

## TD Low Volatility Funds

### Rethinking Risk & Reward.

Babak Rafat, CFA  
TD Asset Management

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# Low volatility investing vs the broader market indices



- Many broad market indices by design are capitalization weighted
- Issues with cap weighted indices:
  - Risk concentration:
    - higher exposure to large-cap and single names i.e. Nortel, Research in Motion Inc.
    - Higher exposure to sectors i.e. financials in the S&P/TSX
  - Prone to bubbles:
    - At the peak of the tech bubble, 20 stocks accounted for 38% of the S&P 500
    - Pre-2008 financial crisis, 20 stocks accounted for 34% of the S&P 500
  - More volatile during crisis periods
  - Weaker risk-adjusted returns\*

\* See Appendix . Source: TDAM & Mercer

# TD Low Volatility

## Key Takeaways



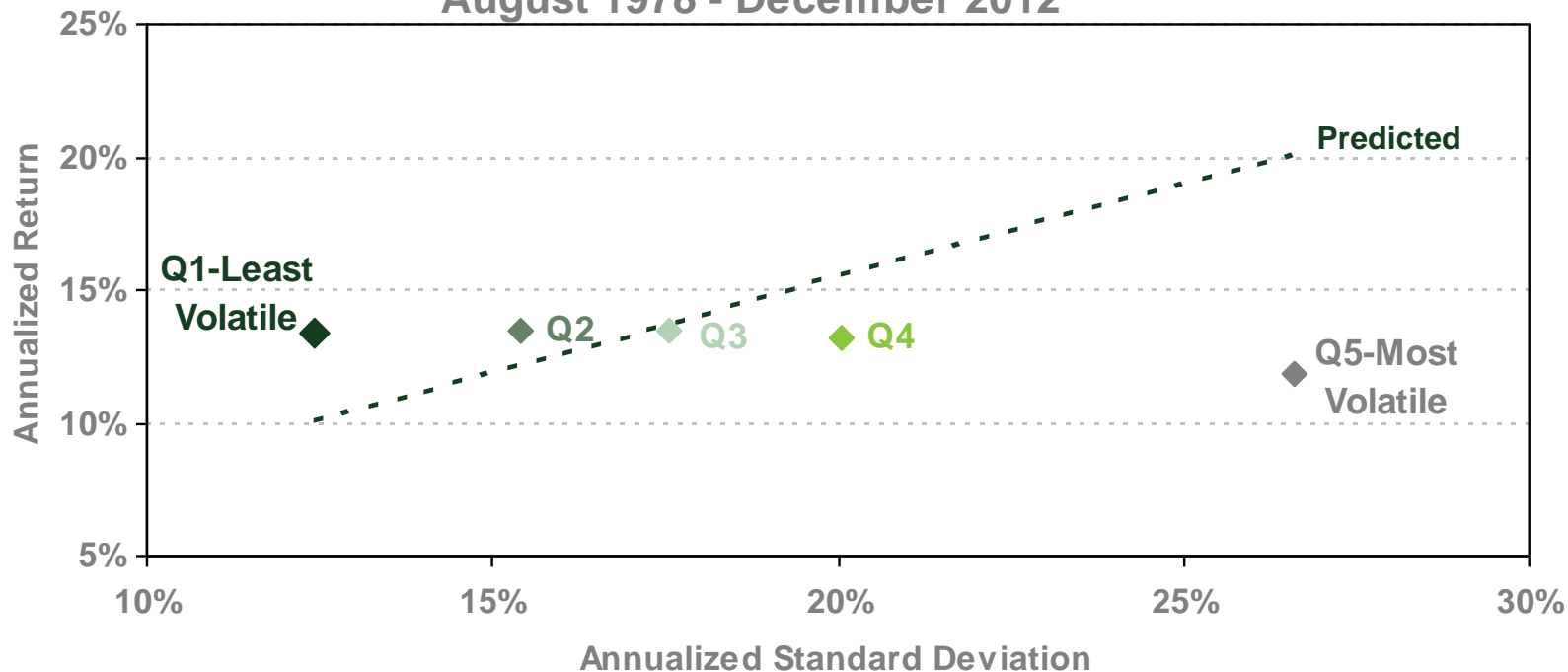
- Empirical evidence studying markets back to 1923 state that within equities – you are not compensated for higher risk
- Low Volatility portfolios are an institutional innovation that offers returns similar to index returns with 2/3rds the volatility
- Proprietary 20-factor model that estimates risk and correlation to create a low volatility portfolio

***WIN BY NOT LOSING***

# Market History: 34 Years of U.S. Experience



## Return and Risk on S&P 500 Index Stocks: August 1978 - December 2012



Sources: TDAM & Standard & Poor's.

Quintiles represent equally-weighted portfolios constructed monthly from equities sorted by trailing 36 months standard deviation..

Annualized returns on S&P500 Index constituents from August 1978 through December 2012.

Risk computed as the standard deviation of monthly quintile returns over the entire period and annualized.

Predicted return from CAPM using betas from TDAM US Statistical Risk model.

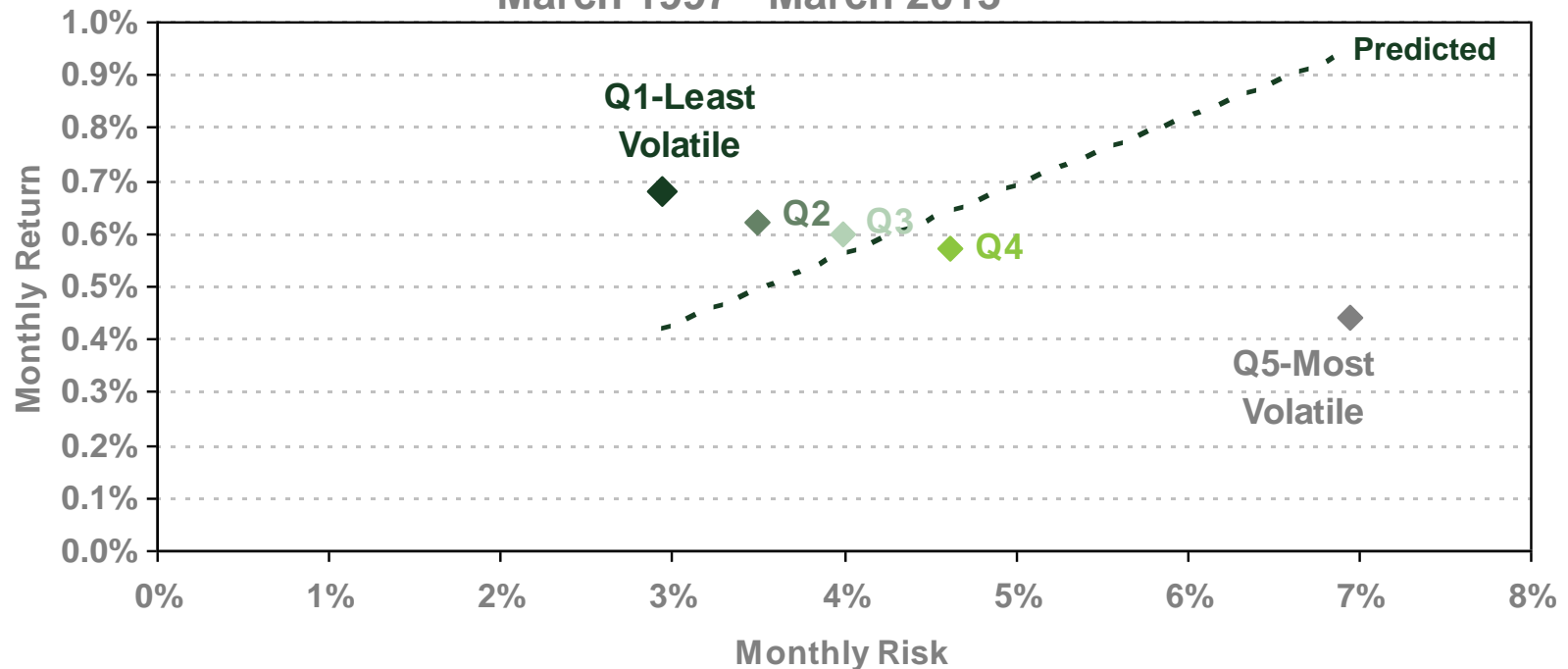
For illustrative purposes only.

