asset classes in the same sense as for individual securities when considering relative market value.

Capitalization weighting also cannot be applied directly in building a portfolio of stocks, bonds and cash. When linking three assets that are structurally different and traded in different markets for different reasons the comparative total value of the three markets are not necessarily associated in a micro-economic sense – especially since the values of fixed income instruments and stocks are not established in the same way.

The methodologies of the underlying sub-asset-class indexes are determined by their respective index providers. The equity indexes are maintained by Dow Jones Indexes; their methodologies are available at [www.djindexes.com](http://www.djindexes.com). The fixed-income and cash (T-bill) indexes are maintained by Lehman Brothers Inc. and are shown at [www.lemalive.com](http://www.lemalive.com).

## DIVIDING THE RISK SPECTRUM

The risk space addressed in the Dow Jones Portfolio Indexes lies between the risk of a diversified stock portfolio and T-bills (cash). This construct requires the assumption that the risk of the stock market will always be the greatest of the three asset classes for the trailing three-year period used to set the risk.<sup>1</sup> Rather than use static allocations of these three asset classes and examine the risks of those allocations, the risk spectrum was defined as percentages of the risk of the stock market. Thus, the Dow Jones Relative Risk Indexes quantify the static risk levels listed above in this manner:

- a. conservative – 20% of risk of an all-stock portfolio
- b. moderately conservative – 40% of the all-stock risk
- c. moderate – 60% of the all-stock risk
- d. moderately aggressive – 80% of the all-stock risk
- e. aggressive – 100% of the all-stock risk

(See Illustration 1.) Similarly, the declining risk of the Dow Jones Target Date Indexes begins at 90% of the risk of an all-stock portfolio 35 years or earlier from the specified date and is falls to 20% of the risk of an all-stock portfolio on Dec. 31 of the target year and later.

It is important to remember that while the percentage of risk of the equity market and the percentage of return of the equity market are connected, the relationship is not always direct and almost never one-to-one. Over short periods the stock market tends to be more volatile and can experience less return than would result from taking less risk for the same period, which leads to a more subtle relationship between risk and return over long periods. In taking 100% of the risk of the equity market one would hope always to achieve at least 100% of the return. But taking 50% of the risk of the equity market over the long run likely will result in receiving not just 50% of the return but usually more. With a T-bill investment one has historically received around 36% of the equity market returns with virtually no risk. See Illustration 4. The challenge for investors is to comprehend on a continuing basis where their portfolio stands in an ever-fluctuating market in order to gain an element of control over the outcome.

## DEFINING RISK

Basing Dow Jones Portfolio Indexes' allocations on the percentage of risk in the stock market allows them to maintain relationships in the risk spectrum that are reasonably delineated regardless of current market conditions. With static allocations of the assets, by contrast, the position of each index in the risk spectrum would vary as the correlation of the returns of the underlying assets changed.

It has long been accepted that risk and return are associated in the capital markets. The Dow Jones Portfolio Indexes attempt to bring the risk-and-return relationship into sharper focus and thus make it more useful to investors. Much of the following discussion focuses on portfolio risk, so it is important to describe what the term means in this context. Rather than using the more common measure of the variance of all returns (positive and negative), Dow Jones Indexes chose to optimize the expected return of the portfolio index based on the historic rolling 36-month below-mean semi-variance of monthly returns – in short, only negative return variance.

Where the Population Variance of return set “R” is calculated as:

$$\sigma^2 = \sum_{i=1}^n (R_i - \mu_R)^2 / n \quad (1)$$

Where  $R_i$  = Return for period  $i$

Where  $\mu_R$  = Mean of return set R

Where  $n$  = Number of Periods in return set R

The Population below-mean semi-variance given here as of return set “R” is calculated as:

$$\downarrow \sigma^2 = \sum_{i=1}^n (L_i)^2 / n \quad (2)$$

Where  $R_i$  = Return for period  $i$

Where  $\mu_R$  = Mean of return set R

Where  $L_i = \begin{cases} R_i - \mu_R & \text{IF } R_i - \mu_R < 0 \\ 0 & \text{IF } R_i - \mu_R \geq 0 \end{cases}$

Where  $n$  = Number of Periods in return set R

The appeal of using semi-variance over variance as a measure of risk is that it measures only the below-average outcomes (bad outcomes) rather than, as variance does, measuring both above- and below-average outcomes (good

