
A NEW WAY TO MEASURE RISK

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THE REAL DEVIATION OF FINANCIAL RETURNS

Standard Deviation by itself is perhaps the most over-used and uninformative number in the entire pantheon of investment metrics.

Standard Deviation comes from the field of statistics, where it is used mainly to make inferences from samples (that is, to calculate confidence intervals for sample statistics). It is also used to test hypotheses, whenever models are being compared with real-life data, in industry and in experimental science, based on the fact that, by the Law of Large Numbers, sample averages are normally distributed.

From the technical fields it has moved to finance as a measure of investment risk. It was propped up by the so-called Modern Portfolio Theory (MPT), or mean-variance analysis, introduced by Harry Markowitz in 1952, which defines risk as variance.

Modern Portfolio Theory has been criticized because it assumes that returns follow a Gaussian distribution. The inadequacy of this assumption was exposed in the 1960s by Benoit Mandelbrot and Eugene Fama, and more recently by Nassim Nicholas Taleb, who says: *"Simply, if you remove their Gaussian assumptions and treat prices as scalable, you are left with hot air."*

We quote from Wikipedia: *"In particular, variance is a symmetric measure that counts ab-*

normally high returns as just as risky as abnormally low returns. Some would argue that, in reality, investors are only concerned about losses, and do not care about the dispersion or tightness of above-average returns. According to this view, our intuitive concept of risk is fundamentally asymmetric in nature."

Therefore (unless the returns are normally distributed, as sample statistics are), the standard deviation has no real significance in assessing the quality of returns.

Standard Deviation is made up of two parts: upside deviation and downside deviation. Analysts tend to regard them equally and to bundle them into one number: Standard Deviation. Of course, this is preposterous.

We propose calculating deviation in a new, non-standard way (we might call it "Non-Standard Deviation" or "True" Deviation): an adjusted measure of risk which multiplies Standard Deviation by the ratio between downside standard deviation and upside standard deviation.

"True Deviation" or "Non-Standard Deviation" (NSD) is an adjusted measure of risk that multiplies standard deviation by the ratio between downside deviation and upside deviation.

This measure is so easy and straightforward that we are surprised that no one has done it before; or if someone has, we are surprised it hasn't gained popularity.

Obvious derivative measures are the **True Sharpe Ratio** and **True Value at Risk** and **True Value at Gain**. We define these as:

True Sharpe Ratio = Return / True Deviation

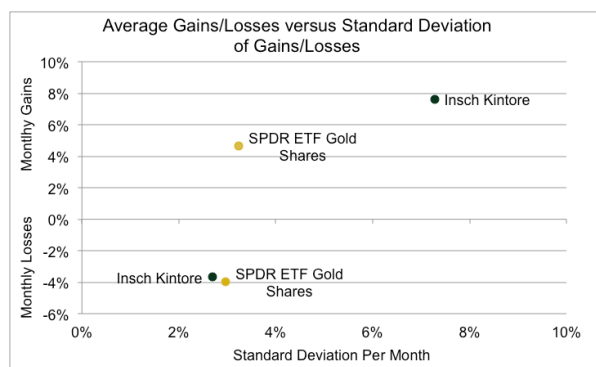
True Value at Risk = $-1.65 \times \text{Std Dev of Losses}$

True Value at Gain = $1.65 \times \text{Std Dev of Gains}$

(We assumed a zero risk-free rate, expected returns of 0%, and we used 95% confidence intervals for Value at Risk and Value at Gain.)

It has been pointed out that our returns were too volatile, in the sense that the standard deviation of our returns was too high relative to that of indices made of equities, bonds, or that of other competitors.

In response, we contend that the above-mentioned standard deviation measure is an improper measure of risk. – As our returns are obviously asymmetrical (skewed versus gains), our returns' distribution is not described by standard deviation.



As an easy example, take a return stream that returns 10% p.a. at a standard deviation of 20%. Now take the negative returns each period. The standard deviation of the returns will be exactly the same as that of the initial series.

