



# Borealis Global Advisory

## A Global Equity Allocation Specialist

**BGA is seeking to partner with an institutional money manager or ETF provider to implement its equity allocation framework.**

Borealis Global Advisory has developed an automated, quantitative framework to support enhanced beta/multi-factor based portfolios. This framework can be implemented in managed portfolios or for ETF creation. BGA has implemented a live portfolio using the benchmark MSCI-ACWI ex US to demonstrate its real world application.

### **To Schedule Presentations:**

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Full White Paper available upon request at: [www.borealisga.com](http://www.borealisga.com)**

## BGA's Framework for Building Portfolio's or Enhanced Indexes

BGA's fundamental framework called the Global Allocation Framework (G-AF) is made of five pillars. This framework is utilized to automate the quantitative implementation of multi-factor portfolios or enhanced indexes.

BGA Framework				
Tranches	Enhanced Beta Approach	Double "Z" Methodology	Yield Forecasting Mechanism	Investment Vehicles

1. **Tranche Creation** to control volatility, limit concentration risks, and aid diversification.
2. **Enhanced Beta** approach is used to implement quantitative and evidence-based techniques for identifying factors.
3. **Double "Z" methodology** to evaluate factors on a standardized score and allocate/weight investments.
4. **Yield Forecasting Mechanism** used to generate medium-term yield forecasts between 5 and 10 years. These BGA devised forecasts assist in setting tranche weights and valuation trends.
5. **Investment Vehicles** used in the creation of the portfolio and/or Enhanced Index

## Implementation of the BGA Framework in International (ACWI - Ex US) Investing

**G-CAF** is the automated implementation of BGA's framework in international investing using single-country ETFs.

GLOBAL COUNTRY ALLOCATION FRAMEWORK
<p><b>Tranching</b></p> <ul style="list-style-type: none"> <li>• Upper Tranche countries – large developed countries</li> <li>• Middle Tranche countries – large emerging countries</li> <li>• Lower Tranche countries – small developed and emerging countries</li> </ul>
<p><b>Enhanced Beta Approach</b></p> <ul style="list-style-type: none"> <li>• Best elements of Smart Beta <ul style="list-style-type: none"> <li>◦ Blend of active and passive investing</li> <li>◦ Transparent and rules based</li> <li>◦ Multi factors <ul style="list-style-type: none"> <li>• Economic intuition and academic evidence</li> <li>• Cyclical and low inter-factor correlation</li> <li>• Volatility adjusted</li> <li>• Determination using Fama-Macbeth OLS regression method</li> </ul> </li> </ul> </li> </ul>
<p><b>Double "Z" Methodology</b></p> <ul style="list-style-type: none"> <li>• Country Ranking, Selection, and Allocation</li> <li>• Z-Scoring</li> </ul>
<p><b>Country Yield Forecasting Mechanism (CY-FOREM)</b></p> <ul style="list-style-type: none"> <li>• Medium-term Country Yield Forecast (CY-M) for each country</li> <li>• Diffusion Index (DI) for each tranche <ul style="list-style-type: none"> <li>◦ Upper Tranche Diffusion Index (UTDI)</li> <li>◦ Middle Tranche Diffusion Index (MTDI)</li> <li>◦ Lower Tranche Diffusion Index (LTDI)</li> </ul> </li> </ul>
<b>Single-Country ETFs</b>

**Tranching.** The BGA Dynamic International Portfolio employs three tranches based on market cap size and economic development (developed vs. emerging).

**Enhanced Beta – Factor Development.** BGA utilizes evidence-based and multi-factor approach to model build-ing. Two sets of factors are employed across the three tranches. These factors are derived from cross-sectional **Fama-MacBeth OLS** regression repeated over multiple periods and they have low inter-correlation. The use of multi-factors minimizes the adverse cyclical effects of relying upon a single factor (such as relying on momentum). STATA soft-ware is used to house the factors and to execute the regressions. The identified factors are backed by sound intuition and academic evidence.