<sup>1</sup> The full assumption in building the Dow Jones Portfolio Indexes is that over time stocks will be riskier than bonds and bonds will be riskier than cash. This assumption also relies on the existence of a risk premium, which is a basic tenet of Modern Portfolio Theory. The logic is that if taking more risk did not offer more potential return, investors would not take more risk.

and bad outcomes). Since the optimization program seeks allocations that maximize expected return for a given portfolio risk based on below-average outcomes, it is quantitatively and intuitively a superior option to isolate the influences of the two measures. If the returns distribution of the asset class were perfectly symmetrical, semi-variance would be half the full variance and the effects of using semi-variance would be moot. However, the distributions are rarely perfectly symmetrical. The differences in the resulting optimized allocations are usually subtle but they can be significant. For example:

The optimal allocation for a Dow Jones Conservative Portfolio index that seeks to take 20% of the risk of the stock CMAC in April 2004 was:

Cash	6.18%
Bonds	77.30%
Stocks	16.52%

If full variance were the measure of risk the optimal allocation would have been:

Cash	13.13%
Bonds	70.84%
Stocks	16.03%

If an alternate conservative portfolio index history of 273 months (January 1983 through September 2005) was constructed exactly as the Dow Jones portfolios were constructed but using variance rather than semi-variance as the measure of risk over the trailing 36-month period, the optimized allocations in each subsequent month would have resulted in superior monthly returns 43% of the time. The actual Dow Jones Conservative Portfolio index allocations based on semi variance had superior returns over those created using variance 57% of the time.

Harry Markowitz [1959, 1991] discusses variance, below-target semi-variance, and below-mean semi-variance as risk measures that can be used to construct optimal portfolios.<sup>2</sup> Since a target return is an investor-specific measure, below-target semi-variance was not considered for use in index construction.

## PORTFOLIO INDEXES AND MODERN PORTFOLIO THEORY

A simple but important assumption underlies the Dow Jones Relative Risk and Target Date indexes: The primary goal of any portfolio is to maximize return for the amount of risk incurred. In Modern Portfolio Theory (MPT) optimization, the optimal allocation depends on three aspects of the returns being optimized: historic risk, expected return, and historic covariance. The covariance is a function of the relationship of the individual historic returns.

Portfolio Variance = Weighted Variances + Weighted Covariances

In the case of a two-security portfolio using below-mean semi-variance:

$$\downarrow \sigma_p^2 = (X_a^2 * \downarrow \sigma_a^2) + (X_b^2 * \downarrow \sigma_b^2) + 2X_a X_b \{ \downarrow \sigma_a * \downarrow \sigma_b * r_{ab} \} \quad (3)$$

Where:

Portfolio semi variance =  $\downarrow \sigma_p^2$

Weight a =  $X_a$

Weight b =  $X_b$

Semi variance a =  $\downarrow \sigma_a^2$

Semi variance b =  $\downarrow \sigma_b^2$

Covariance ab =  $\{ \downarrow \sigma_a * \downarrow \sigma_b * r_{ab} \}$

Where:

Correlation coefficient ab =  $r_{ab}$

Expected return has long been the subject of countless articles and endless debate. Expected return is the least predictable of the three metrics listed above and therefore will not be covered here. Yet, as standard practice in ordinary optimization, upon which countless investors base future asset allocations, we are given an expected return and must minimize expected portfolio risk. Expected return drives the traditional model, and if the expectations about the returns do not prove correct the model is less effective if not useless. Dow Jones Indexes takes the alternate route, choosing the more predictable level of risk as the given in the optimization process. The model attempts to maximize return for given levels of risk.

2 Markowitz, Harry M. Portfolio Selection (1959) 2nd ed. Oxford: Basil Blackwell, 1991.

## INVERTING THE OPTIMIZATION PROCESS

Running the optimization process with a given portfolio risk means that the individual risk and portfolio covariance leads to a set of allocations that historically produced the particular portfolio risk. The optimal return of this portfolio therefore will be a function of the weighted expected returns of a and b (which in most optimizations are securities but for the Dow Jones Portfolio Indexes are CMACs):

$$R_{ab} = X_a R_a + X_b R_b + X_c R_c \quad (4)$$

Where:

$R_{ab}$  = weighted portfolio expected return

$R_a$  = expected return Cash CMAC

$R_b$  = expected return Bond CMAC

$R_c$  = expected return Stock CMAC

$X_a$  = allocation to Cash CMAC

$X_b$  = allocation to Bond CMAC

$X_c$  = allocation to Stock CMAC

Dow Jones Indexes uses an expected return of 6% for stocks, 3% for bonds and 1% for Treasury bills in the actual optimization calculation of the index allocations. The model is constrained to a minimum allocation of 5% for any of the three asset classes in the Dow Jones Relative Risk Indexes and 4% minimum allocation in the Dow Jones Target Date Indexes. These minimums can in certain cases affect the allocations of the optimal portfolio.

## COMMON ELEMENTS

Both forms of Dow Jones Portfolio Indexes have some common elements, though they are deployed differently to achieve the distinct objectives:

1. Both develop allocations based on percentages of risk of the equity CMAC. While the Relative Risk indexes seek to maintain static levels of risk, the Target Date indexes seek to reduce risk from 90% to 20% of the equity CMAC risk over 420 months.
2. For the allocations, both use reverse Markowitz optimization, in which expected return is maximized for a specific level of risk.
3. Both use the most recent 36 months of below-mean semi-variance as the measure of risk to determine the optimal allocation for the desired risk for the coming month.

4. Stock, bond and cash CMACs are exactly the same for all global versions of the indexes regardless of the risk level.
5. Stock, bond and cash CMACs are exactly the same for all U.S. versions of the indexes regardless of the risk level.

## USING THE DOW JONES PORTFOLIO INDEXES

Most portfolios that are comprised of more than one asset class have two primary ongoing structural considerations. The first is long term strategic allocations to major asset classes such as stocks, bonds and cash. The second is tactical allocations (usually of smaller amounts of capital for shorter periods) to stocks, bonds and cash or, within those major asset classes, such sub-asset-classes as large-capitalization growth equities or, even more targeted, technology stocks. Measuring the effectiveness of a portfolio's strategic allocations of capital to stocks, bonds and cash over time can be accomplished by blending three capitalization-weighted indexes that represent the different major asset classes in the same proportions as the allocations. The result would be a market weighted total portfolio index, but it would fall short as a benchmark of the shorter-term tactical allocations.

Dow Jones Portfolio Indexes can help investors determine how well both the strategic and tactical elements of their portfolios have worked together. Dow Jones Portfolio Indexes can highlight the sources of over- or under-performance in the portfolio asset allocation over both the long and short term. Thus informed, investors can decide if they are getting an appropriate return for the amount of risk taken and thus give them greater control over the performance outcome.

The data in Illustration 5 can be used to create an example of how the Dow Jones Portfolio Indexes can be applied. Suppose the investor has a balanced portfolio of moderate risk. By comparing it to the Dow Jones Moderate Portfolio Index (which maintains 60% of the risk of the equity CMAC) the allocations and returns of the investment portfolio can be placed side by side with those of this index. Also suppose the investment portfolio underperformed the index for the year. An analysis might begin by comparing the equity portion of the investment portfolio to the equity portion of the index. If the portfolio's equity allocation was similar to that of the index but achieved lower returns, the sub-asset-class allocations could then be compared. Conversely, if the sub-asset-class performance of the