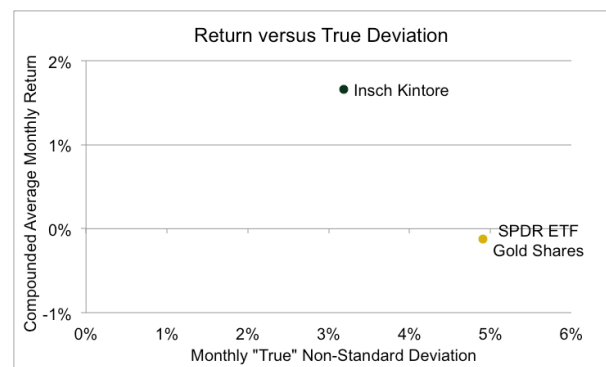
Take another example, however improbable, of a return stream made entirely of positive records. The results each period being prof-

its, high standard deviation would actually be a desirable thing, rather than a downer.

We provide detailed results regarding the True Deviation, True Sharpe Ratio, True Value at Risk, True Value at Gain, Drawdowns and RunUps of Insch Kintore and of several well-known indices and competitors in the Appendix.

Monthly returns data range from July 2010 to December 2016. Insch Kintore data are before fees – more adequate to calculate statistics such as return deviation. However, if fees were taken into account, Insch Kintore would still outperform the other programs and indices by far.

Judging by the Non-Standard Deviation (NSD), Insch Kintore is much less risky than other programs or indices.



Measures of Tail Risk adjusted accordingly and the size of RunUps relative to that of DrawDowns confirm this.

We find that the Value at Risk based on Loss Deviation is a better predictor of Historical Value at Risk than the Normal Value at Risk (higher correlations prove the point), and the Value at Gain based on Gain Deviation is a better predictor of Historical Value at Gain than the Normal Value at Gain.

We have criticized Normal VAR in the past, and our findings are in line with our previous findings ([VAR: What Is It Good For?](#), August 31, 2011).

APPENDIX

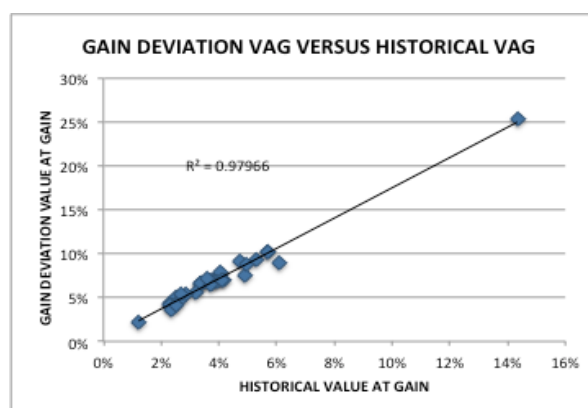
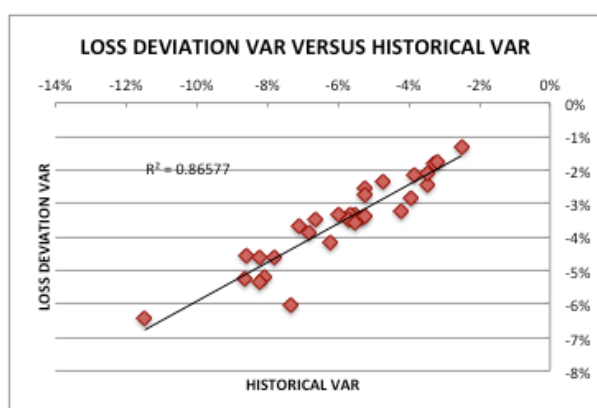
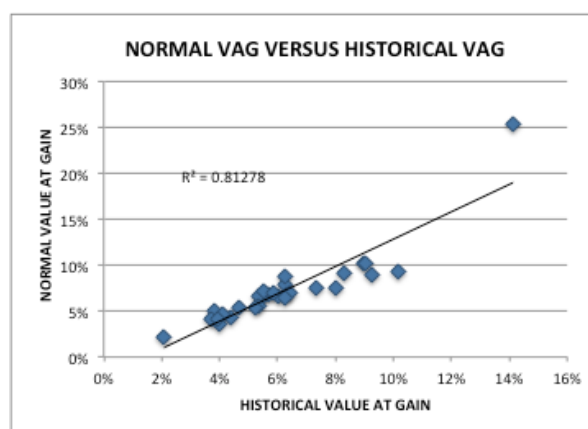
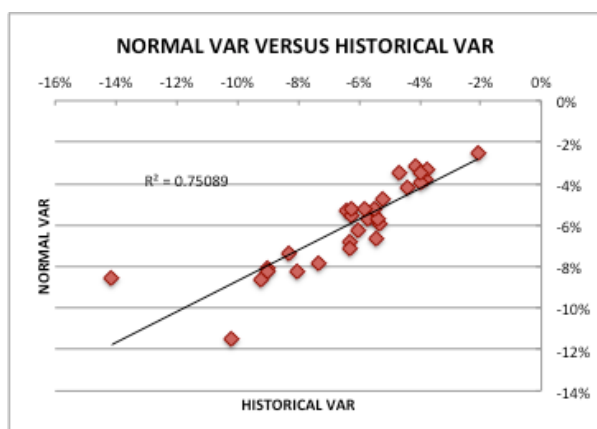


