

A Prognostic Yield Measure for Country Selection in the Medium Term Using Shiller's PE

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International stocks make investing more complex. Unlike in domestic equity investing, where we examine only the economic and corporate building blocks underlying the U.S. market, we must scrutinize more than 45 countries and their respective corporate underlings. There is also the burden of analyzing those countries' complex economic, financial, and political interrelationships, which affect international returns overall. Moreover, given the limited availability of accurate and timely fundamental data on international stocks, advisors incur exorbitant data and research costs to evaluate a copious number of stocks in the international universe. In our experience, these challenges make some advisors reluctant to recommend international investments, especially emerging, to their clientele.

To reduce the complexities that advisors face in international equity investing, we have developed a measure that expresses the medium-term equity performance expectations of a country. This measure, the medium-term country yield forecast (MCY forecast),¹ is a simple yield forecast measure at the country level that builds on concepts that advisors already know from the widely popular cyclically adjusted price-to-earnings ratio (CAPE, or Shiller's price-to-earnings [PE]). We have formulated a country yield

forecasting mechanism,² a forecast model and the fifth pillar in our global country allocation framework (GCA framework),³ which applies the cyclically adjusted country yield (CAC yield)⁴ to derive the medium-term yield forecast on an inflation-adjusted (real) basis for any country outside the United States. The CAC yield of any country in our investment universe,⁵ which feeds into the

² The yield forecasting mechanism referred to in the article is otherwise known as the country yield forecasting mechanism (CY-FOREM™).

³ The framework referred to in the article is otherwise known as the G-CAF™.

⁴ The CAC yield referred to in the article is otherwise known as CACY™.

⁵ The investment universe referred to in the article is the broad-based benchmark MSCI All Country World Index ex. USA (popularly known as ACWX), which is composed of 22 developed countries and 23 emerging countries. The developed countries are Australia, Austria, Belgium, Canada, Denmark, Finland, France, Germany, Hong Kong, Ireland, Israel, Italy, Japan, Netherlands, New Zealand, Norway, Portugal, Singapore, Spain, Sweden, Switzerland, and the United Kingdom. The emerging countries are Brazil, Chile, China, Colombia, Czech Republic, Egypt, Greece, India, Indonesia, Korea, Malaysia, Mexico, Peru, Philippines, Poland, Qatar, Russia, South Africa, Taiwan, Thailand, Turkey, and the United Arab Emirates (UAE). All the MSCI country indexes and the broad-based MSCI benchmark used for the empirical analysis in this article are of standard form. However, in June of 2017, Pakistan was added to the benchmark after it was upgraded from a frontier country to an emerging country, increasing the number of emerging countries in the benchmark to 24.

¹ The MCY forecast referred to in the article is otherwise known as CY-M™.

model, is nothing but its Shiller's PE (a price multiple) expressed in yield form. The mechanism departs significantly from most applications of Shiller's PE found in investment research and literature from the recent past, where Shiller's PE is used primarily as a tool to gauge the expectations of a national stock market in the long run. In our application, we use Shiller's PE to forecast expectations in the medium run, which for us is between 3 and 10 years out in the future. Moreover, the model augments the forecasting capabilities of Shiller's PE by incorporating into it a country's cyclically adjusted real exchange rate (RER 10). Incorporation of RER 10 into the model stems from recent studies evaluating the application of Shiller's PE on national stock markets; these studies have concluded unequivocally that Shiller's PE is not as precise a predictor of long-term equity returns for the emerging countries as it is for developed countries.

This article will discuss the country yield forecasting mechanism in detail and is organized as follows. The first section will briefly touch upon the reasons for using medium-term forecast horizons in forecasting national stock market returns. The second will summarize the genesis of Shiller's PE and its application in the U.S. stock market and other national stock markets, emerging and developed, outside the U.S. The third section examines the genesis, empirical analysis, and model building stages of the country yield forecasting mechanism, including the reasons for adopting real exchange rates to enhance the forecasting capabilities of Shiller's PE for emerging countries. The fourth discusses the features of the MCY forecast; its application in country selection, using Ireland as a detailed example; and its use in the GCA model for setting tranche weights. The final section draws conclusions on how MCY forecasts may be used by investment advisors in their practices.