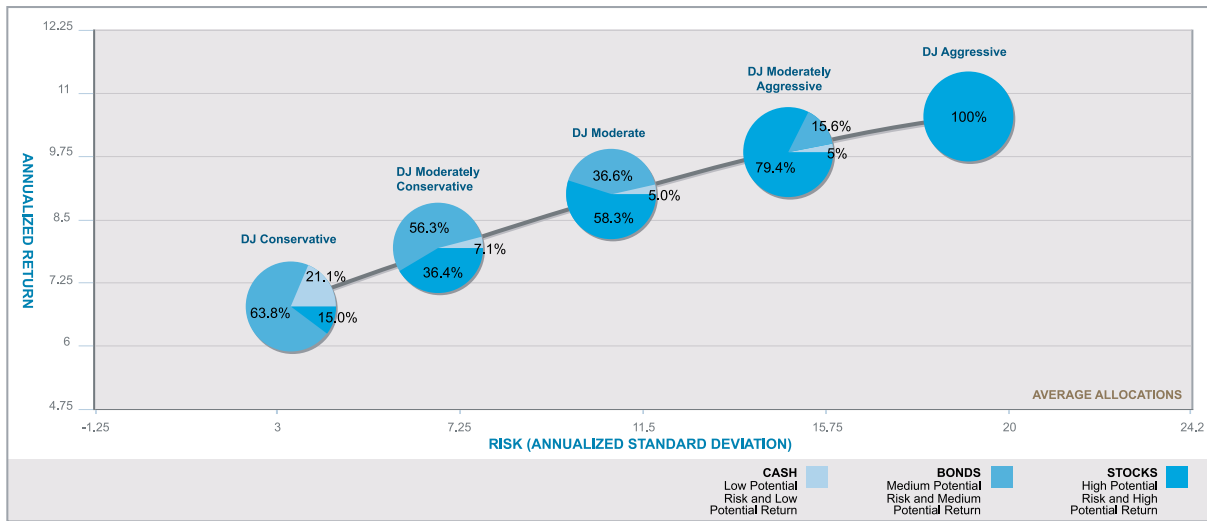
portfolio's equity investments were similar to that of the comparable sub-asset class indexes the allocations could be compared. Perhaps the portfolio's allocation was much higher to Large-Cap Growth than to Mid-Cap Growth, while the index data shows that for the year Mid-Cap Growth returned almost six times more than Large-Cap Growth. Next, one could compare the total stock weight in the portfolio to that of the portfolio index to assay the contribution of the allocation to Mid-Cap Growth to the contribution of the total stock investment performance, which in turn affects total portfolio performance. The

depth of analysis available through the indexes is therefore up to the user. If one wants only to know whether portfolio return has been appropriate to portfolio risk very little effort is required. But with the Dow Jones Portfolio Indexes, details of all of these elements can be compared and understood in a simple yet comprehensive context.

It is in this manner that investors can use the Dow Jones Portfolio Indexes for assessment and for better-informed portfolio decisions.

### Illustration 1 The Dow Jones Relative Risk Indexes

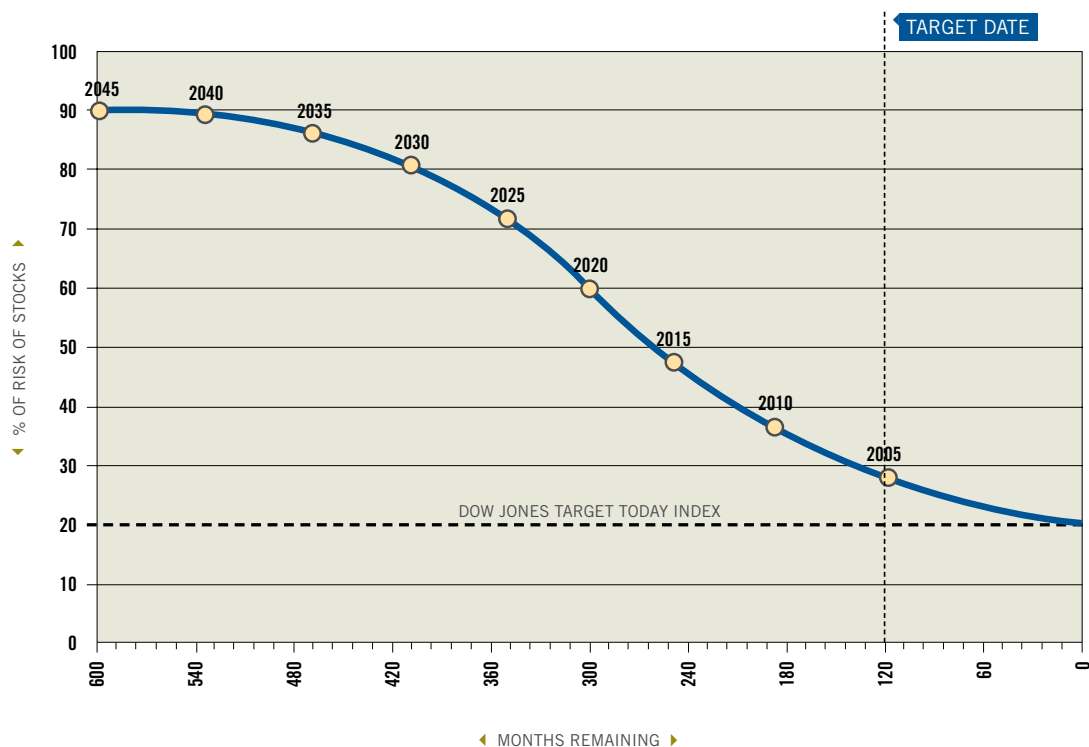
*Asset Allocation and Annualized Risk and Return: 3/29/1996 - 3/31/2006*