Table 1. True or Non-Standard Deviation

INDEX	STD DEV PER MONTH	STD DEV OF GAINS	STD DEV OF LOSSES	GAIN/LOSS DEVIATION RATIO	TRUE DEVIATION PER MONTH
Insch Kintore	8.57%	8.69%	2.76%	3.14	2.73%
USD Index	2.31%	1.51%	1.30%	1.16	1.99%
Gold London PM Fix	5.45%	3.45%	3.15%	1.09	4.98%
Dow Jones Corporate Bonds Index	1.26%	0.74%	0.80%	0.93	1.36%
Dow Jones Industrial Average	3.35%	2.29%	2.02%	1.13	2.96%
CAC 40 Index	4.45%	2.47%	2.79%	0.88	5.04%
S&P 500 Index	3.47%	2.33%	2.02%	1.15	3.01%
MSCI World	3.81%	2.46%	2.34%	1.05	3.62%
FTSEMIB Index	6.17%	3.21%	3.89%	0.83	7.47%
DAX Index	5.03%	2.85%	3.66%	0.78	6.47%
E300 Index	3.66%	2.04%	2.52%	0.81	4.51%
FTSE 100 Index	3.30%	2.05%	2.10%	0.98	3.38%
FTSE All Share Index	3.24%	2.03%	2.01%	1.01	3.22%
SMI Index	3.25%	1.93%	2.12%	0.91	3.55%
XAUUSD Index	5.46%	3.44%	3.24%	1.06	5.15%
TSX Composite	2.68%	1.40%	1.96%	0.72	3.74%

SG CTA Trend Subindex	3.17%	1.72%	1.43%	1.21	2.63%
SG CTA Index	2.26%	1.40%	1.09%	1.28	1.77%
Winton Futures Fund	2.50%	1.61%	1.08%	1.48	1.69%
Man AHL Diversified Fund	3.82%	2.38%	2.24%	1.06	3.59%
Altis Global Futures	4.87%	2.98%	2.81%	1.06	4.58%
Aspect Capital (Diversified)	3.88%	2.53%	2.08%	1.22	3.18%
Campbell Managed Futures	3.80%	2.25%	2.18%	1.03	3.68%
Cantab Capital Partners Quant Fund Aristarchus	5.61%	3.70%	3.19%	1.16	4.83%
Crabel Capital Management (Multi-Product)	2.41%	1.42%	1.73%	0.82	2.94%
Transtrend BV (DTP Enhanced Risk)	3.34%	2.17%	1.54%	1.41	2.37%
FORT LP (Global Contrarian)	3.79%	2.99%	1.68%	1.78	2.13%
Millburn Ridgefield Corp (Diversified Program)	2.84%	1.61%	1.47%	1.10	2.59%
QMS Capital Mgmt Diversified Global Macro	3.54%	2.50%	2.06%	1.21	2.91%
SEB Asset Mgmt. (SEB Asset Selection)	2.40%	1.54%	1.29%	1.20	2.00%