### More volatile U.S. equities have not delivered higher returns

# Market History: The Global Experience



Return and Risk on MSCI World Index Stocks:  
March 1997 - March 2013



Sources: TDAM & MSCI.

Quintiles represent equally-weighted portfolios constructed monthly from equities sorted by trailing 36 months standard deviation.

Average monthly returns on MSCI World constituents from March 1997 through March 2013.

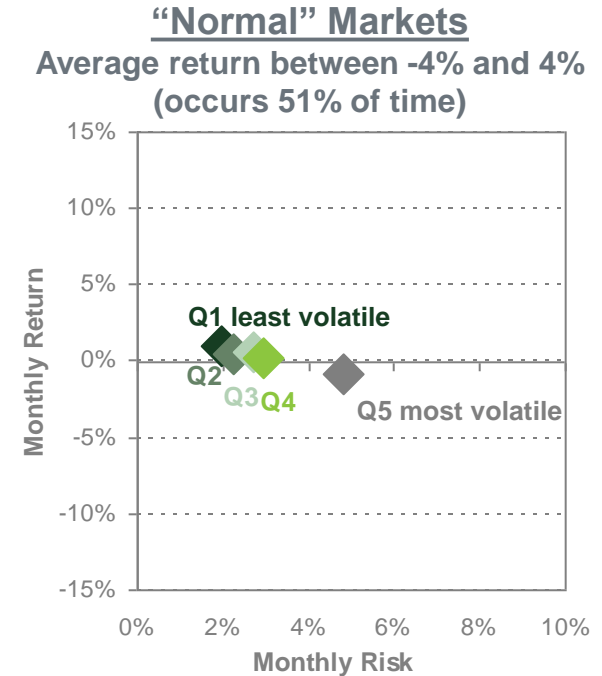
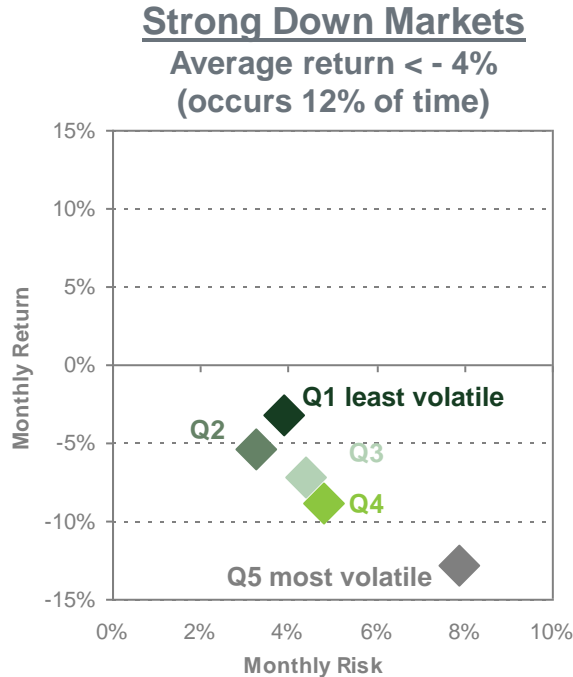
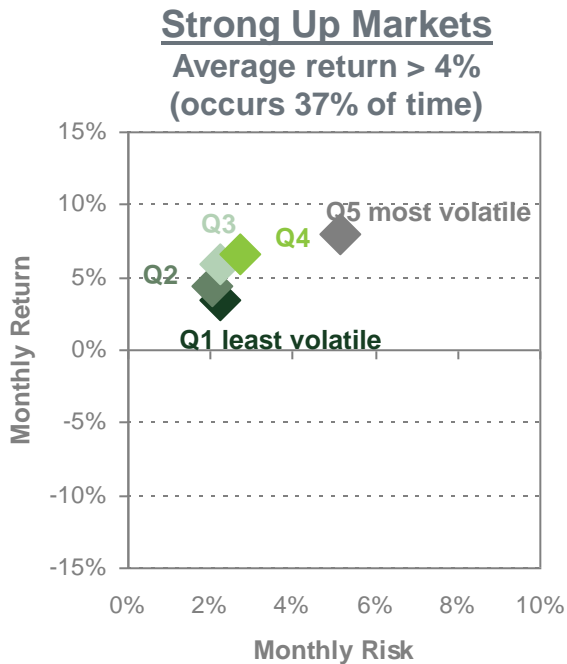
Risk computed as the standard deviation of monthly quintile returns over the entire period.

Predicted return from CAPM using betas from TDAM DM Statistical Risk model.

For illustrative purposes only.

**More volatile global equities have not delivered higher returns**

# Market History by Type of Market



Sources: TDAM & TMX Group.

Quintiles represent equally-weighted portfolios constructed monthly from equities sorted by trailing 36 months standard deviation.

Average monthly returns on S&P/TSX Composite Index constituents from July 1991 through March 2013.

Risk computed as the standard deviation of monthly quintile returns over the entire period.

For illustrative purposes only.

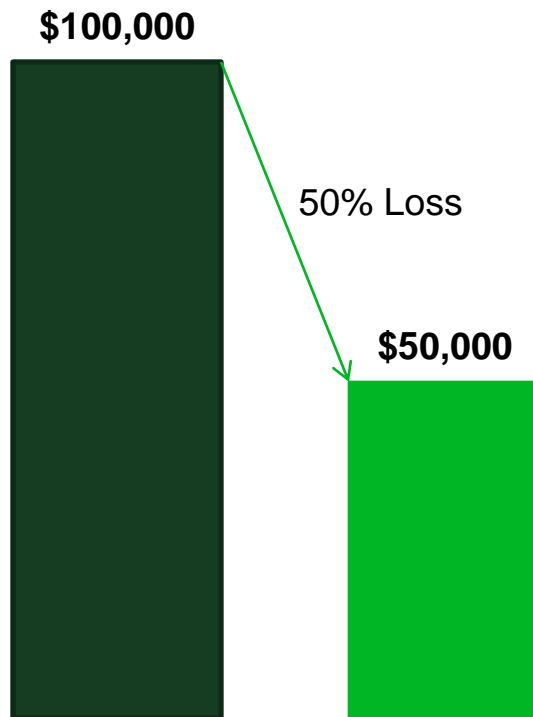
**Less volatile stocks outperform more volatile stocks most of the time, except in very strong bull markets**

# Mathematics of compounding

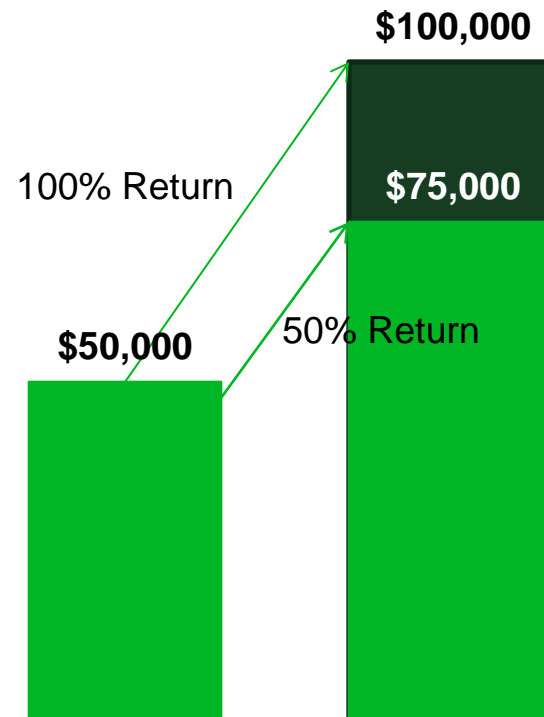
*WIN BY NOT LOSING*



When you lose...



