

# BellAssociates

Model Portfolios: Risk Analytics

Sample Period: January 2007—October 2010

October 14, 2010

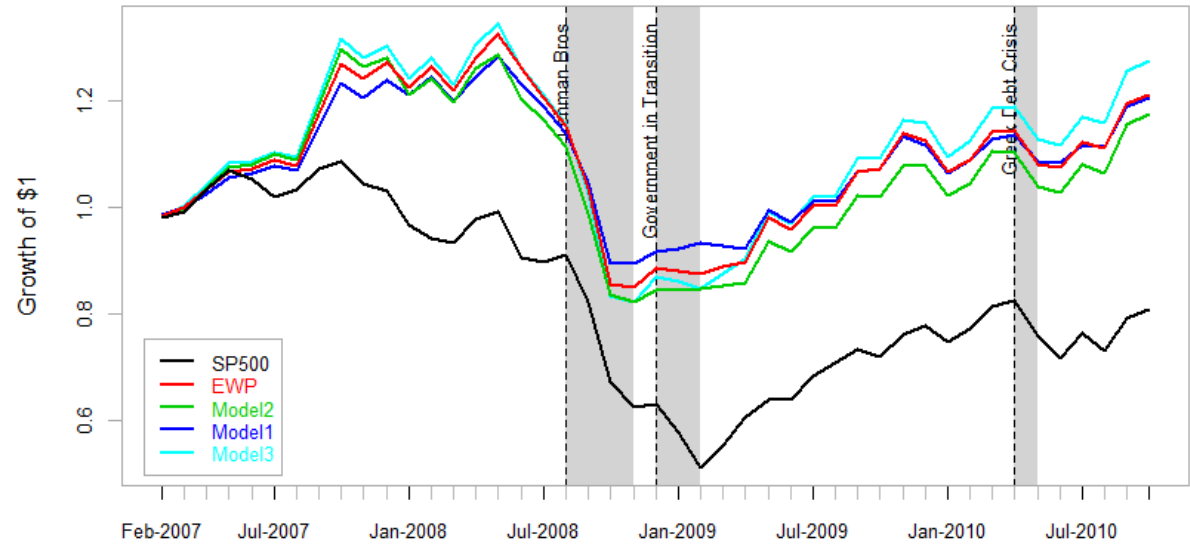
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# Client Information

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 Package(s): Risk Analytics  
 Portfolios: EWP, M1, M2, M3  
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 Date Submitted: 10/13/2010

## Cumulative Returns vs. Benchmark



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\*For this sample report, other model portfolios are omitted. The complete report includes all models.

## Stress Test

	SP500	EWP	Model1	Model2	Model3
Lehman Bros	-22.3%	-16.7%	-13.6%	-15.9%	-18.1%
Govt in Transition	-18.1%	-1.3%	1.8%	0.2%	-2.7%
Greek Debt Crisis	-7.9%	-5.3%	-4.4%	-5.6%	-5.1%

EWP refers to the Equally Weighted Portfolio.

The **Cumulative Returns** chart above compares model portfolios relative to their benchmark (e.g. S&P 500) for the time period January 2007 through October 2010.

The **Stress Test** table shows how portfolios performed during three recent events ( e.g. Lehman Brothers, Bush/Obama Transition, and the 2010 Greek Debt Crises).

The corresponding dates are:

Lehman Brothers, September 2, 2008—November 3, 2008  
 Obama Transition, January 6 - March 9, 2009  
 Greek Debt Crises, May 3-26, 2010

SP500				Months			
From	Trough	To	Depth	Length	To Trough	Recovery	
Nov-2007	Feb-2009	Current	-53.01%	37	16	Current	
Jun-2007	Jul-2007	Sep-2007	-4.60%	4	2	2	
Feb-2007	Feb-2007	Apr-2007	-1.98%	3	1	2	