Fama-MacBeth (1973) Two-Step procedure						Number of obs	=	2918
						Num. time periods	=	140
						F( 6, 139)	=	2.98
						Prob > F	=	0.0090
						avg. R-squared	=	0.2299
return1	Coef.	Std. Err.	t	P> t	[95% Conf. Interval]			
value_2	-1.023322	.2843398	-3.60	0.000	-1.585512	-.4611316		
value_3	-.9155863	.5236465	-1.75	0.083	-1.950928	.1197559		
ner_nom1	-.8770707	1.738581	-0.50	0.615	-4.314554	2.560412		
risk	.6544365	.5341109	1.23	0.223	-.4015957	1.710469		
return_mom	.155796	1.297185	0.12	0.905	-2.408969	2.720561		
ner_pusd	-.0001246	.0003871	-0.32	0.748	-.0008901	.0006408		
_cons	2.956014	1.017886	2.90	0.004	.9434719	4.968556		

	Pos	Pos/Sig*	Neg	Neg/Sig*
value_2	56	4	84	10
value_3	68	1	72	8
ner_nom1	61	6	79	5
risk	82	18	58	15
return_mom	78	11	62	13
ner_pusd	72	5	68	7
_cons	80	11	60	1

\* Significant at .05

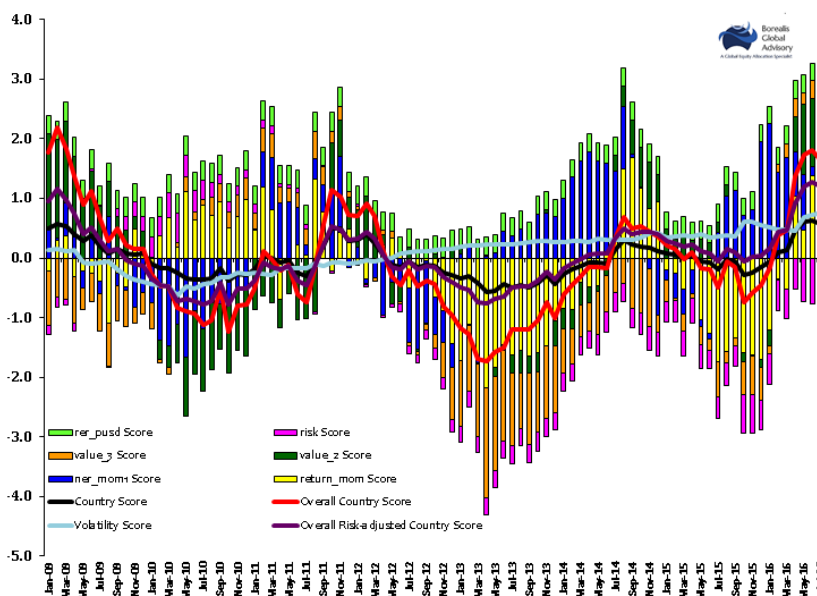
Some factors driving country returns,  
Upper Tranche and Middle Tranche

Source: BGA calculation and MSCI.

### Strength of factors chart for Canada

Source: BGA computation.

Notes: data through July 2016.  
The actual factors are propri-etary, and therefore, the factors are represented mnemonically.



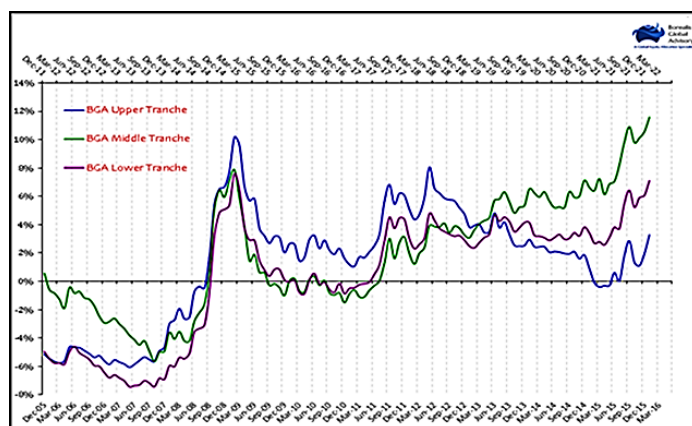
**Use of Double “Z” scoring for country ranking, selection, and weighting.** Automated statistical Z scoring implemented on R software allows for apples to apples comparisons of countries across diverse factors on a standardized scale, and countries with the highest overall expressed factors are weighted more heavily. The countries are evaluated at the tranche level before being expressed as the overall country allocation recommendations.

