The Future of Equity Investing is Long / Short

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Presentation Outline

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3. **Mathematics of Long / Short Portfolios**
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Thesis

Most investors focus on the management of "long" portfolios and identification of "winning" securities. Success is measured by performance relative to a benchmark (e.g. TSX) or to other long only managers.

While "comfortable", this dynamic is sub-optimal. The identification of winning securities ignores by definition a whole class of "losing" securities. The ability to sell short frees the manager to take advantage of the full array of securities and to maximize the value of his or her insights.

In addition, within the long/short portfolio, there is no need to converge to a security's index weight (e.g. Nortel at 10%) in order to control risk. Rather, offsetting long and short positions can be used to control and even customize portfolio risk.

Adoption of the long/short investment process demands increased understanding on behalf of the investor and his or her agents and, importantly, increased responsibility on behalf of the investment manager.

Comparing Long Only and Long/Short Portfolios

Typical Portfolio Construction
Long vs. Long / Short

	Long	Long / Short
# Stocks	30 to 60 positions	50 to 200 positions
Stock exposure	0.5% - 10%	-5% - +5%
Sector Exposure	0% - 40%	-15% - +15%
Market Exposure	100%	30-70%
Risk Factor Exposure	1.0 – 2.0 Std Dev	-0.5 - +0.5 Std Dev
Leverage	0X	1-2X
Typical allocation	$1.00 Long	$1.50 Long / $1.00 Sh
Annual Turnover	80%	150%

Example Stock Weightings
Long vs. Long / Short

Long only	Long / Short
2% RIM	4% RIM , -2% Nortel
0.5% Transat A.T.	3% Transat, -2.5% Air Cda.
0.5% RONA	3% RONA, -1.5% Cdn. Tire
1% Quebecor	4% Quebecor, -1% Torstar
5% TD Bank	2% TD Bank, -2% Laurentian
3% Placer Dome	2% Placer, -2% Barrick

Mathematics of Long / Short Portfolios

The Mathematics of Diversification

- **For 2 assets:**

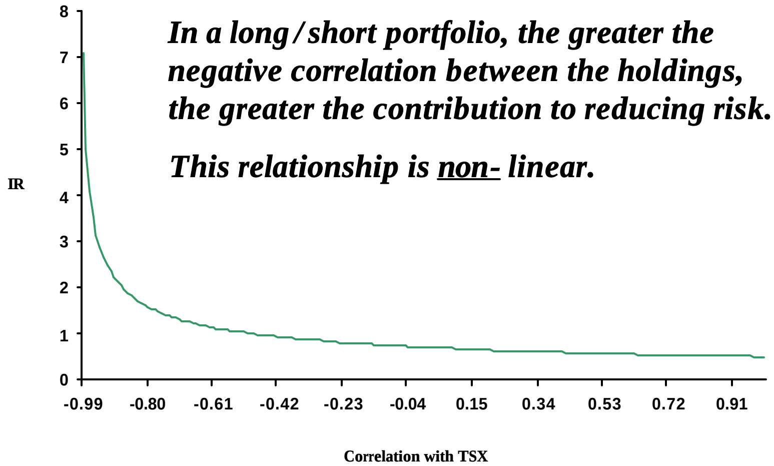
$$s_P^2 = w_i^2 s_i^2 + w_j^2 s_j^2 + 2 w_i w_j s_i s_j r_{ij}$$

- **The key to diversification is correlation, *p* < 1.0, with the lower the correlation the better**
- **This is an axiom**

The Power of Diversification

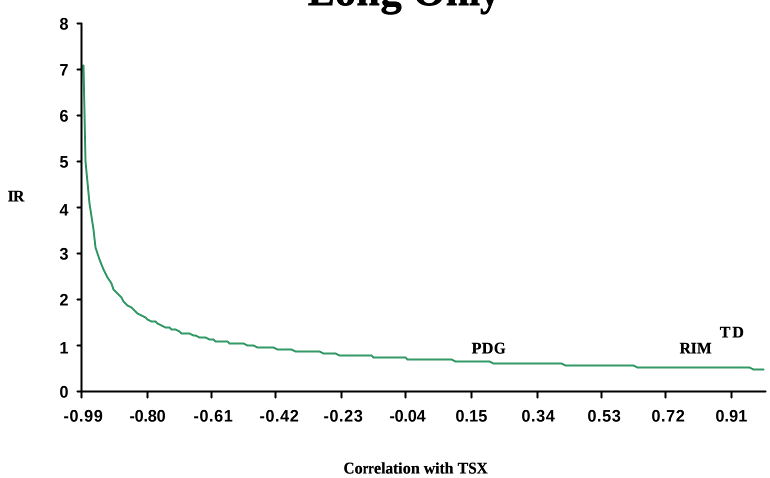
In a long/short portfolio, the greater the negative correlation between the holdings, the greater the contribution to reducing risk.