WHY FOCUS ON THE MEDIUM TERM?

You may wonder why we focus on the medium term. We believe that advisers have to approach country selection from the medium-term perspective to get the most out of investing internationally on their clients' behalf. We generally divide investment horizons into three categories: short term (1 to 3 years), medium term (3 to 10 years), and long term (greater than 10 years).

Country selection using short-term perspectives typically does not work as advisors intend. Why? In the

short term, many known and unknown factors affect the country risk premium. Although institutional-level sophisticated models could capture many of those factors, most individual advisors lack the resources to develop and monitor them. As a result, advisors using short-term investment views on countries typically hurt their buy-and-hold clients, as transaction costs begin to nibble away at the excess returns, if any exist.

Long-term perspectives also fall short. During a long stretch of time, the investment and economic regimes of countries change, and clients' circumstances may change as well. It is not possible to efficiently model these changes in the country selection process. Accordingly, we believe that advisors can only model effectively a country selection process reflecting market views over a period largely ranging from three to seven years.

CAPE (OR SHILLER'S PE)

In 1934, Graham and Dodd, in their landmark tome, *Security Analysis*, recommended using earnings from the trailing 7 to 10 years to compute the PE ratio, for they had suspected that volatility of corporate earnings had an undue adverse influence on the traditional PE ratio.⁶ Keimling [2014] was of the opinion that traditional PEs seem to be expensive during times of crisis, when low or negative earnings should provide rewarding buying opportunities. At such times, he believed the traditional PE does not take into account the potential for earnings growth after the crisis. Taking up the recommendation of Graham and Dodd, Campbell and Shiller [1988, 1998, 2001] developed a CAPE, popularly known as Shiller's PE, for the entire U.S. market, which was computed as the price of the S&P 500 index divided by its trailing 10-year average earnings, adjusted for inflation. The purpose of the 10-year observation is to capture average corporate earnings over a full economic cycle, while inflation adjustment allows for the comparability of earnings during periods of high inflation. Robert Shiller of Yale University famously used CAPE to predict the tech bubble in the U.S. market in the closing days of the last millennium. Since the late 1990s, advisors have largely used the measure as a tool to forecast the long-term returns of the U.S. market.

⁶ Traditional PE is the ratio of current price to the trailing one-year earnings.

Research in the last decade or more has indicated that since 1881, Shiller's PE has been a reliable predictor of S&P 500 returns for periods 10 or more years ahead, which we classify as the long term. There has been a recent spate of research on this measure and its relevance to national markets outside the United States. Keimling [2005, 2014] of Star Capital published a couple of papers in the last decade regarding the application of Shiller's PE in forecasting long-term returns of developed countries outside the United States. These papers have confirmed reliability of the measure in predicting long-term returns in those national markets as well. Klement [2012], while investigating application of Shiller's PE in both developed and emerging countries in his paper "Does the Shiller-PE Work in Emerging Markets," arrived at similar conclusions. However, the biggest takeaway from his paper, apart from the application of Shiller's PE in emerging markets, is that the correlation of Shiller's PE with future real stock market returns is very low for very short investment horizons, but averages around 0.7 for investment horizons of five years or more. Moreover, Klement harnessed this finding by employing Shiller's PE to predict real returns of national markets across successive periods of five years or more. In the process, he showed the efficacy of this measure to predict forward returns over intervals shorter than 10 years. As we discussed earlier, we categorize intervals longer than three years and shorter than 10 years as medium-term forecast horizons.