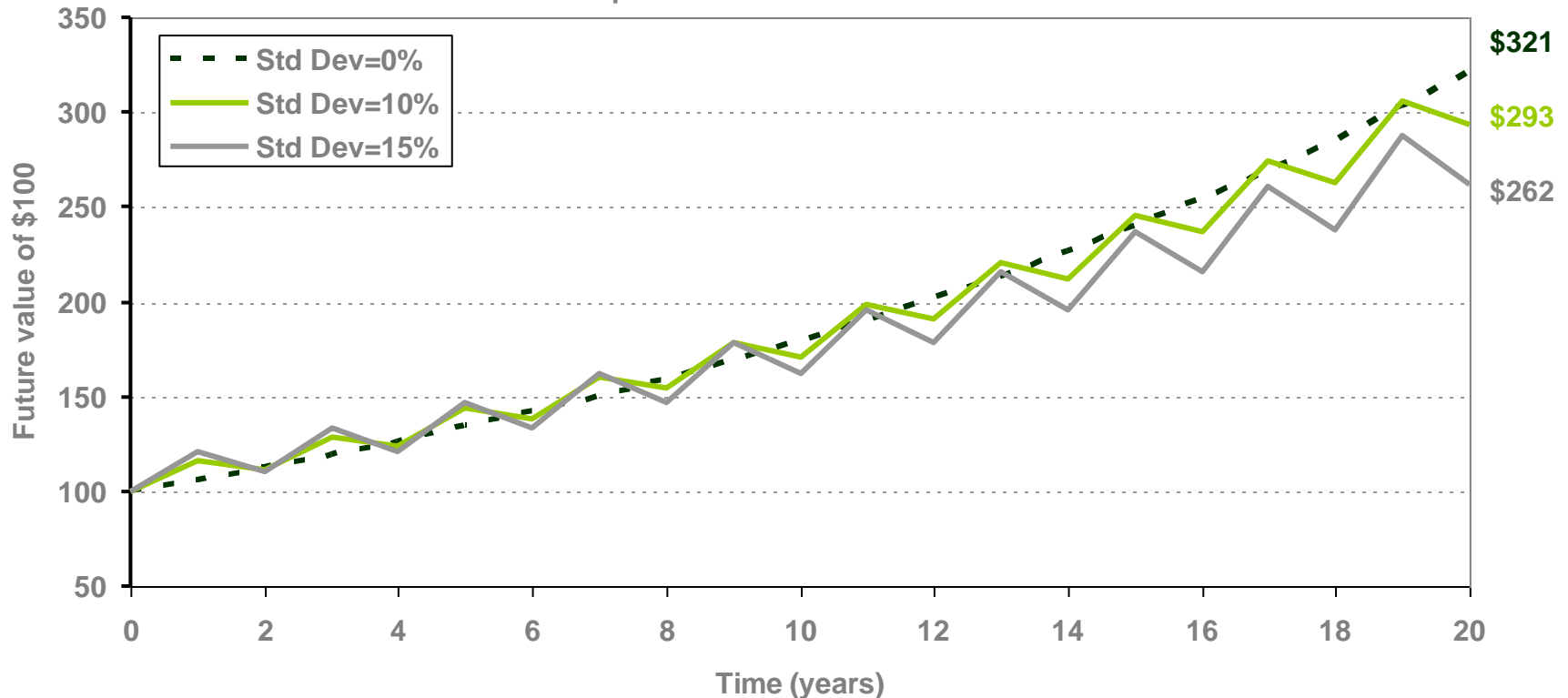
You need to recover



# Mathematics of Compounding: Why Low Volatility Matters



Future value of \$100  
Expected annual return = 6%



Source: TDAM. Standard deviation is a statistical measure of the range of a security's performance. When a security has a high standard deviation, its range of performance has been very wide, indicating that there is a greater potential for volatility than those with low standard deviations. For illustrative purposes only.

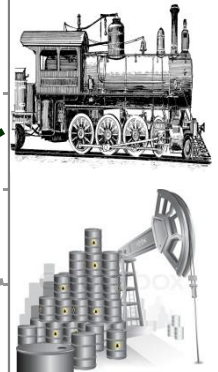
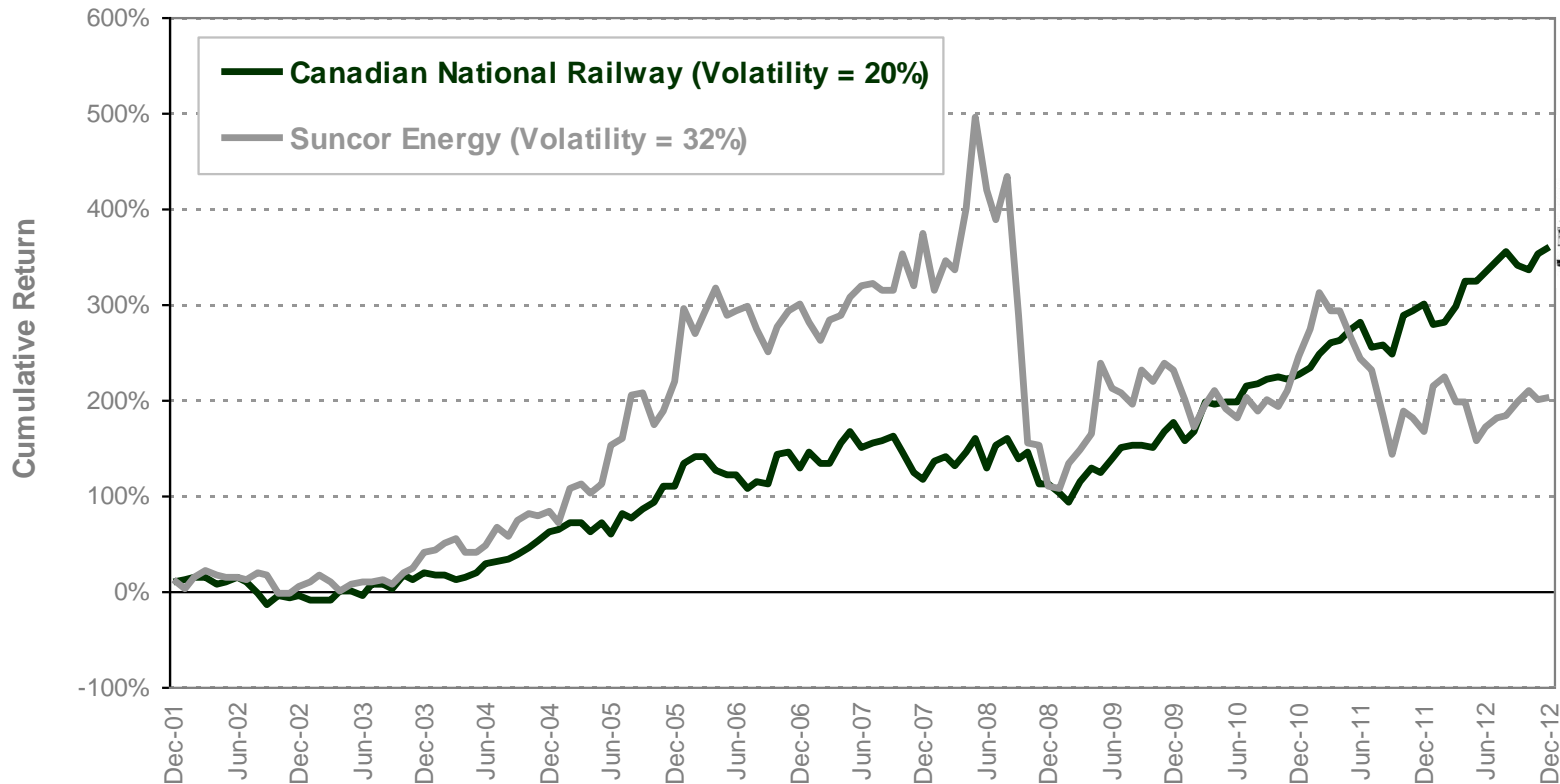
**Holding the expected annual return constant,  
the lower the volatility, the greater the expected final wealth**



