

## MPT Statistics – Understanding and Using Them

MPT Statistics can be extremely valuable in understanding how securities or portfolios might perform and how different securities might perform in combination with each other. However, these statistics, especially as provided by Morningstar and others, can also be confusing and not particularly useful. Typically, these companies measure Betas, Alphas, Correlation Coefficients and R-squared values for equity funds using the S&P 500 index as the independent variable (benchmark). Unfortunately, few funds, other than index funds, actually perform like the S&P 500. The table below provides MPT stats for a sample of mutual funds classified as Small Company Growth. Notice that the correlations and betas bear little relationship when compared to the S&P 500 and a group of similarly managed funds (the fund index). Consequently, using MPT stats from Morningstar and others to find appropriate securities for the asset class benchmarks you are using, may be very misleading. The above values, when used for Fund Hypotheticals and Fund Overviews in the ICE application, are calculated on the fund versus the index benchmark used for that fund. The “Details” feature displays MPT Statistics provided by Thompson Financial. The ICE application also provides real-time calculations for Sharpe Ratios, Standard Deviations, Covariances, Probability Ranges and other valuable statistics using actual historical performance.

R-Squared is reasonably good at describing the historical ‘fit’ (performance) of one variable compared to another as well as the dispersion of returns around the independent variable. However, the covariance, in my opinion, is a far better measure of the timing, direction and volatility of performance. While a lower R-squared value may tell you that the returns for the dependent variable are widely dispersed around the benchmark, it does not give any indication of the volatility of that performance. The calculation for covariance is:  $COV_{x,y} = (STD_x * STD_y) * COR$ , which translates into the product of the standard deviations of the two variables multiplied by the correlation between the two.

Independent Variable: Wilshire Small Co Growth

ROR: -4.54%    STD: 30.65%

Holding Period: 12 Months

Horizon: 12/96 - 12/02

Risk-free Return: 1.91%

Independent Variable: S&P 500 Composite

ROR: 4.21%    STD: 19.87%

Holding Period: 12 Months

Horizon: 12/96 - 12/02

Risk-free Return: 1.91%

Code	Name	ROR%	STD%	Corr.	Beta	Corr.	Beta
ALSRX	AIM S-Cap Grow A	12.88	37.66	0.95	1.17	0.81	1.53
BBBSX	Alger Fd-S-Cap Retire	0.44	34.55	0.91	1.03	0.89	1.55
BNSIX	BB&T S-Cap Grow A	-3.84	39.84	0.95	1.24	0.79	1.58
DTSGX	BlackRock-S-Cap Gr Svc	-1.73	40.37	0.95	1.26	0.79	1.60
EKABX	BNY Hamilton S-Cap Gr Ins	11.74	32.29	0.93	0.98	0.66	1.07
ENGEX	CG CMF-S-Cap Grow	-0.67	27.77	0.97	0.88	0.78	1.09
FEGAX	Enterprise-S-Cap Grow Y	4.07	25.16	0.92	0.75	0.61	0.78
FIEGX	Evergreen S-Cap Grow B	-1.48	34.94	0.97	1.10	0.63	1.11
GTSAX	FAIF S-Cap Grow A	4.47	33.65	0.95	1.04	0.79	1.34
JCGYX	INVESCO S-Cap Grow Inv	4.79	35.82	0.96	1.12	0.81	1.46
MASCX	J. Hancock Foc S-Cp Gr Y	-1.73	36.93	0.94	1.13	0.86	1.60
MSSGX	J. Hancock S-Cap Grow A	1.35	33.24	0.96	1.05	0.81	1.35
MULBX	Marshall Sm-Cap Gro Adv	2.55	27.64	0.95	0.86	0.69	0.96
NAGQX	Morgan S-Cap Grow B	-3.63	55.06	0.93	1.67	0.86	2.39
NAMCX	MSIF Inc. S-Cap Grow A	14.11	36.85	0.95	1.14	0.79	1.46
PCGEX	Munder S-Cap Grow B	-7.73	23.66	0.91	0.70	0.69	0.82
PCSGX	Nicholas Mini-Cap Gr I	8.63	38.83	0.98	1.24	0.69	1.35
PGSGX	Nicholas S-Cap Gr I	1.08	39.13	0.97	1.23	0.78	1.54
PISCX	One Group-S-Cap Grow A	4.55	21.08	0.93	0.64	0.66	0.70
PSGIX	Paine PACE S/M Gr Eq P	9.11	35.56	0.97	1.13	0.78	1.39
RSSGX	Prov Inc Couns S-Cap Gr I	2.58	38.05	0.96	1.19	0.68	1.29
SMPBX	RS Smer Co Grow	8.25	31.09	0.94	0.95	0.68	1.07
SOCAX	SB S-Cap Gr Opp A	2.73	26.85	0.93	0.82	0.61	0.82
SOGBX	SEI Instl Mgd Tr-S-Cp Gr	3.24	33.69	0.96	1.05	0.75	1.27
SSCGX	Sit S-Cap Grow Fd	7.19	44	0.93	1.33	0.64	1.41
SSMGX	Target-S-Cap Grow Portf	-0.58	26.12	0.93	0.79	0.76	1.00
STSIX	Turner S-Cap Grow Fd	4	37.91	0.97	1.20	0.80	1.53
TAEMX	Warburg Pincus S-Cp Gr Tr	-0.36	34.33	0.99	1.10	0.73	1.27
TASGX	Wells F S-Cap Grow A	-1.9	45.84	0.97	1.46	0.72	1.67
WSMGX	Wilshire Targ-S-Cp Gro In	-1.69	19.57	0.92	0.59	0.57	0.56