Table 2. True Sharpe Ratio

INDEX	TRUE DEVIATION PER MONTH	AVERAGE RETURN P.M.	TRUE SHARPE RATIO
Insch Kintore	2.73%	1.66%	61.08%
USD Index	1.99%	0.22%	11.12%
Gold London PM Fix	4.98%	-0.10%	-2.05%
Dow Jones Corporate Bonds Index	1.36%	0.09%	6.93%
Dow Jones Industrial Average	2.96%	0.91%	30.59%
CAC 40 Index	5.04%	0.44%	8.80%
S&P 500 Index	3.01%	1.00%	33.24%
MSCI World	3.62%	0.67%	18.47%
FTSEMIB Index	7.47%	-0.01%	-0.07%
DAX Index	6.47%	0.84%	13.04%
E300 Index	4.51%	0.47%	10.51%
FTSE 100 Index	3.38%	0.49%	14.40%
FTSE All Share Index	3.22%	0.54%	16.82%
SMI Index	3.55%	0.38%	10.61%
XAUUSD Index	5.15%	-0.10%	-1.92%
TSX Composite	3.74%	0.39%	10.40%
SG CTA Trend Subindex	2.63%	0.20%	7.45%
SG CTA Index	1.77%	0.16%	8.93%
Winton Futures Fund	1.69%	0.39%	22.86%
Man AHL Diversified Fund	3.59%	0.23%	6.50%
Altis Global Futures	4.58%	-0.62%	-13.44%
Aspect Capital (Diversified)	3.18%	0.33%	10.37%
Campbell Managed Futures	3.68%	0.44%	11.98%
Cantab Capital Partners Quant Fund Aristarchus	4.83%	0.44%	9.19%
Crabel Capital Management (Multi-Product A)	2.94%	0.41%	14.02%
Transtrend BV (DTP Enhanced Risk)	2.37%	0.27%	11.57%
FORT LP (Global Contrarian)	2.13%	0.79%	37.11%
Millburn Ridgefield Corp (Diversified Program)	2.59%	0.31%	12.02%
QMS Capital Mgmt. (Diversified Global Macro)	2.91%	0.61%	20.93%
SEB Asset Mgmt. (SEB Asset Selection)	2.00%	0.25%	12.37%

Table 3. True Value At Risk

INDEX	NORMAL VALUE AT RISK	LOSS DEVIATION VALUE AT RISK	HISTORICAL VALUE AT RISK
Insch Kintore	-14.14%	-4.56%	-8.58%
USD Index	-3.82%	-2.15%	-3.82%
Gold London PM Fix	-8.99%	-5.20%	-8.09%
Dow Jones Corporate Bonds Index	-2.08%	-1.32%	-2.51%
Dow Jones Industrial Average	-5.53%	-3.34%	-5.50%
CAC 40 Index	-7.34%	-4.61%	-7.81%
S&P 500 Index	-5.72%	-3.33%	-5.68%
MSCI World	-6.28%	-3.86%	-6.81%
FTSEMIB Index	-10.18%	-6.41%	-11.47%
DAX Index	-8.30%	-6.04%	-7.35%
E300 Index	-6.03%	-4.16%	-6.22%
FTSE 100 Index	-5.44%	-3.47%	-6.64%
FTSE All Share Index	-5.34%	-3.32%	-5.97%
SMI Index	-5.36%	-3.49%	-5.72%
XAUUSD Index	-9.01%	-5.35%	-8.21%
TSX Composite	-4.42%	-3.24%	-4.21%
SG CTA Trend Subindex	-5.23%	-2.36%	-4.74%
SG CTA Index	-3.74%	-1.80%	-3.29%
Winton Futures Fund	-4.13%	-1.79%	-3.17%
Man AHL Diversified Fund	-6.31%	-3.70%	-7.09%
Altis Global Futures	-8.04%	-4.63%	-8.24%
Aspect Capital (Diversified)	-6.40%	-3.42%	-5.31%
Campbell Managed Futures	-6.26%	-3.60%	-5.54%
Cantab Capital Partners Quant Fund Aristarchus	-9.25%	-5.26%	-8.64%
Crabel Capital Management (Multi-Product A)	-3.98%	-2.86%	-3.95%
Transtrend BV (DTP Enhanced Risk)	-5.51%	-2.55%	-5.24%
FORT LP (Global Contrarian)	-6.25%	-2.77%	-5.22%
Millburn Ridgefield Corp (Diversified Program)	-4.69%	-2.43%	-3.49%
QMS Capital Mgmt. (Diversified Global Macro)	-5.84%	-3.40%	-5.25%
SEB Asset Mgmt. (SEB Asset Selection)	-3.95%	-2.12%	-3.46%