This relationship is <u>non-</u> linear.



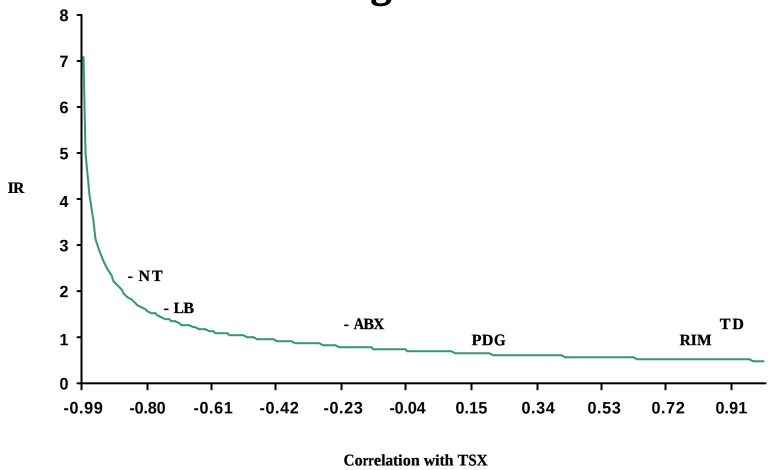
The Power of Diversification

Long Only



The Power of Diversification

Long / Short



Covariance Matrices

- **Because correlations and covariances are expressed in terms of pairs of investments, they are usually arranged in matrix form.**
- **For a portfolio of investments, indexed by i, then the matrix will have the form**

$$\begin{pmatrix} s_{1,1} & s_{1,2} & \cdots & \cdots & s_{1,n} \\ s_{2,1} & s_{2,2} & & & \\ \vdots & & \ddots & & \\ \vdots & & & s_{n-1,n-1} & \\ s_{n,1} & & & & s_{n,n} \end{pmatrix}$$

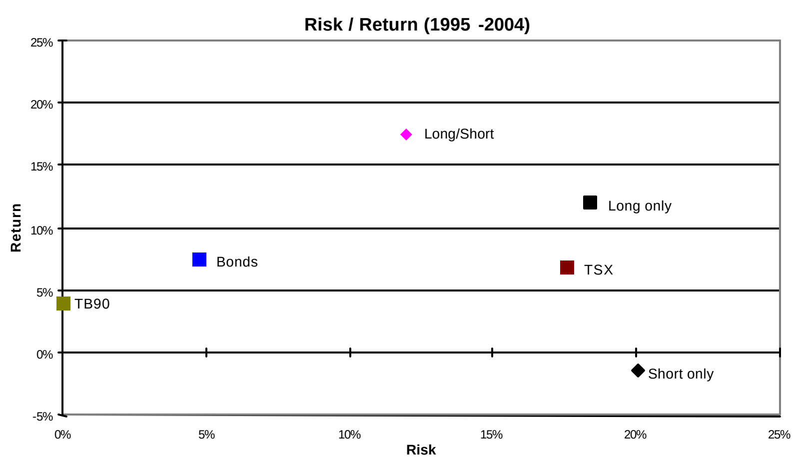
Optimization

The real benefits of long / short emerge only when the portfolio is conceived as a single, integrated portfolio of long and short positions.

In this framework, the long and short positions are determined jointly within an optimization that takes into account the expected returns of the individual securities, the standard deviation of those returns and the matrix of correlations between them.