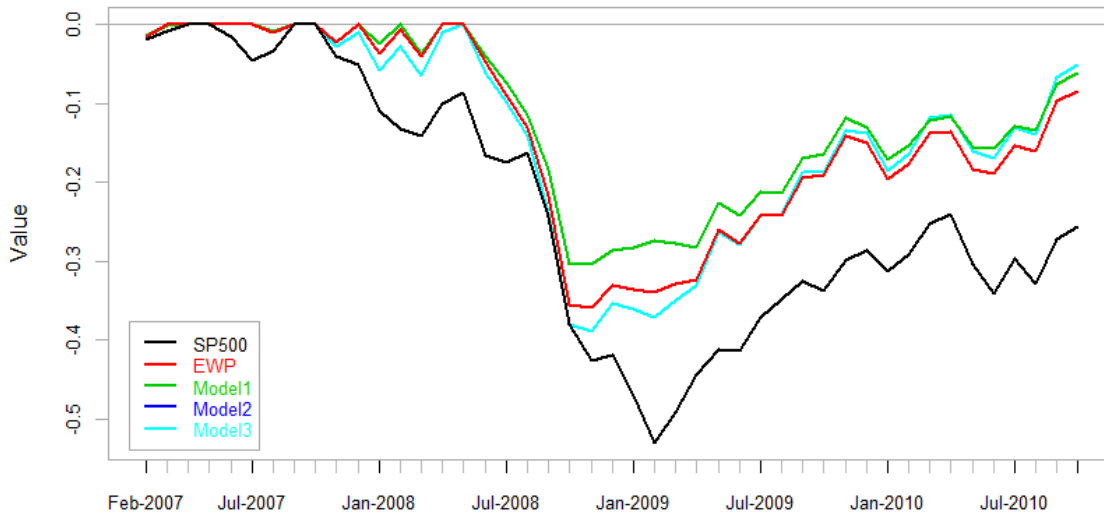
EWP				Months			
From	Trough	To	Depth	Length	To Trough	Recovery	
Jun-2008	Nov-2008	Current	-35.95%	30	6	Current	
Jan-2008	Mar-2008	Apr-2008	-4.12%	4	3	1	
Nov-2007	Nov-2007	Dec-2007	-2.20%	2	1	1	
Feb-2007	Feb-2007	Mar-2007	-1.61%	2	1	1	
Aug-2007	Aug-2007	Sep-2007	-1.05%	2	1	1	

Model1				Months			
From	Trough	To	Depth	Length	To Trough	Recovery	
Jun-2008	Nov-2008	Current	-30.37%	30	6	Current	
Mar-2008	Mar-2008	May-2008	-3.73%	3	1	2	
Jan-2008	Jan-2008	Feb-2008	-2.43%	2	1	1	
Nov-2007	Nov-2007	Dec-2007	-2.25%	2	1	1	
Feb-2007	Feb-2007	Apr-2007	-1.36%	3	1	2	

Model2				Months			
From	Trough	To	Depth	Length	To Trough	Recovery	
Nov-2007	Nov-2008	Current	-36.74%	37	13	Current	
Feb-2007	Feb-2007	Apr-2007	-1.92%	3	1	2	
Aug-2007	Aug-2007	Sep-2007	-0.97%	2	1	1	

Model3				Months			
From	Trough	To	Depth	Length	To Trough	Recovery	
Jun-2008	Nov-2008	Current	-38.86%	30	6	Current	
Nov-2007	Mar-2008	May-2008	-6.60%	7	5	2	
Feb-2007	Feb-2007	Mar-2007	-1.56%	2	1	1	
Aug-2007	Aug-2007	Sep-2007	-0.80%	2	1	1	

### Model Drawdowns



The **Drawdown Chart** (left) compares model portfolio performance relative to the benchmark (e.g. S&P 500). A drawdown is simply the amount of loss a fund incurs since its previous peak (i.e. “high water mark” for hedge funds). A zero drawdown indicates a new peak.