The Dow Jones Relative Risk Indexes described in this document were launched June 2001. This document contains index performance data based on backtesting, i.e., calculations of how the index might have performed prior to launch if it had existed using substantially the same index methodology employed by Dow Jones today. Backtested performance information is purely hypothetical and is provided in this document solely for informational purposes. Backtested performance does not represent actual performance and should not be interpreted as an indication of actual performance. Please see the disclaimer at the end of this document for more information concerning the backtested index data.

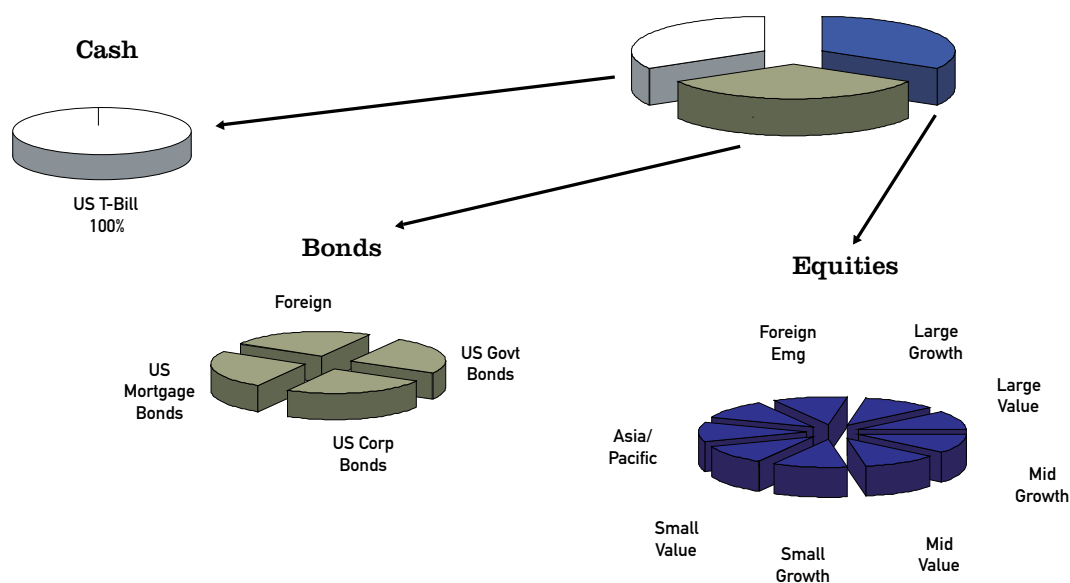
## Illustration 2 Relative Risk of Dow Jones Target Date Indexes

This systematic reduction of risk over time exposes investors to higher, but appropriate, levels of risk in the early years and lower levels of risk in the years immediately prior to their target dates.



## Illustration 3 CMAC Construction

Each fund represents a balanced portfolio of equities, bonds, and cash throughout the investment lifecycle. This balanced structure remains intact at all levels of risk. Risk is controlled by adjusting allocations among the three major asset classes, not by including or excluding asset classes or sub asset classes.



## Illustration 4 Dow Jones Portfolio Indexes (January 1992 through December 2005)

% of Equity Risk	Highest 12 Months Return	Lowest 12 Months Return	Average Return	% of Equity Return
100%	54.73%	-26.44%	10.71%	100%
90%	49.17%	-23.29%	10.26%	96%
80%	44.11%	-19.89%	9.86%	92%
70%	39.28%	-16.30%	9.45%	88%
60%	34.55%	-12.56%	8.99%	84%
50%	29.87%	-8.65%	8.43%	79%
40%	25.19%	-4.47%	7.93%	74%
30%	20.39%	-0.99%	7.34%	69%
20%	16.11%	0.06%	6.62%	62%
T-bills	6.22%	0.89%	3.87%	36%

The Dow Jones Portfolio Indexes described in this document were launched on June 30, 2001 (Dow Jones Relative Risk Indexes) and on April 1, 2005 (Dow Jones Target Date Indexes). This document contains index performance data based on backtesting, i.e., calculations of how the index might have performed prior to launch if it had existed using substantially the same index methodology employed by Dow Jones today. Backtested performance information is purely hypothetical and is provided in this document solely for informational purposes. Backtested performance does not represent actual performance and should not be interpreted as an indication of actual performance. Please see the disclaimer at the end of this document for more information concerning the backtested index data.