EMPIRICAL ANALYSIS AND MODEL BUILDING

Until now, international country markets lacked a measure similar in gravity to Shiller's PE, which was established primarily to value U.S. equity markets. To fill the gap, we created an international version of Shiller's PE. To that end, we have done an extensive empirical study of the national markets—comprising 22 developed and 24 emerging—under the MSCI All Country World Index ex. USA benchmark. In our research, we embraced the thesis that Shiller's PE can be used to forecast real returns of national equity markets for successive medium-term horizons. Furthermore, we departed from the usual price-multiple expression of Shiller's PE by inverting the Shiller's PE of each national market to its yield expression form because the latter is

more intuitive for investors to grasp.⁷ Why? It is easier to explain a negative yield than a negative PE. We call this yield expression the CAC yield.

By definition, we use historical monthly values from 1996 for earnings, national stock price index, and consumer price index (CPI)⁸ of each of the countries to compute its respective historical monthly CAC yield dating from 2006. In addition, we employ rolling monthly series of six-, seven-, eight-, and nine-year forward compound annual growth rates⁹—CAGR6, CAGR7, CAGR8, and CAGR9 (all mnemonics), respectively—of real (adjusted for inflation) price returns in local currency for each country¹⁰ in the universe. As a result of limited earnings yield history for Qatar and UAE,¹¹ we exclude them from the study.

For each country in the universe, its multiple successive forward returns time series CAGR6, CAGR7, CAGR8, and CAGR9 are regressed separately against its respective CAC yield series. Based on the regressions, we find that CAC yield is relatively the most reasonable predictor of national equity returns (expressed on a CAGR basis) in the successive six-year time periods. The gray bars in Exhibit 1 display the average power of CAC yield, expressed in percentage on the vertical axis, in predicting compounded average annual real (adjusted for inflation) returns for six successive years for all the countries in the MSCI All Country World Index ex. USA benchmark. Technically speaking, the regressions using the rolling six-year CAGR series (CAGR6) yielded the highest R^2 values for all countries, and they are represented in gray in Exhibit 1. However, one can observe from the chart that commodity-based countries such as Brazil, Chile, Columbia, Peru, and Indonesia and purely export-oriented economies like South Korea are conspicuous because of their disappointingly low R^2 values.

⁷Earnings yield is obtained by dividing 1 by the PE ratio, which is nothing but an inversion of the PE ratio, as defined by Graham and Dodd [2009] and further elucidated by Shen [2000].

⁸The CPI is based to 100 in 2010.