Country	Risk-adjusted Overall Z-Score	Allocation
UK	1.37	11.6%
Canada	1.20	10.7%
New Zealand	0.93	8.6%
China	0.63	8.2%
Switzerland	0.71	7.3%
Netherlands	0.69	7.1%
Peru	0.59	5.6%
Korea	0.42	5.5%
Malaysia	0.58	5.5%
Belgium	0.52	4.8%

### Top 10 ranking countries in G-CAM, July 2016

Source: BGA calculations

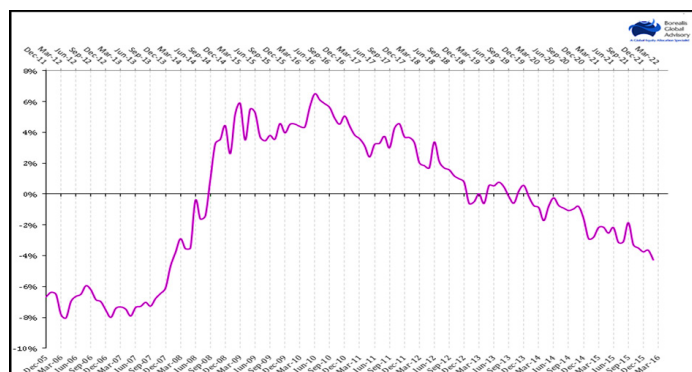
**Country Yield Forecasting Mechanism (CY-FOREM).** This is a BGA developed instrument to generate medium-term yield forecasts (CY-M) for countries and tranches using a modified version of Shiller’s CAPE. Moreover, the forecasts are also used to express the investment expectations of the tranches using diffusion indexes. These BGA devised measures assist in setting tranche weights as well as indicate country level valuation trends.



### Medium-term country yield forecast (CY-M) of Upper Tranche, Middle Tranche, and Lower Tranche

Source: BGA calculations, MSCI, IMF, Australia Bureau of Statistics, New Zealand Statistics, OECD, and IADB.

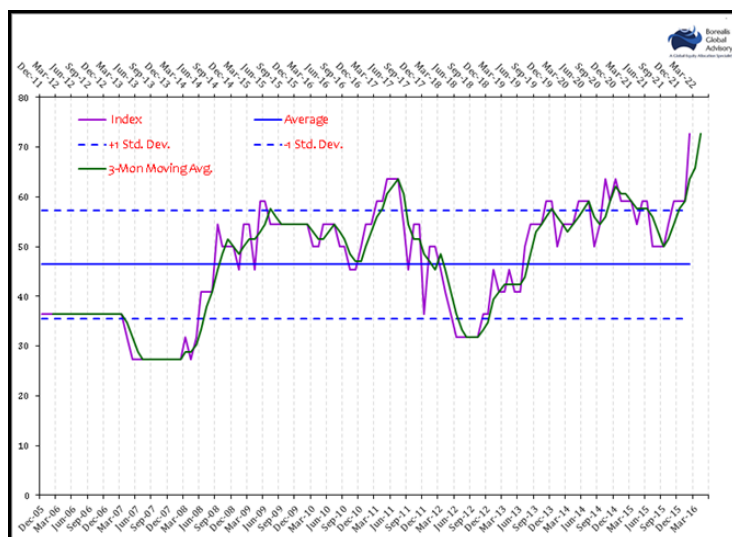
Notes: Data runs through February 2016.



### Medium-term country yield forecast (CY-M), Ireland

Source: BGA calculations, MSCI, and IMF.

Notes: Data runs through February 2016. The vertical lines indicate the forecast horizons, starting from the dates listed on the bottom x-axis and ending on the dates listed on the top x-axis.