## Illustration 5 Dow Jones Portfolio Indexes

Cash					Bonds					Stocks					Dow Jones Portfolio Indexes									
Target % of Equity Risk					12/30/05										Daily Report									
					TR Close	Prev TR Close	% Change	Last Month End	Date Total Return	Year To Date Total Return	52 Week Return	Annulzd Total Return %	Rolling 12 Month* High/Low Return %	3 Years		10 Yr Hi	10 Yr Lo							
20%	40%	60%	80%	100%	Dow Jones Portfolio Indexes																			
% Allocation Beginning of Month					Dow Jones 100% Global Portfolio Index (100% Global Equity Portfolio)																			
15.21%	36.45%	57.33%	79.60%	100%	416.21	418.30	-0.50	407.84	2.05	12.09	12.12	23.29	54.72			-26.44								
% Allocation Current					Underlying Stock Indexes																			
15.41%	36.69%	57.60%	79.79%	100%																				
1.66%	3.30%	6.20%	8.59%	10.77%	1048.50	1054.46	-0.56	1060.26	-1.11	2.56	2.37	11.74	53.84			-51.88								
1.68%	3.36%	6.30%	8.73%	10.94%	1722.90	1729.22	-0.37	1715.22	0.45	5.12	4.99	14.54	50.64			-23.19								
1.70%	3.38%	6.35%	8.80%	11.03%	1889.42	1896.78	-0.39	1865.48	1.28	14.54	14.49	23.97	98.91			-50.97								
1.70%	3.38%	6.35%	8.79%	11.02%	2936.05	2948.27	-0.41	2901.14	1.20	10.88	10.80	23.48	50.06			-17.77								
1.68%	3.35%	6.28%	8.70%	10.90%	1681.62	1691.09	-0.56	1679.54	0.12	8.78	8.58	23.30	116.49			-44.78								
1.68%	3.35%	6.29%	8.72%	10.92%	2599.66	2634.31	-0.59	2581.03	0.34	6.88	6.58	22.16	63.12			-23.18								
1.80%	3.59%	6.73%	9.32%	11.68%	160.53	161.89	-0.84	149.62	7.29	23.78	24.52	28.19	82.11			-34.91								
1.74%	3.47%	6.50%	9.01%	11.29%	382.07	385.56	-0.91	388.38	3.72	11.89	11.71	24.70	57.94			-27.32								
1.76%	3.52%	6.60%	9.14%	11.45%	416.60	415.97	0.15	396.09	5.18	24.56	25.19	36.69	91.11			-48.13								
% Allocation Beginning of Month					Dow Jones 80% Global Portfolio Index																			
27.92%	55.43%	37.67%	15.40%		373.19	374.74	-0.41	366.57	1.81	9.70	9.75	19.33	44.10			-19.89								
% Allocation Current					Dow Jones 60% Global Portfolio Index																			
27.98%	55.31%	37.46%	15.28%		333.79	334.88	-0.32	328.62	1.57	6.99	7.07	15.53	34.54			-12.56								
% Allocation Beginning of Month					Dow Jones 40% Global Portfolio Index																			
27.98%	55.31%	37.46%	15.28%		291.24	291.84	-0.21	287.70	1.23	3.93	4.04	11.52	25.19			-4.47								
% Allocation Current					Dow Jones 20% Global Portfolio Index																			
27.92%	55.43%	37.67%	15.40%		245.27	245.54	-0.11	243.38	0.78	2.62	2.72	6.99	14.04			0.06								
% Allocation Beginning of Month					Lehman Bond Composite																			
27.98%	55.31%	37.46%	15.28%		245.94	246.17	-0.09	243.47	1.01	-0.71	-0.53	4.39	19.77			-3.31								
% Allocation Current					Underlying Bond Indexes																			
6.99%	13.82%	9.36%	3.82%		14.01	14.02	-0.06	13.88	0.93	2.65	2.87	2.78	18.34			-2.66								
7.00%	13.83%	9.36%	3.82%		15.35	15.37	-0.08	15.20	1.01	1.88	1.89	5.03	22.25			-3.26								
7.00%	13.83%	9.36%	3.82%		12.71	12.72	-0.07	12.58	1.00	2.61	2.80	3.45	16.80			0.26								
7.00%	13.84%	9.37%	3.82%		4.15	4.15	-0.16	4.10	1.11	-9.38	-9.28	6.14	27.94			-8.60								
% Allocation Beginning of Month					Cash Component																			
56.87%	14.12%	5.80%	5.00%		1.71	1.71	-0.01	1.71	0.32	3.00	3.00	1.75	6.22			0.89								
% Allocation Current					Lehman 1-3 month T-Bill																			
56.61%	13.99%	4.94%	4.93%		1.71	1.71	-0.01	1.71	0.32	3.00	3.00	1.75	6.22			0.89								