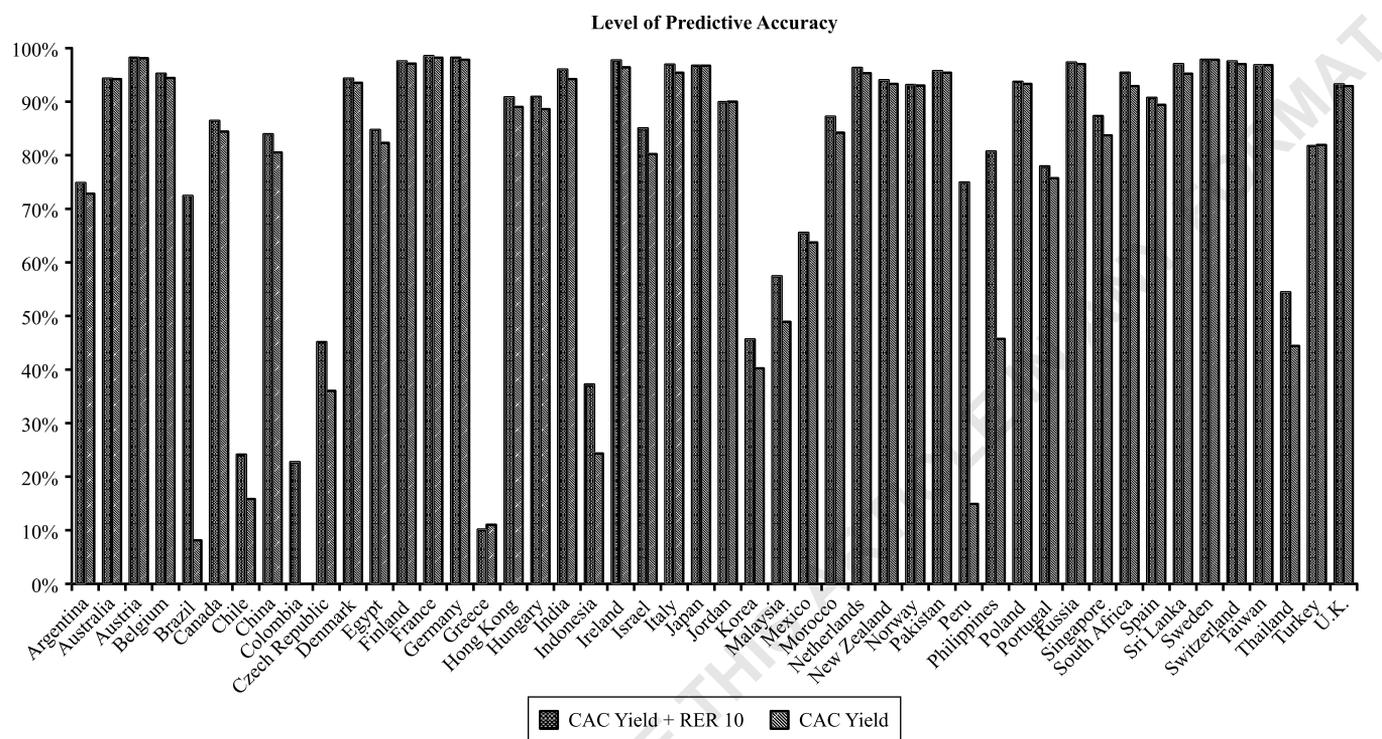
⁹Compound annual growth rate is popularly known in finance as CAGR.

¹⁰The standard form of the indexes used in this article covers 85% their total underlying market capitalization and captures only large-cap and mid-cap stocks.

¹¹Earnings yield history of Qatar and UAE starts only in June 2014.

EXHIBIT 1

Explanatory Power of CAC Yield Alone and CAC Yield and RER 10 Together in Predicting the Forward Six-Year Average Annual Real Returns for Countries in the MSCI All Country World Index ex USA



Notes: Returns are expressed in CAGR basis.

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

To develop an enhanced predictor of returns for emerging countries, we amended the CAC yield measure to include the effects of real exchange rate on the cyclically adjusted reported earnings that go into the computation of the measure. The rationale for introducing the real exchange rate is intuitive—export-oriented economies, both commodity and noncommodity based, depend on the relative price of export goods in the international market. The relative price of an exported good is a function of its native price and the exporting country's nominal exchange rate, inflation level, and its long-run productivity. The real exchange rate measure encapsulates these factors into a single measure.

For predictive purposes, we adopt the real exchange rate in the RER 10 form. RER 10 of a country is its real exchange rate divided by the trailing 10-year average of the real exchange rate.¹² The purpose of averaging the

real exchange rate over a 10-year period is to smooth out the volatility of nominal exchange rate over a full economic cycle, whereas adjusting the nominal exchange rate for inflation would help reflect the changes in the productivity of the country as well.

To improve the explanatory power of CAC yield so as to forecast more accurately successive six-year forward returns for commodity-based and export-oriented countries (most of which are classified as emerging markets by MSCI), we introduce the monthly time-series measure, RER 10,¹³ as an additional explanatory variable in the regressions. The historical real exchange rates used to compute the time-series RER 10 for the countries are expressed per unit of U.S. dollar. As we can see from the black bars in Exhibit 1, the variable RER 10 improves the R^2 values of the country regressions, by a significant margin for the emerging countries. In other

¹² The real exchange rate of a country is its nominal exchange rate adjusted for its inflation rate.