### Diffusion index, Middle Tranche

**Source:** BGA calculations, MSCI, IMF, and OECD.

**Notes:** Data runs through February 2016.

### Theoretical performance of G-CAF Implementation (Annual Performance)

	3-yr		5-yr		10-yr		Since inception	
	Portfolio	Benchmark*	Portfolio	Benchmark	Portfolio	Benchmark	Portfolio	Benchmark
<b>Returns</b>	5.9%	1.8%	4.9%	1.8%	6.9%	2.3%	11.9%	5.9%
<b>Volatility</b>	12.6%	13.1%	14.7%	15.5%	18.6%	17.8%	17.7%	17.8%
<b>Sharpe ratio**</b>	0.39	0.06	0.26	0.05	0.32	0.07	0.61	0.28

\* Benchmark is MSCI All Country World Index ex USA

\*\* Risk-free rate used is 1%

**Source:** BGA and MSCI

Notes: Data runs through July 2016. Theoretical performance denotes using reported country index returns rather than ETF returns to compute performance. The returns are in U.S. dollars on a gross basis. The portfolio implemented tranche weights of: 40% (Upper Tranche), 20% (Middle Tranche), and 40% (Lower Tranche).

### Actual Performance of the BGA Dynamic International Portfolio

Implementation of the G-CAF framework is based on single-country ETF's. To maintain a balance of turnover cost and minimize event risk, the portfolio is reviewed monthly so that minor adjustments may be made monthly with larger quarterly re-balancing.

	2nd Qtr	Inception
BGA International Growth (Gross)	1.40	4.92
Foreign Blend Category*	-1.08	3.14
MSCI -Ex US Index*	-0.64	4.30

Notes: Data thru 7/29/2016 as reported by Morningstar®, Inception date April 4, 2016.

## Additional Applications of the BGA Framework

The BGA framework could be used for investing in the following entities using ETFs or individual equities:

- i. Size, style or both
- ii. Sectors – U.S. or Global Sectors
- iii. Regions (economic or geographic) or countries by levels of development, size or both

### Portfolio (or Enhanced Index) applications include:

- Diversified International Markets
- Emerging Markets
- U.S. or Global Sector Rotation
- U.S. Style Tilt (Value/Growth, Large, Mid, Small Cap)

## Sailesh Radha, MALD, Chief Investment Officer

Sailesh is co-founder and head of Research for Borealis Global Advisory where he is responsible for development of new intellectual property and strategies. His development of a multi-pillar approach to single country ETF investing is unique and has a patent pending. Sailesh is the Chief Investment Officer of the firm. Prior to co-founding BGA, he worked with Yardeni Research, Inc. as a global macroeconomic analyst; at CCM Investment Advisors as a portfolio manager/commodity analyst; at the World Health Organization (WHO) in Geneva, Switzerland as a research economist and at the Strategic Finance Group (SFG) of ICICI Bank at Mumbai, India as a quantitative analyst. He received his master's degree with a focus in global macroeconomics & international development from the Fletcher School of Law & Diplomacy, Tufts University and his MBA in Finance from the Darla Moore School of Business, University of South Carolina. His undergraduate degree is in Electrical & Electronics Engineering from National Institute of Technology (NIT), Warangal, India.

### Special Thanks

We would like to express our gratitude to the University of South Carolina for providing input, consulting, research, and intern assistance for development of the BGA framework. We would also like to thank Dr. Brian Gendreau, Professor, Warrington College of Business, University of Florida for his consultation and advice in our development of the scoring structure we termed "Double Z methodology".

**Disclosures/Endnotes** *Backtested theoretical performance is NOT an indicator of future actual results.* The results reflect performance of a strategy not historically offered to investors and do NOT represent returns that any investor actually attained. Backtested results are calculated by the retroactive application of the Borealis model constructed on the basis of historical data, starting from 12/31/2003, and based on assumptions integral to the model which may or may not be testable and are subject to losses. Borealis Global Advisory, LLC (BGA) does not render or offer to render personalized investment advice. The information contained herein is based on data gathered from sources we believe to be reliable. It is not guaranteed against errors and or omissions, and is not intended as the primary basis for investment decisions. Additionally, it should not be construed as advice meeting the particular individual investment needs or any investor. All references made to investment or portfolio performance are based on historical data. One should not assume that this performance will continue in the future. BGA is registered in the state of South Carolina. This publication is not intended to be a solicitation for clients in any other state. BGA welcomes residents (institutions and individuals) of other states to contact BGA directly concerning their individual state's compliance requirements. BGA services will only be rendered after compliance regulations are satisfied and prospective clients have received Borealis Global Advisory brochure (ADV Form Part 2).