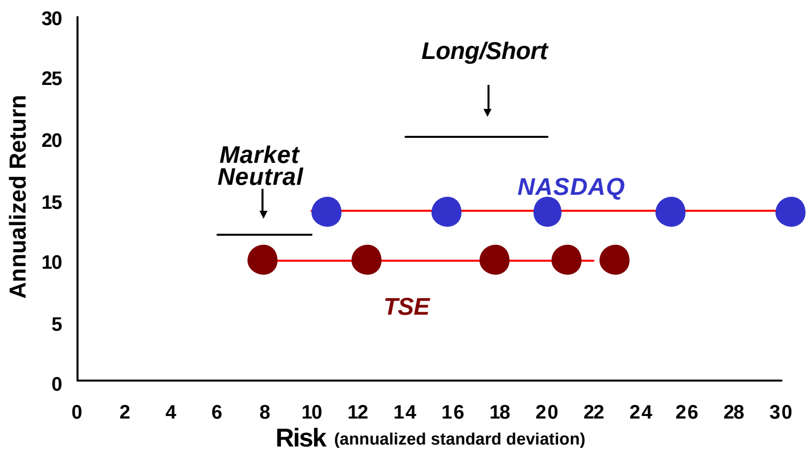
Bruce Jacobs and Ken Levy

Risk / Return of Long / Short



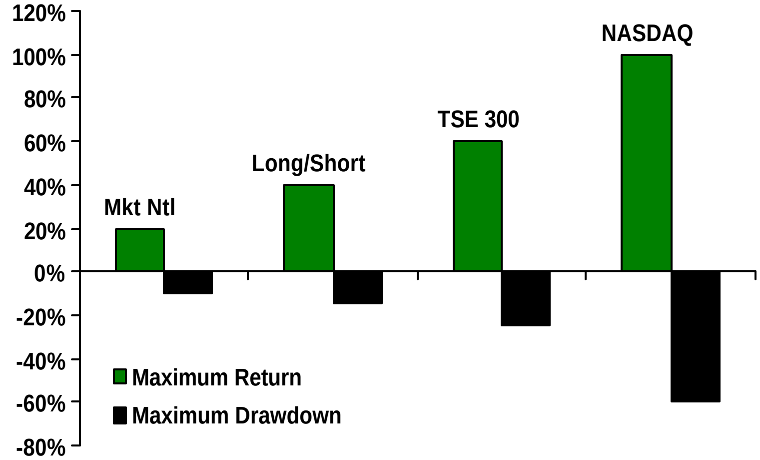
Advantages of Long / Short Portfolios

Long / Short Offers a Consistent Risk Profile



A Consistent Return Profile

(12 months)



The "Temptress"
Top 10 Canadian Mutual Funds 1999

	Returns to 2003 (%)				Beta	S.Dev
	1999	**3 Yr**	**Best 3Y**	**Worst 3Y**		
Talvest China Plus	203.6	-1.3	229.2	-51.3	0.89	21.1
Excel India	202.4	-1.2	17.8	-69.5	0.78	25.3
AIM Global Technology	200.3	-38.6	607.8	-85.1	1.15	45.0
AGF Aggressive Growth	195.1	-25.1	554.7	-75.5	0.88	23.9
Altamira e-business	190.2	-36.1	2.6	-87.1	0.9	36.4
Cda Pacific Basin (KBSH)	177.6	-25.4	191.3	-75.6	1.22	23.2
Clarica MVP Asian Pac RSP	177.2	-23.3	187.3	-73.2	1.24	22.2
Altamira Sci& Tech	175.5	-39.7	712.7	-84.9	1.12	44.3
Talvest Global Sci & Tech	171.8	-41.2	671.5	-84.5	1.13	44.7
Elliot & Page Asian Growth	159.0	-8.7	99.1	-60.2	1.03	19.1

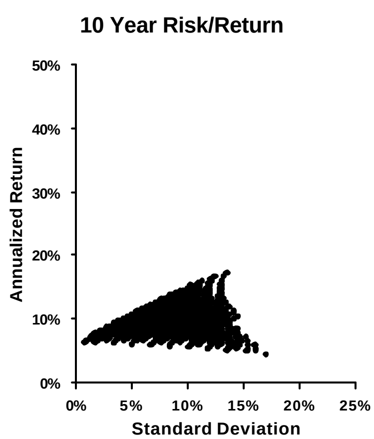
Profit Opportunities in Down Markets

Year	***TSX***	***Shorts***
1987 oct	-22.5%	+24.7%
1990	-14.8%	+34.7%
1994	-0.2%	+10.6%
1998 *	-1.6%	+20.3%
2001 sept *	-7.4%	+16.1%