¹³ The CPI used to adjust the nominal exchange rates for inflation is based to 100 in 2010.

words, we find that CAC yield, when combined with RER 10, explains more accurately medium-term returns for emerging countries. Furthermore, the combination marginally improves the predictions for the developed countries. The significant advantage of the combined measure is shown by the greater height of the black bars over the gray bars in Exhibit 1 for almost all emerging countries. These measures together form the CAPE-equivalent measure that advisors have sought for evaluating the country markets outside the United States.

The individual ordinary least squares regression for each country, described earlier, that regresses a country's CAGR6 time series on CAC yield and RER 10 time series is what we term the *country yield forecasting mechanism*.¹⁴ As noted in the preceding discussion, CAGR6 is the compounded average annual growth rate of real returns over six successive years. To reflect its connotation truly, we have renamed the CAGR6 measure as the MCY forecast. The individual country regression or, otherwise, the country yield forecasting mechanism for any country in the MSCI All Country World Index ex. USA is formalized generically with mathematical notations as

$$(\text{MCY forecast})_{it} = A_i * (\text{CAC Yield})_{it} + B_i * \text{RER 10}_{it} + (\text{CAC Yield})\phi_i$$

(MCY forecast)_{it} = CAGR of real returns over successive six years for *i*th country at time period *t*.

(CAC Yield)_{it} = CAC yield of the *i*th country at time period *t*.

CAC Yield of a country is the ratio of its trailing 10-year average earnings divided by its price, all adjusted for inflation.

RER 10 of a country is the ratio of its real exchange rate divided by its 10-year average real exchange rate.

RER 10_{it} = RER 10 of the *i*th country at time period *t*.

(CAC Yield) ϕ_i = Residual country yield of the *i*th country at time period *t*.

A_i = yield coefficient of the *i*th country.

B_i = real exchange rate coefficient of *i*th country.

n = number of countries in the investment universe.

t = time period, monthly as in the end of the last trading day of a month.

i = *i*th country, $1 \leq i \leq n$.

¹⁴ Refer to footnote 2.

To be specific, for a given country with the given values of CAC yield and RER 10 at time period (outside the sample used to develop the model) t , the country yield forecasting mechanism for the country would generate its MCY forecast, the forecast compounded annual growth rate of its real equity returns over the successive six years from time t . Exhibit 2 reflects the regression coefficients and intercept of the country yield forecasting mechanisms for each country in the universe (see the Appendix for their robustness check as done at the end of 2016), and Exhibit 3 features the descriptive statistics of CAC yield, the main driver of the mechanism, for the same over the time period of 2006 through February 2016. So far, we have discussed the development of MCY forecast measure, the cornerstone of the country yield forecasting mechanism.

LOOKING AT THE MCY FORECAST

How can you get from the CAC yield and RER 10 to information that you can use to create country allocations? As described, we combine CACY and RER 10 in a simple model, called the country yield forecasting mechanism, to predict the compounded average annual real returns of a country (nominal returns adjusted for inflation) for six successive years, which we have designated as the MCY forecast.¹⁵

The actual versus forecast table (Exhibit 4) compares the countries' actual compounded average annual real returns for the period 2011–2017¹⁶ with the corresponding MCY forecasts made for the same period at the end of the calendar year 2010. As the exhibit shows, the accuracy of the forecasts is respectable enough that, for at least 75% of the countries, the forecast and actual returns coexist in the same quintile categories; for a significant number of the remaining countries, the actual and forecast values exist in quintile groups separated at most by one quintile group.¹⁷

We recommend using the rolling monthly values of each country's MCY forecast to assess the monthly trend of its average medium-term return expectations.

¹⁵ The MCY forecast, otherwise known as M-CY™, is always expressed in CAGR terms.

¹⁶ The actual returns are expressed in CAGR terms.

¹⁷ Disparities between MCY forecasts and actual CAGR returns may exist for some countries because the country yield forecasting mechanism is only a forecasting model. The forecasts need to be fine-tuned further to be used in constructing portfolios, and that treatment can be left entirely to a different discussion.