# A Tale of Two Stocks with the Same Average Monthly Return

## Canadian National vs. Suncor Energy

Same Average Monthly Return: 1.3%



For illustrative purposes only

Source: TDAM. Total stock return including dividends. Volatility measured as the annualized standard deviation of monthly returns during the period.

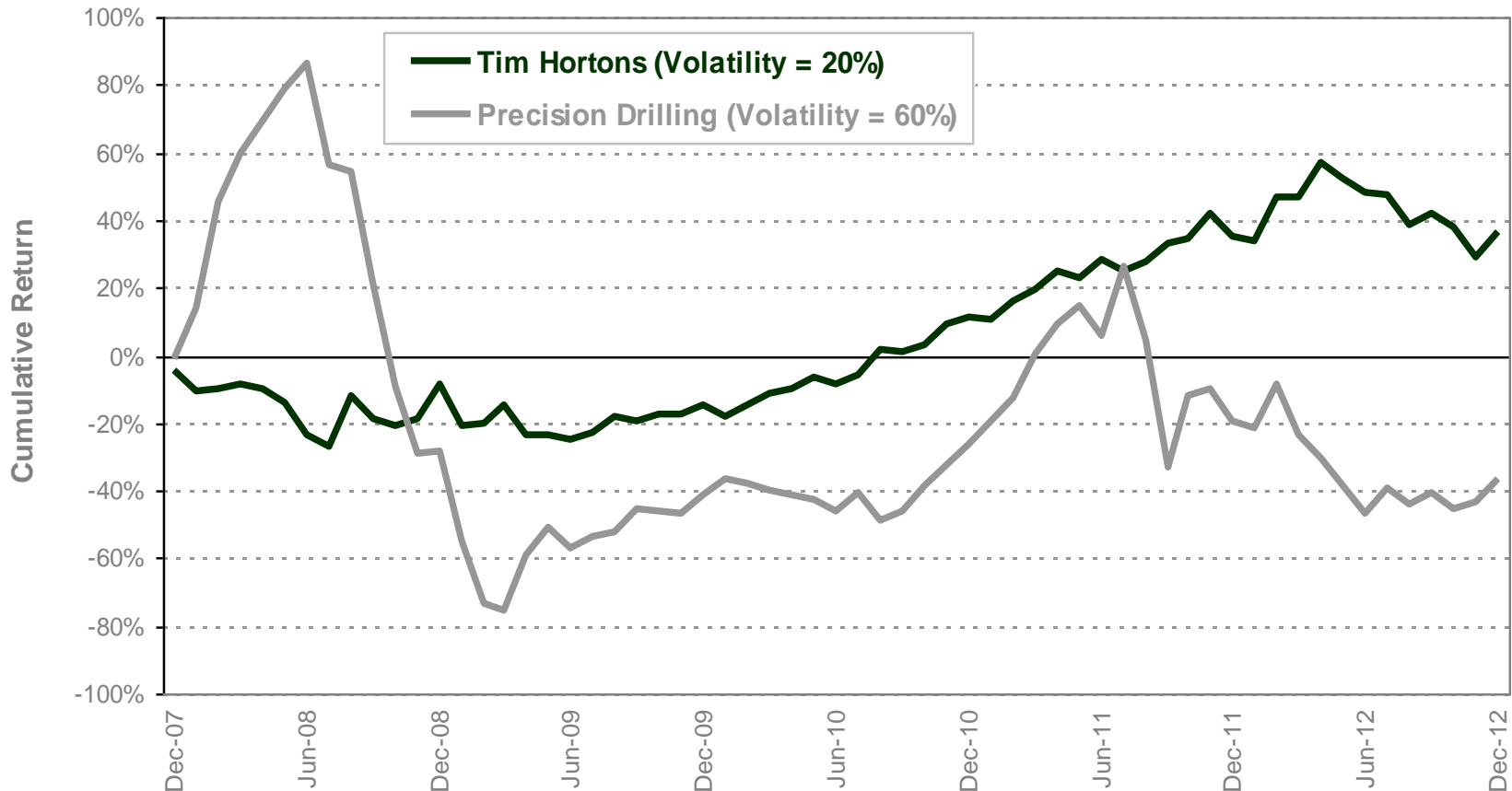
**The lower volatility stock outperformed over time**

# A Tale of Two Stocks with the Same Average Monthly Return



## Tim Hortons vs. Precision Drilling

Same Average Monthly Return: 0.7%



For illustrative purposes only

Source: TDAM. Total stock return including dividends. Volatility measured as the annualized standard deviation of monthly returns during the period.