## **Betas**

Betas indicate how each asset/manager (dependent variable) has or should perform in relation to movement by the primary index (independent variable). Beta is the "slope" of the regression line or the amount of change on the vertical axis (dependent variable return) per unit of change on the horizontal axis (independent variable return). If the slope is at 45 degrees, the beta is 1.0 which means that on average every one percent change in the asset/manager's return was associated with a one percent change in the index return. A Beta greater than 1.0 indicates a higher level of risk and an expected change in value in excess of that experienced by the primary index (independent variable). Betas measured against a market index such as the S&P 500 may give some indication of how a funds might perform compared to the over-all market, but it explains little about how a funds is performing relative to its peer group.

## **Correlation Coefficient**

Correlations represent the strength of the relationship between two variables. The correlation coefficient measures the timing and direction of movement between two variables (assets) (i.e. are they moving in the same direction at the same time, or in opposite directions at the same time). If the correlation coefficient is 1, there is a perfect linear relationship between the independent and dependent variables, they are moving in the same direction at the same time and the relationship is direct. Conversely, if the correlation coefficient is -1, there is a direct but inverse relationship between the independent and dependent variables, they are moving in opposite directions at the same time. Negative correlations are always preferable for diversifying portfolios. The correlation explains most of what the R-squared value is describing and actually gives a better indication of how a fund will perform relative to a benchmark such as its peer group index.

## **R-Square – simple regression**

The R-Square regression describes the way in which one variable is related to another. The resulting value indicates the "fit" in terms of the performance of one variable compared to the performance of an independent variable. A high value implies that there is a very close relationship while a smaller number indicates there is less fit between the two variables. The R<sup>2</sup> value, however, does not describe the volatility of this relationship. For example, a low value may indicate that the dependent variable is exhibiting greater volatility. The Covariance between variables gives a better understanding of this relationship.

## **Covariance**

Covariance is a measure of the timing, direction, and magnitude of the fluctuations of two independent variables. The measure of diversification in a portfolio is determined by the negative covariance of the assets in relation to each other. Effective diversification is achieved when the assets do not fluctuate in a similar manner, so that the variability of the expected rates of return for the portfolio will be less than the variability of individual components of the portfolio. The covariance is a product of the standard deviations of the variables times the coefficient of correlation. While it is important to understand how two variables perform relative to each other (moving in the same or opposite directions), it is at least as important to understand the volatility of these movements. The volatility of movement is a primary factor in determining how much of one security might be used in combination with other securities. The greater the covariance, the greater the volatility.

## **Sharpe Ratio and Minimum Downside Risk Tolerance**

The Sharpe Ratio is a way of measuring the efficiency of a portfolio while the Minimum Downside Risk Tolerance (Minimum ROR) indicates the maximum amount of real or nominal principal (as a percentage of the portfolio) that a client might be willing to lose in any 12-month period. In most, but not all, cases the higher the Sharpe Ratio the more desirable the security or portfolio. However, in some cases a security will have a higher Sharpe Ratio but the potential for downside risk exceeds the Minimum ROR acceptable to the client. IN these cases, I would always choose the security or portfolio that exhibits the least downside risk.

Like any statistic, MPT statistics should not be used out of context and without understanding what these values represent and how they have been calculated. If there is any question, contact the provider and use these statistics accordingly.