Table 4. True Value At Gain

INDEX	NORMAL VALUE AT GAIN	GAIN DEVIATION VALUE AT GAIN	HISTORICAL VALUE AT GAIN
Insch Kintore	14.14%	14.33%	25.34%
USD Index	3.82%	2.50%	5.02%
Gold London PM Fix	8.99%	5.69%	10.28%
Dow Jones Corporate Bonds Index	2.08%	1.22%	2.21%
Dow Jones Industrial Average	5.53%	3.78%	7.08%
CAC 40 Index	7.34%	4.07%	7.54%
S&P 500 Index	5.72%	3.84%	6.88%

MSCI World	6.28%	4.06%	7.83%
FTSEMIB Index	10.18%	5.30%	9.32%
DAX Index	8.30%	4.70%	9.06%
E300 Index	6.03%	3.37%	6.72%
FTSE 100 Index	5.44%	3.39%	6.53%
FTSE All Share Index	5.34%	3.34%	6.69%
SMI Index	5.36%	3.19%	5.48%
XAUUSD Index	9.01%	5.67%	10.28%
TSX Composite	4.42%	2.32%	4.31%
SG CTA Trend Subindex	5.23%	2.84%	5.45%
SG CTA Index	3.74%	2.30%	4.14%
Winton Futures Fund	4.13%	2.65%	4.59%
Man AHL Diversified Fund	6.31%	3.93%	6.79%
Altis Global Futures	8.04%	4.92%	7.59%
Aspect Capital (Diversified)	6.40%	4.18%	7.01%
Campbell Managed Futures	6.26%	3.72%	6.40%
Cantab Capital Partners Quant Fund Aristarchus	9.25%	6.10%	9.03%
Crabel Capital Management (Multi-Product A)	3.98%	2.35%	3.53%
Transtrend BV (DTP Enhanced Risk)	5.51%	3.59%	7.08%
FORT LP (Global Contrarian)	6.25%	4.93%	8.70%
Millburn Ridgefield Corp (Diversified Program)	4.69%	2.66%	5.43%
QMS Capital Mgmt. (Diversified Global Macro)	5.84%	4.13%	7.03%
SEB Asset Mgmt. (SEB Asset Selection)	3.95%	2.54%	4.20%

Table 5. Largest Drawdown and Largest Runup

INDEX	LARGEST DRAWDOWN	LARGEST RUNUP
Insch Kintore	-25.91%	292.64%
USD Index	-15.21%	40.14%
Gold London PM Fix	-41.55%	55.13%
Dow Jones Corporate Bonds Index	-6.56%	13.41%
Dow Jones Industrial Average	-14.81%	102.20%
CAC 40 Index	-27.45%	70.45%
S&P 500 Index	-17.03%	117.21%
MSCI World	-20.49%	70.87%
FTSEMIB Index	-42.70%	82.84%
DAX Index	-26.78%	117.49%
E300 Index	-21.02%	71.79%
FTSE 100 Index	-15.51%	45.98%
FTSE All Share Index	-15.87%	52.28%
SMI Index	-17.19%	70.54%
XAUUSD Index	-41.49%	55.13%
TSX Composite	-18.56%	38.35%
SG CTA Trend Subindex	-15.16%	36.89%
SG CTA Index	-11.63%	28.45%
Winton Futures Fund	-8.36%	47.77%
Man AHL Diversified Fund	-18.84%	53.03%
Altis Global Futures	-46.95%	38.25%

Aspect Capital (Diversified)	-22.21%	58.87%
Campbell Managed Futures	-19.57%	76.45%
Cantab Capital Partners Quant Fund Aristarchus	-34.87%	70.45%
Crabel Capital Management (Multi-Product A)	-14.25%	50.99%
Transtrend BV (DTP Enhanced Risk)	-13.61%	33.12%
FORT LP (Global Contrarian)	-13.71%	100.05%
Millburn Ridgefield Corp (Diversified Program)	-22.84%	46.69%
QMS Capital Mgmt. (Diversified Global Macro)	-16.84%	93.19%
SEB Asset Mgmt. (SEB Asset Selection)	-8.93%	35.83%

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