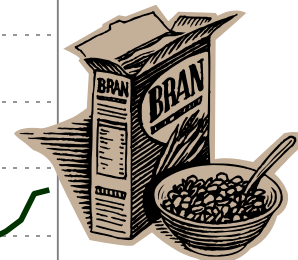
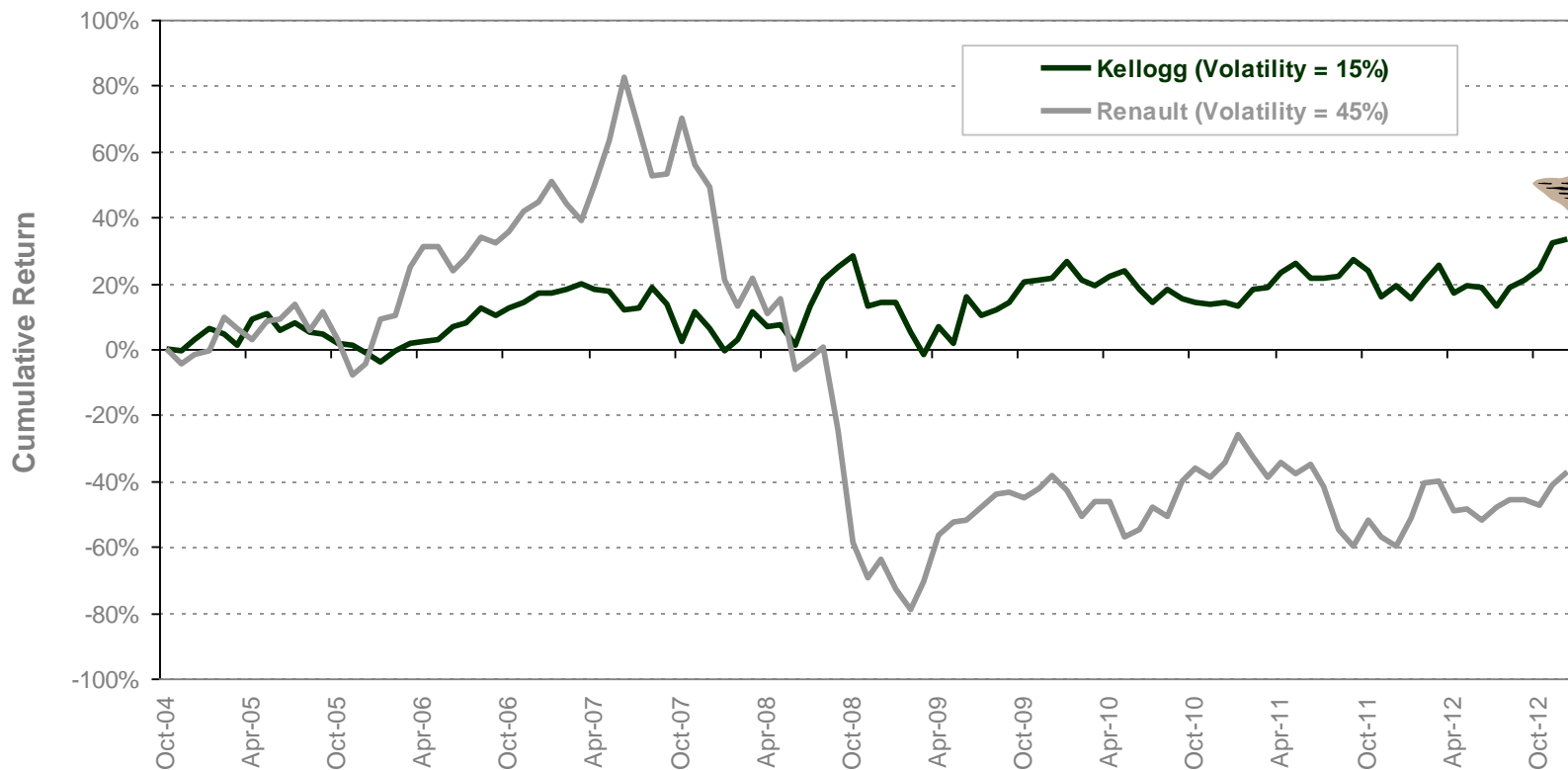
**The lower volatility stock outperformed over time**

# A Tale of Two Stocks with the Same Average Monthly Return

## Kellogg vs. Renault



Same Average Monthly Return: 0.4%



For illustrative purposes only

Source: TDAM. Total stock return in CAD including dividends. Volatility measured as the annualized standard deviation of monthly returns during the period.

### The lower volatility stock outperformed over time

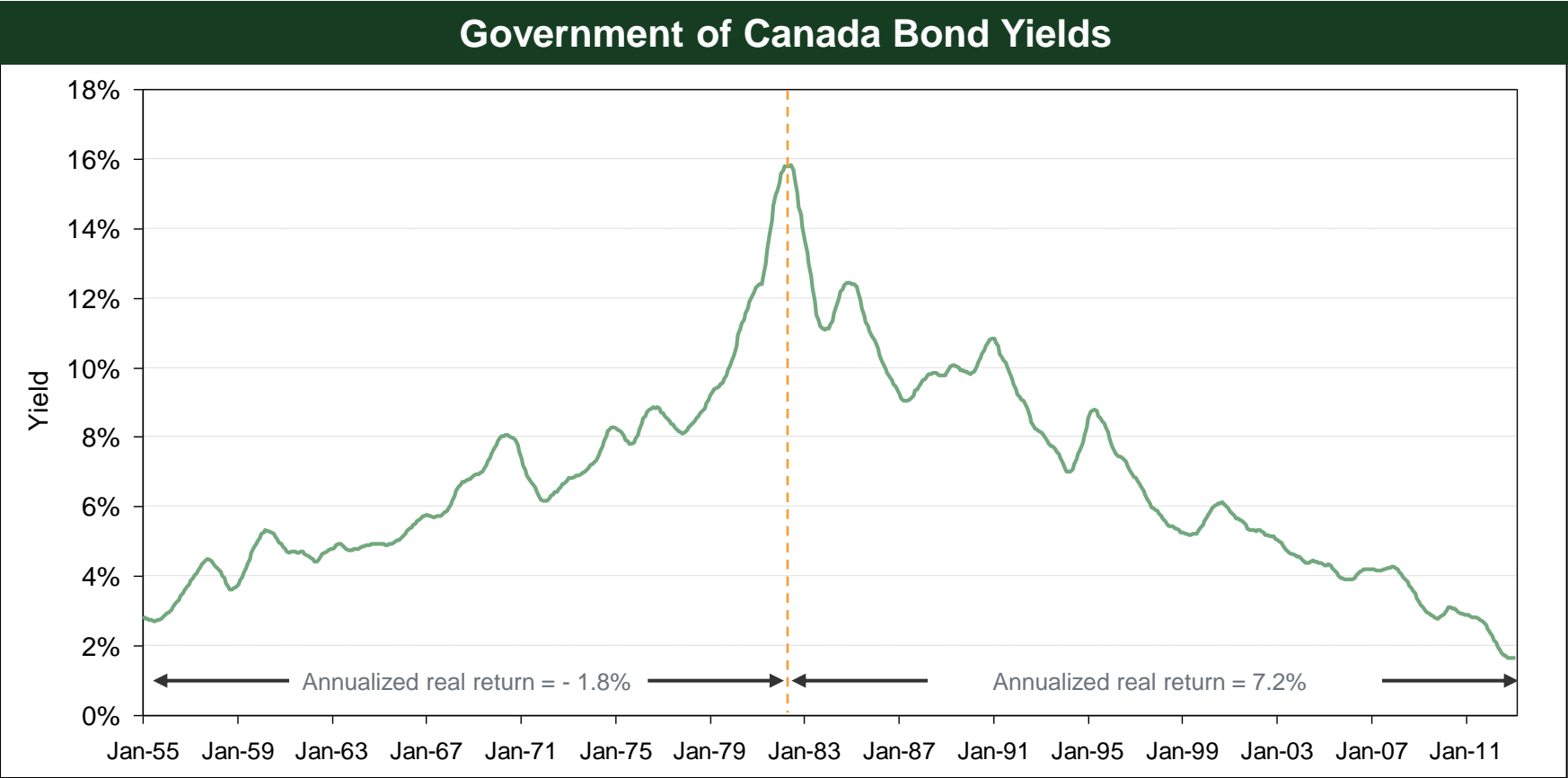
# The benefits of including a low volatility strategy in a client's portfolio



- Low correlation with traditional active investment strategies
  - Provides a cushion when uncertainty reigns while lagging in risk-on environments
- Replacement of passive investment strategies
- Allows increase allocation to higher risk strategies
- **Replace some portion of a portfolio's fixed income exposure**

**Lower your clients' risk, not their expectations**

# Brief History of the Markets: The Fixed Income Experience



**Great while it lasted, but what's next?**

Source: Statistics Canada, Average 5-10 Year Yields.  
Data to February 28, 2013

# How long can the low volatility equity advantage continue?



- As long as most investors are concerned about performance and risk relative to traditional indices
  - Low volatility stocks are unattractive to benchmark-sensitive managers due in part to their high tracking error
- Hedge funds are unlikely to speed up the move to low volatility equities
  - Long low volatility / short high volatility would be a high risk hedge fund strategy
- Are low volatility equities just a fad?
  - Most of the low volatility research was published between 1972 and 1991
  - Low volatility equities have delivered excellent returns since 1991
- What if low volatility becomes the norm?
  - Early adopters should realize gains