The tables above detail the extent of each drawdown period for a given portfolio.

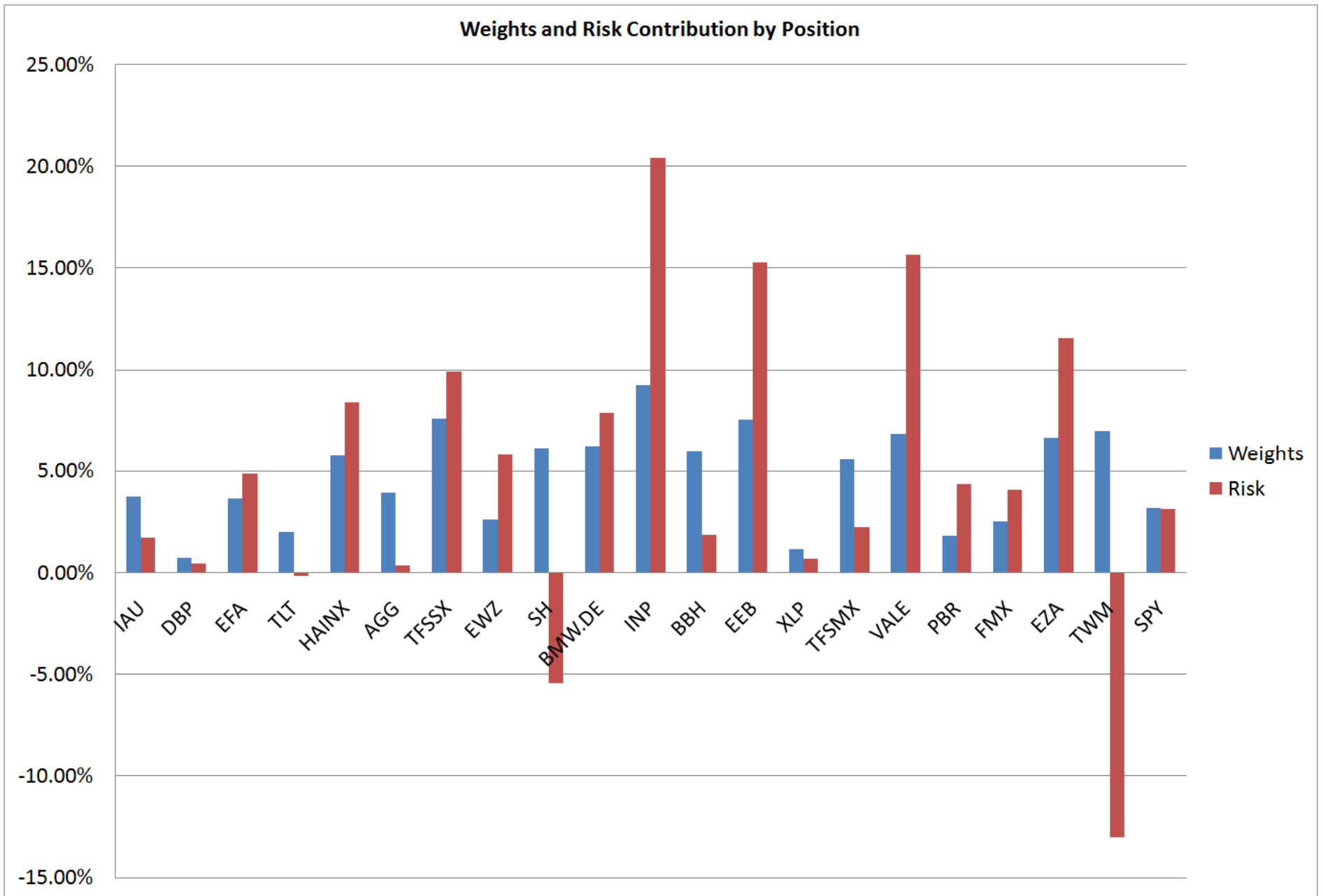
See [bell-analytics.com](http://bell-analytics.com) for further technical information.