<http://www.djindexes.com>. Click on Portfolio Indexes. Click on Statistics.

\* As of Most Recent Calendar Month End.

Rodney Alldredge\* is a Senior Vice President of Global Index Advisors, Inc. ("GIA"). GIA is a licensee of the Dow Jones Portfolio Indexes and the Dow Jones Target Date Indexes. GIA also acts as a sub-advisor to the Wells Fargo Advantage Dow Jones Target Date Funds and State Street Global Advisors' ("SSgA") Dow Jones Target Date Strategy commingled funds and sub-licensor of the Dow Jones Target Date Indexes to the American Independence NestEgg Dow Jones U.S. Target Date Funds, all of which are based on the Dow Jones Target Date Indexes. The Wells Fargo Advantage Dow Jones Target Date Funds, SSgA Dow Jones Target Date Strategy commingled funds and American Independence Nest Egg Dow Jones U.S. Target Date Funds are not sponsored, endorsed, marketed or promoted by Dow Jones & Company, Inc., and Dow Jones makes no representation regarding the advisability of investing in such funds or about the quality, accuracy and/or completeness of the Dow Jones Target Date Indexes.

This document contains comparisons, assertions, and conclusions regarding the performance of the Dow Jones Portfolio Indexes based on backtesting, i.e., calculations of how an index might have performed in the past if it had existed. Backtested performance information is hypothetical and provided solely for informational purposes. Backtested performance does not represent actual performance, and should not be interpreted as an indication of actual performance. Dow Jones & Company, Inc. began publishing the Dow Jones Relative Risk Indexes on June 30, 2001, and the Dow Jones Target Date Indexes on April 1, 2005. Each Dow Jones Portfolio Index is comprised of a set of equity, bond and cash sub-indexes. As of publication, the equity component is represented by the Dow Jones U.S. Style Indexes, Dow Jones Europe/Canada Index, Dow Jones Asia/Pacific Index, Dow Jones Institutional Emerging Markets Index; the bond component by the Lehman Government, Corporate, Mortgage Bond and Majors (ex U.S.) Indexes and the cash component by the Lehman 1-3 Month T-Bill Indexes. Dow Jones created backtested theoretical history for the Dow Jones Portfolio Indexes for the period 12/31/1991 through their launch dates using the aforementioned indexes. The historical data included herewith for the time period prior to 12/31/1991 was not created by Dow Jones. The various index components of historical data for the time period 1/1/1983 to 12/31/1991 are represented as follows: (i) the bond component is represented by the Lehman Government, Corporate, Mortgage Bond and Majors (ex U.S.) Indexes; (ii) the cash component is represented by the Federal Reserve T-Bill Index for the period January 1, 1980 through December 31, 1980 and by the Lehman 3-Month T-Bill Index for the period January 1, 1981 through December 31, 1991 and (iii) the equity component is represented by the MSCI World Index for the international component and Muldex data for the US component. Muldex data reflects the returns of an equity portfolio invested according to a style-based investment strategy owned and implemented by State Street Global Advisors ("SSgA"). Dow Jones acquired the Muldex data from SSgA in June 2000 and used SSgA's multi-factor cluster analysis in creating the methodology for the Dow Jones U.S. Style Indexes. While the methodology of the DJ US Style Indexes and that of the Muldex investment strategy are similar, they are not identical.

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