**Long runway of opportunity in low volatility strategies**

# TDAM uses a proprietary risk model



- Tailored to the universe of stocks of interest
- Tailored for Canadian investors
- Statistical Risk Model based on:
  - 20 common sources of risk capturing volatilities from sector, country and style
  - Model for stock specific risk
  - Adjustment for extreme risk events
  - Scaled with the level of implicit market volatility from the options market

**Most commercial risk models are from a U.S. Dollar perspective and estimated over wider universes**

# Investment Process

## TDAM Portfolio Constraints



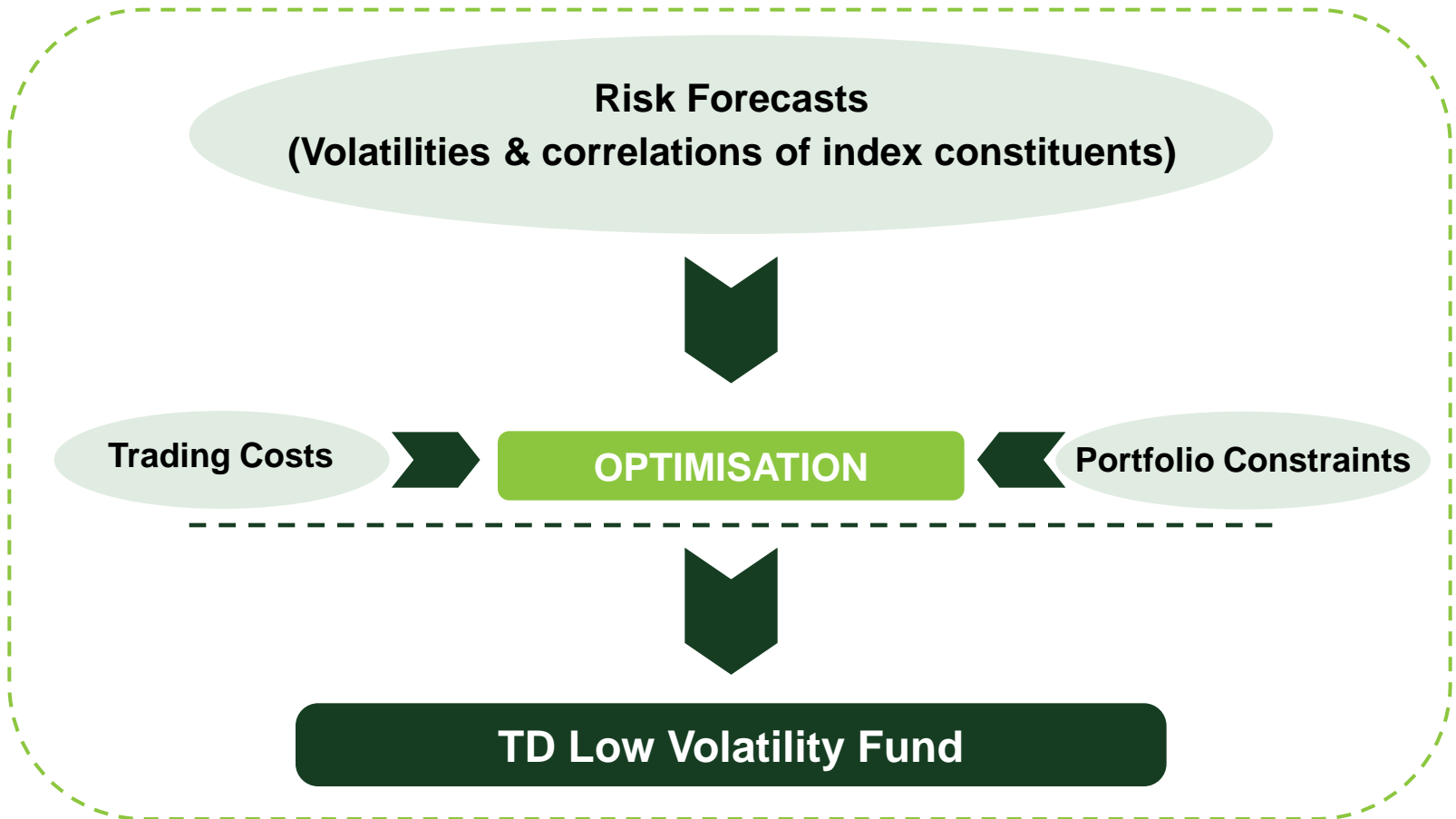
	TD Canadian Low Volatility Fund	TD Global Low Volatility Fund
Minimum number of positions	40	120
Maximum sector exposure	30%	25%
Maximum individual security exposure	5%	2%
Maximum allocation per developed market (ex-USA)	100% in Canada	30%
Maximum allocation to Canada	100%	15%
Maximum allocation to USA	0%	55%
Maximum allocation per main emerging market	0%	7.5% <sup>1</sup>
Maximum aggregate emerging market weight	0%	MSCI ACWI weight + 15%
Eligible securities	Members of the S&P/TSX Composite Index except TD	Members of the MSCI ACWI except TD & AMTD

<sup>1</sup>Maximum allocation at rebalancing is 5% (lower for certain markets)

**Quantitative discipline with monitoring by  
TDAM risk management team**



# How TDAM constructs low volatility portfolios



# Holdings Comparison for TD Global Low Vol Fund



10 largest Constituents	MSCI All Country World Index – C\$			TD Global Low Volatility Fund
	Capitalisation in C\$ billion	Index weight <sup>1</sup>	Risk (std dev 36 months <sup>2</sup> )	Weight
APPLE INC	416.4	1.33%	23.1%	0.43%
EXXON MOBIL	410.8	1.31%	13.8%	0.16%
GENERAL ELECTRIC CO.	242.4	0.78%	21.8%	-
NESTLE SA	221.4	0.75%	13.1%	0.20%
CHEVRON CORPORATION	232.6	0.74%	14.6%	0.29%
INTL BUSINESS MACHINES	229.0	0.73%	12.4%	0.59%
JOHNSON & JOHNSON	225.9	0.72%	12.8%	0.16%
MICROSOFT CORP	216.7	0.69%	18.0%	-
PFIZER INC	212.5	0.68%	15.4%	-
PROCTER & GAMBLE	210.7	0.67%	13.8%	0.73%
<b>Total</b>	<b>2618.4</b>	<b>8.42%</b>	<b>-</b>	<b>2.56%</b>

<sup>1</sup>MSCI ACWI = Morgan Stanley Capital International (MSCI) All Country World Index

<sup>2</sup>Standard deviation is a statistical measure of the range of a security's performance. When a security has a high standard deviation, its range of performance has been very wide, indicating that there is a greater potential for volatility than those with low standard deviations.

Security weightings and measures of risk are subject to change without notice.

<sup>2</sup>Note: Standard deviations computed from the last 36 monthly returns.