## Model 2: Weights and Risk Contribution by Position

	IAU	DBP	EFA	TLT	HAINX	AGG	TFSSX	EWZ	SH	BMW.DE
Weights	3.72%	0.75%	3.66%	2.01%	5.79%	3.93%	7.60%	2.61%	6.16%	6.24%
Risk	1.73%	0.42%	4.86%	-0.16%	8.43%	0.34%	9.89%	5.83%	-5.42%	7.89%
	INP	BBH	EEB	XLP	TFSMX	VALE	PBR	FMX	EZA	TWM
Weights	9.27%	6.01%	7.54%	1.17%	5.56%	6.83%	1.83%	2.50%	6.65%	7.00%
Risk	20.39%	1.86%	15.28%	0.69%	2.23%	15.65%	4.34%	4.07%	11.54%	-13.00%
	SPY									
Weights	3.18%									
Risk	3.13%									

The above table shows the weights and marginal risk contributions by asset for a given model portfolio. The computer determines how much risk each security/fund contributes to the overall volatility of the portfolio. The marginal risk contribution can be negative if an asset exhibits negative correlation to the overall portfolio.

Please see the technical addendum at [bell-analytics.com](http://bell-analytics.com) for details on the volatility attribution calculation.



The chart above uses the statistical data from the previous page (3) and plots the associated weights and risks in a histogram (bar) format.

The table to the right provides several comparative risk measures. Model 2 is the primary portfolio under consideration. EWP refers again to the equally weighted portfolio.

**Semi Deviation**– is a measure of downside risk for a portfolio. Semi deviation is similar to standard deviation, but only accounts for returns that are below the target or average level (typically set to 0%.)

**Maximum Drawdown**– the maximum cumulative loss from a market peak to the following trough (i.e. “peak-to-valley”). The maximum drawdown (MDD), is a measure of how severe one’s losses can be. Large drawdowns usually lead to fund redemptions, and so the MDD is the risk measure of choice for many hedge fund professionals – a reasonably low MDD is critical to the success of any fund.

**Historical VaR**- In its most general form, the Value at Risk measures the potential loss in value of a portfolio over a defined period for a given confidence interval. For example, if a portfolio of stocks has a one-day 5% VaR of \$1 million, there is a 5% probability that the portfolio will fall in value by more than \$1 million over a one day period, assuming markets are normal and there is no trading. Informally, a loss of \$1 million or more on this portfolio is expected on one trading day in 20. VaR can also be expressed as a percentage of portfolio value.

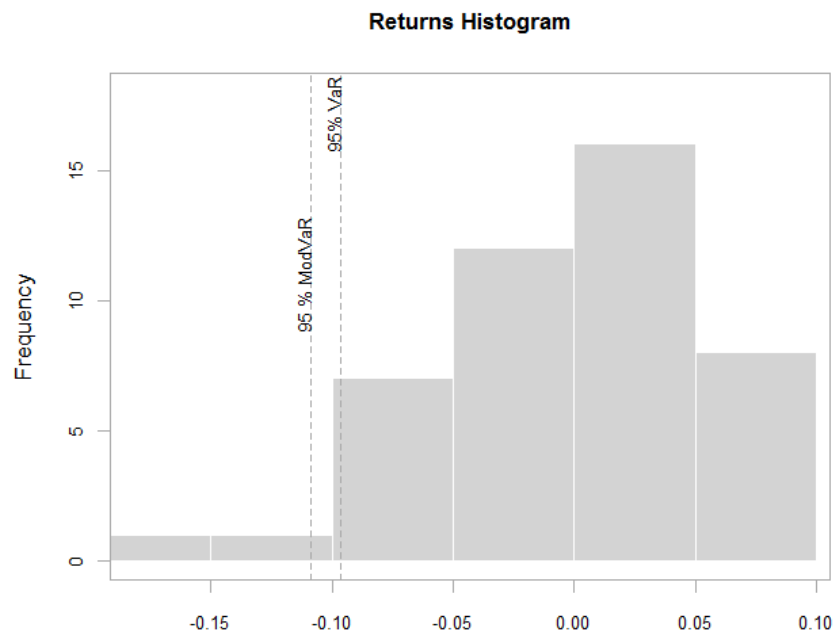
**Historical ES**- is an alternative to Value at Risk that has greater sensitivity to expected loss outcomes in extreme events. The "Expected Shortfall at the 1% level" is the expected return on the portfolio in the worst 1% of the cases. Compared to VaR, ES provides a more accurate estimate of the actual loss a portfolio will suffer when extreme negative events occur. As with Historical VaR, Historical Expected Shortfall assumes normality of asset return distributions.