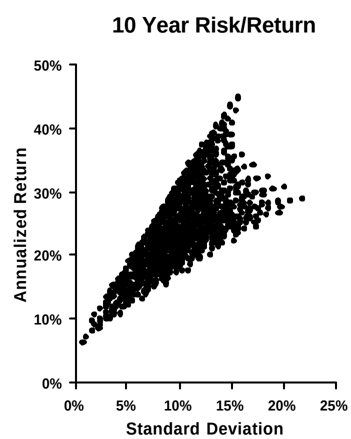
* Actual

True Diversity in Asset Allocation

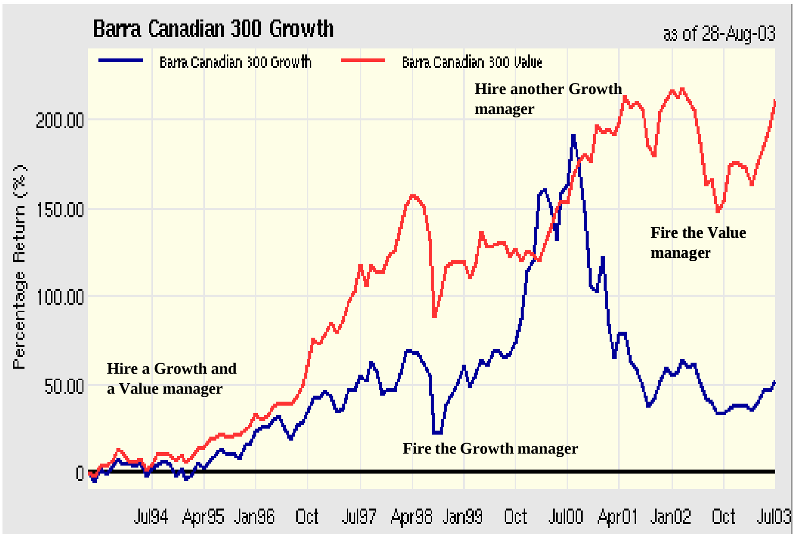
Unconstrained Optimization using Traditional Asset Classes



Unconstrained Optimization using Long/Short Portfolios



Style Neutrality



Better Matching of Liabilities

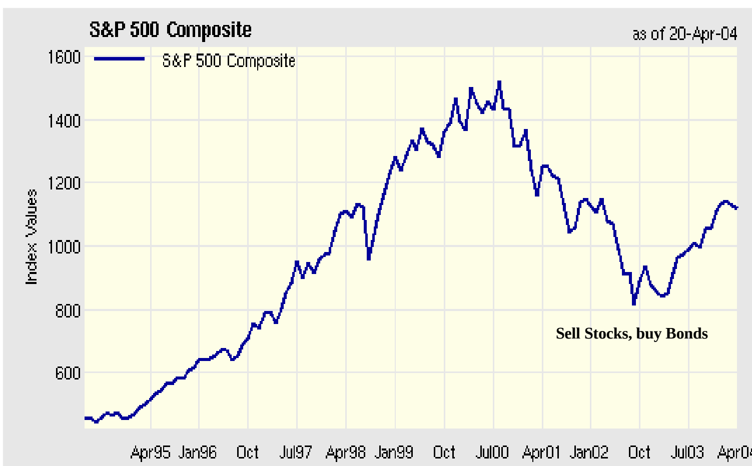
"Equity benchmarks produce a high tracking error against underlying liabilities of pension plans"

Alan Brown, CIO State Street Global Advisors

Controlled Drawdowns & Time Underwater

- Maximum drawdown is the worst "peak to valley" performance for a fund, regardless of whether or not the drawdown consisted of consecutive days or months of negative performance
- Time underwater is the time taken for a fund to regain its previous peak
- Large drawdowns and long time underwater cause "Erosion of Purpose"
- 'Erosion of Purpose' is the propensity of investors to throw away a carefully designed plan when one asset class or investment generates an unexpectedly large negative return or a very long extended non-return

Control of 'Erosion of Purpose'



Towards a Better Mandate

5d Benchmark for a Long / Short Fund

Benchmarks over 2-3 years

Return Expectation	**TSE 300 + 6%**
Risk Budget	**Less than market**
Correlation	**30-70% relative to the market**
Drawdown	**½ of the market**
Time Underwater	**½ of the market**

Impediments to Adoption

Impediments to Adoption

1. There is a lack of a generally accepted institutional framework. Are long / short funds "equity proxies"? Do they fit in my "core / satellite" framework? Can I use them for "beta timing"? Should I invest through "fund of funds?
2. There is a shortage of qualified managers.
3. There are a very few 'bad' managers.
4. Long / Short often gets framed as an 'active / passive' debate. ie. "Long / Short is just doubling down on active management." There is still tremendous value in controlling risk through long / short portfolio construction. Also, if >50% of investors are passive, active management will win!
5. Complacency. "It's 'ok' to lose 40% as long as it is at the same time as everybody else". Demand better.

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