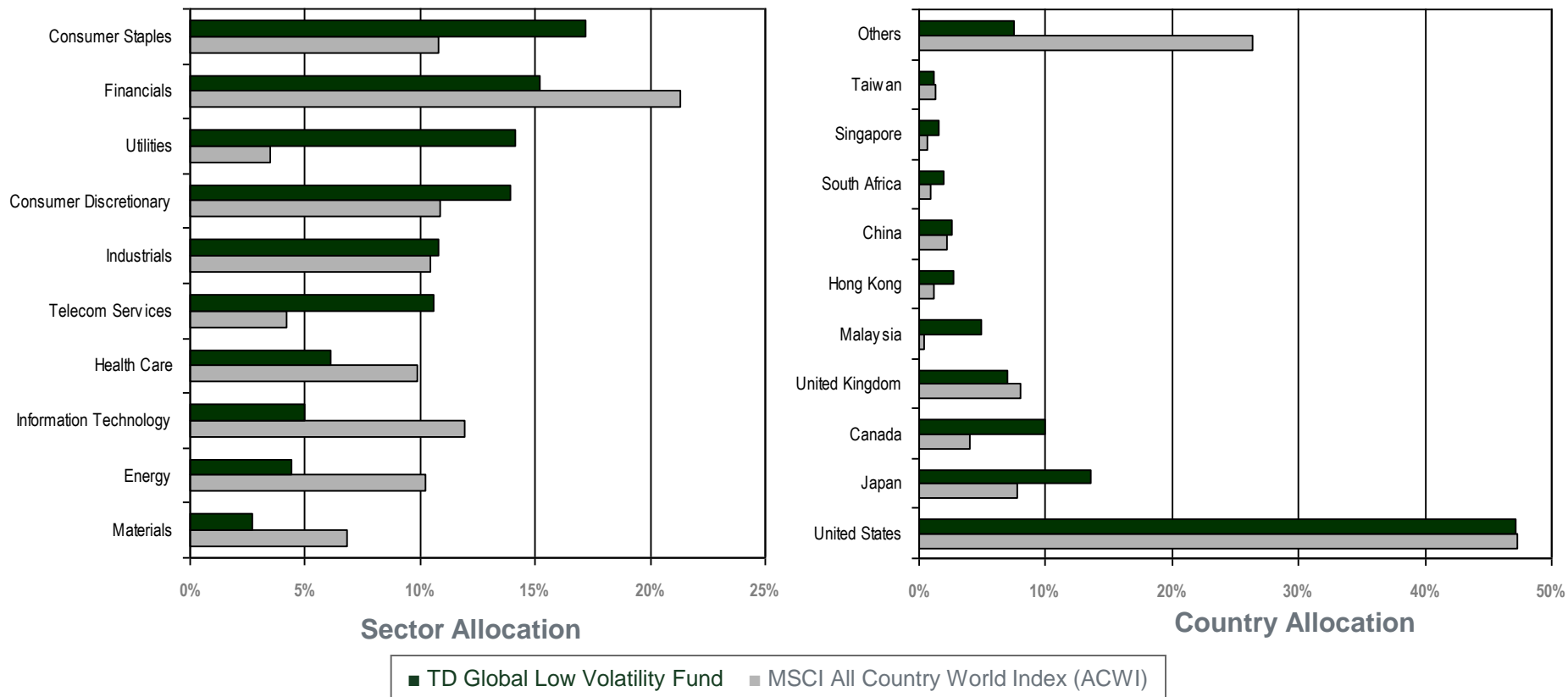
Sources: MSCI and TDAM. Data as of March 29, 2013

**Low volatility funds are focused on risk**

# TD Global Low Volatility Fund - Positioning



## Sector & Country Weights vs. MSCI All Country World Index



**Similar country weights... different sector weights**

Sources: MSCI, TDAM. As of March 29, 2013  
Sector and country weights are subject to change without notice.

# Risk Plays No Role In S&P/TSX Composite Index Construction



10 Largest Constituents	S&P/TSX Composite Index		
	Capitalisation in C\$ billion	Index weight	Risk (std dev) <sup>1</sup>
ROYAL BANK OF CANADA	88.5	5.80%	17.3%
TORONTO-DOMINION BANK	78.0	5.11%	11.4%
BANK OF NOVA SCOTIA	70.5	4.62%	12.4%
SUNCOR ENERGY INC	46.3	3.04%	27.3%
CANADIAN NATL RAILWAY	43.6	2.86%	12.6%
BANK OF MONTREAL	41.7	2.73%	12.8%
ENBRIDGE INC	38.1	2.50%	10.2%
BCE INC	36.8	2.41%	10.5%
CANADIAN NAT RESOURCE	35.6	2.33%	24.1%
POTASH CORP	34.5	2.26%	37.1%
<b>Total</b>	<b>513.6</b>	<b>33.65%</b>	<b>-</b>

	S&P/TSX Composite Index
Risk (standard deviation) <sup>1</sup>	11.4%
Number of securities	239

<sup>1</sup> Standard deviations computed from monthly returns over 36 months and annualized.

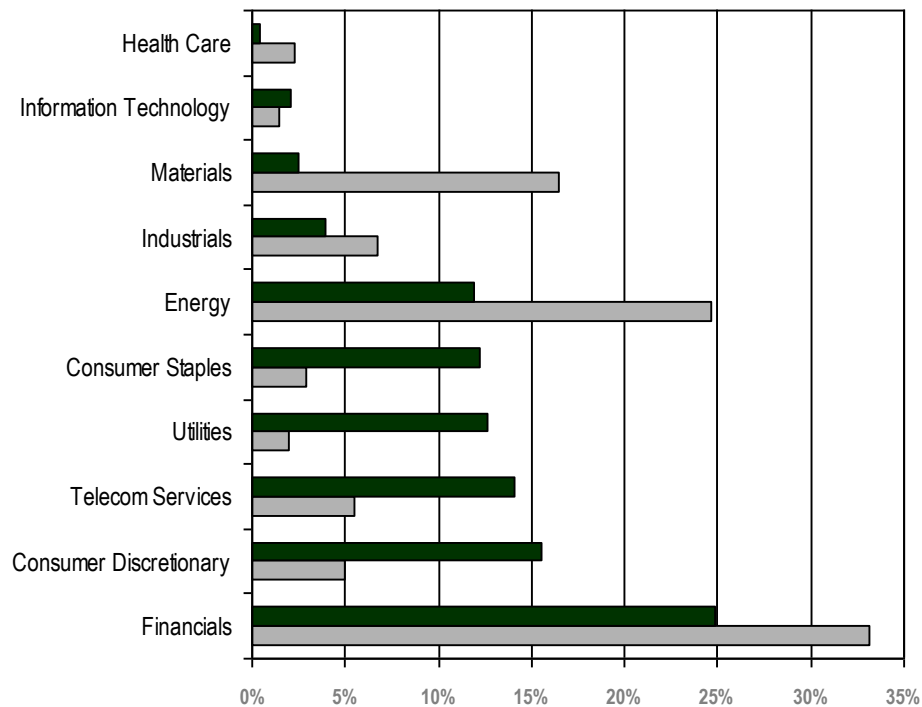
Sources : TMX Group and TDAM. As at March 31, 2013

## TSX more exposed to volatile commodity producers than global indices

# TD Canadian Low Volatility Fund - Positioning



## Sector Weights vs. S&P/TSX Composite Index



### Sector Allocation

■ TD Canadian Low Volatility Fund ■ S&P/TSX Composite Index

**Low Volatility Fund is well represented in 6 sectors**

Sources: TMX Group, TDAM. As of March 29, 2013  
Sector weights are subject to change without notice.