**Modified VaR**- measures Value at Risk for non-normally distributed data, such as hedge fund returns.

**Modified ES**- measures Expected Shortfall for non-normally distributed data, such as hedge fund returns.

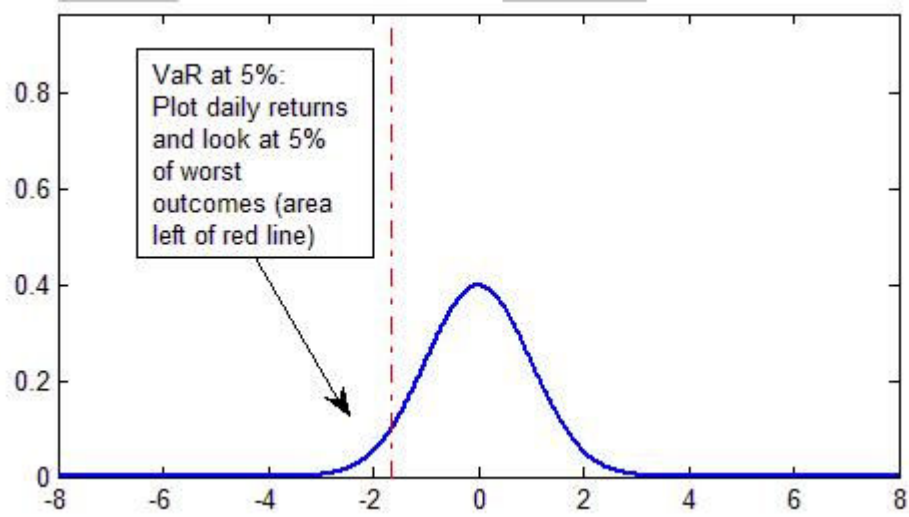
Please see the technical addendum at [bell-analytics.com](http://bell-analytics.com) for more information.

	SP500	EWP	Model2	Model1	Model3
Semi Deviation	6.73%	5.60%	5.37%	4.71%	5.87%
Maximum Drawdown	53.01%	35.95%	36.74%	30.37%	38.86%
Historical VaR (95%)	-9.66%	-5.47%	-6.37%	-4.59%	-5.99%
Historical ES (95%)	-13.11%	-11.01%	-11.02%	-9.05%	-12.08%
Modified VaR (95%)	-10.89%	-8.62%	-8.46%	-7.18%	-9.37%
Modified ES (95%)	-13.96%	-13.64%	-12.21%	-11.29%	-14.52%



The returns histogram above plots the distribution of monthly returns for the S&P 500 from Jan 07– Oct 10. Similar charts can be created for each model portfolio using monthly or daily returns.

**Notes:**



VaR is given by the red line. Expected shortfall (ES) is the area of the red region in the chart below.

Historical VaR and ES assume the distribution is normal (blue). Modified VaR and ES use the observed distribution, which can be non-normal (e.g. fat tails for extreme events like 9/11, Lehman, etc.)