# TDAM's Low Volatility Strategies



- Strive to achieve approximately 2/3 volatility (relative to cap-weighted index) over the long term
- Typically hold large weight in non-cyclical sectors
  - Utilities & Consumer Staples
- Expect somewhat smaller capitalization relative to cap-weighted index

**Low volatility strategies have historically delivered better risk-adjusted returns than cap-weighted indices**

# Large Body Of Academic Research



## Stock return – Market risk (Beta) relationship much flatter than predicted by

- Black, Jensen & Scholes (1972) *Riskier equities have not yielded statistically significantly higher returns than less risky equities*
- Fama & MacBeth (1973)

## Traditional indices (S&P/TSX, MSCI World, S&P 500) not as efficient as minimum variance combination of same equities:

- Haugen and Baker (1991) – *analyzes US equity returns 1972-1989 – low volatility portfolios perform better over the long term*
- Blitz and van Vliet (2007)
- MSCI BARRA (2008)
- Bodjov and Masson (2009, TD Asset Management white paper)

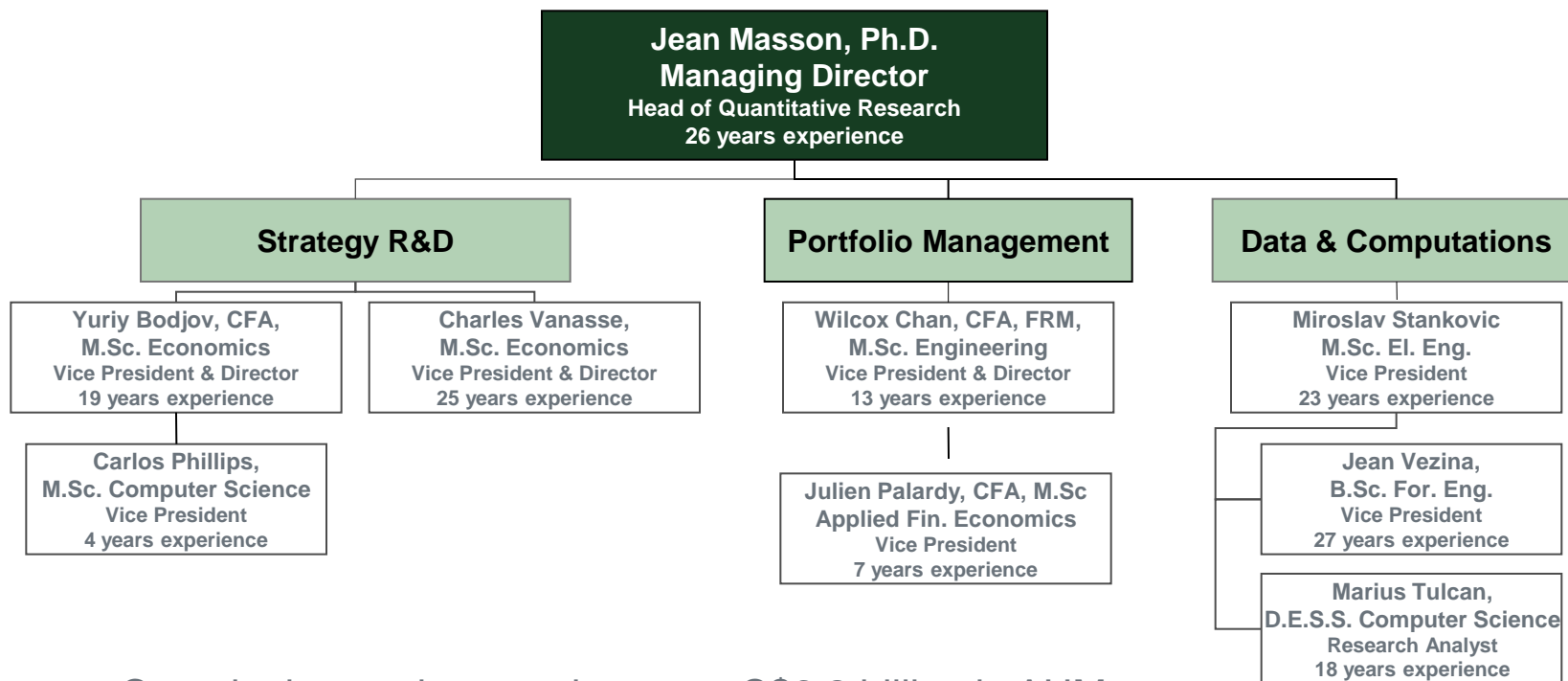
## Riskier equities under-perform less volatile equities

- Ang, Hodrick, Xing, and Zhang (2006) – *analyzes US equity returns 1963-2000 – returns on more volatile stocks have been lower than the return on less volatile stocks in the long run*
- International (including Canada): Ang, Hodrick, Xing, and Zhang (2009)

## Additional

- Chopra and Zeimbra (1993) *errors in estimating expected returns are over 10 times larger than errors estimating volatility and over 20 times larger than errors estimating covariances*

# TDAM Quantitative Equity Team



- Quantitative equity team has over C\$6.2 billion in AUM
  - About C\$5.5 billion in low volatility strategies

## Combining market intelligence, research and technology

Source: TD Asset Management Inc. Data as at March 31, 2013



# Low Volatility Strategies



## Portfolio Management Team



**Jean Masson, Ph.D., Managing Director**

**27 years experience**

Jean Masson joined TD Asset Management Inc. in 1997, after spending 10 years teaching Finance and conducting research at the University of Ottawa and Washington University in St. Louis. His areas of specialization included econometric methods, derivatives, and market microstructure. Jean leads TDAM's quantitative research and development efforts and manages our team of research professionals. He is involved in the modeling and research of various quantitative strategies including Low Volatility Equities and Enhanced. Jean holds M.S. and Ph.D. degrees in Finance from the University of Rochester and B.A. and M.A. degrees in Economics from Simon Fraser University.

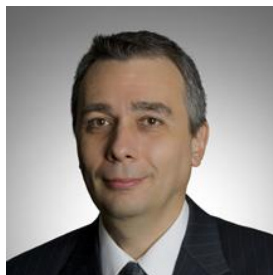


**Wilcox Chan, CFA, Vice President & Director**

**14 years experience**

Wilcox Chan joined TD Asset Management Inc. in November 2003. He is currently the lead manager of the quantitative equity portfolios which include low volatility equity and enhanced equity. Previously he was responsible for quantifying the risk associated with TDAM's products and investment processes, with a primary focus on enhanced equity and alternative investment strategies. Prior to joining TDAM, he was a Senior Manager in the Middle Office for the Bank of Nova Scotia for five years, where he performed a variety of risk management duties and analysis for the Foreign Exchange, Precious Metals, Interest Rate, and Equity Derivatives business lines. Prior to pursuing a career in the financial sector, he had spent seven years in the simulation software area for the power generation industry. Wilcox holds a Master of Engineering degree from the University of London, UK. He also attended York University where he graduated from the Masters of Business Administration program with a major in Finance. Wilcox is a CFA charterholder. He also holds the Chartered Alternative Investment Analyst<sup>SM</sup> designation.

## Quantitative Research



**Yuriy Bodjov, M.Sc., CFA, Vice President & Director**

**20 years experience**

Yuriy Bodjov joined TD Asset Management Inc. in January 2008. He works on the research and development of low volatility and absolute return strategies and is also responsible for the design of quantitative risk models. Prior to joining TDAM, Yuriy worked as a director and portfolio manager at a large public pension fund where he was managing tactical asset allocation strategies. He had previously worked as a portfolio manager of US and international equities and as a fixed income portfolio manager. Prior to that he was a senior consultant at a financial risk consulting firm. Yuriy is a CFA charterholder and has Master's degrees in Economics from the Université du Québec à Montréal and the University of National and World Economy, Sofia, Bulgaria.

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