EXHIBIT 2

Coefficients and Residual Country Yield of Country Yield Forecasting Mechanisms by Country

	A	B	(CAC Yield)Ø	R ² with RER 10	R ² without RER 10
Argentina	3.31	0.13	-0.36	0.75	0.73
Australia	2.90	0.02	-0.18	0.94	0.94
Austria	1.99	-0.04	-0.19	0.98	0.98
Belgium	2.08	-0.17	-0.07	0.95	0.94
Brazil	0.37	0.39	-0.36	0.72	0.08
Canada	2.46	0.10	-0.18	0.86	0.84
Chile	2.89	0.18	-0.24	0.24	0.16
China	3.43	-0.13	-0.03	0.84	0.81
Colombia	2.04	0.22	-0.19	0.23	-0.01
Czech Republic	1.67	0.17	-0.25	0.45	0.36
Denmark	6.05	-0.12	-0.06	0.94	0.94
Egypt	3.81	0.10	-0.32	0.85	0.82
Finland	2.93	-0.08	-0.18	0.98	0.97
France	3.02	-0.06	-0.12	0.99	0.98
Germany	3.36	-0.06	-0.11	0.98	0.98
Greece	0.43	-0.07	-0.28	0.10	0.11
Hong Kong	3.02	0.08	-0.24	0.91	0.89
Hungary	1.25	0.10	-0.25	0.91	0.89
India	4.48	0.11	-0.27	0.96	0.94
Indonesia	0.77	0.39	-0.26	0.37	0.24
Ireland	1.51	-0.22	-0.10	0.98	0.96
Israel	5.85	0.09	-0.32	0.85	0.80
Italy	2.33	-0.13	-0.14	0.97	0.95
Japan	6.39	0.05	-0.25	0.97	0.97
Jordan	2.11	0.03	-0.27	0.90	0.90
Korea	2.64	-0.15	0.02	0.46	0.40
Malaysia	2.03	0.15	-0.19	0.57	0.49
Mexico	3.11	-0.09	0.01	0.66	0.64
Morocco	4.68	0.17	-0.39	0.87	0.84
Netherlands	2.70	-0.13	-0.09	0.96	0.95
New Zealand	2.95	-0.05	-0.16	0.94	0.93
Norway	1.90	0.04	-0.16	0.93	0.93
Pakistan	1.48	-0.11	-0.08	0.96	0.95
Peru	1.09	1.04	-0.92	0.75	0.15
Philippines	4.93	-0.33	0.15	0.81	0.46
Poland	2.45	-0.05	-0.14	0.94	0.93
Portugal	1.48	-0.08	-0.16	0.78	0.76
Russia	1.23	0.06	-0.25	0.97	0.97
Singapore	2.80	0.14	-0.28	0.87	0.84
South Africa	3.24	0.06	-0.17	0.95	0.93
Spain	2.96	-0.10	-0.14	0.91	0.89
Sri Lanka	1.75	-0.14	0.01	0.97	0.95
Sweden	3.95	-0.02	-0.13	0.98	0.98
Switzerland	3.90	-0.07	-0.10	0.98	0.97
Taiwan	3.35	-0.03	-0.14	0.97	0.97
Thailand	1.48	0.21	-0.15	0.54	0.44
Turkey	2.02	0.03	-0.14	0.82	0.82
U.K.	2.19	-0.03	-0.12	0.93	0.93

Notes: All countries reflected here are countries underlying MSCI's All Country World Index ex USA. Argentina, Jordan, Morocco, and Sri Lanka are no longer part of the index. Qatar and UAE have been excluded because of lack of sufficient history. Data run from December 2005 through February 2016.

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

EXHIBIT 3

Descriptive Statistics of CAC Yield by Country

	Mean	Median	Standard Deviation	Range	Minimum	Maximum
Australia	5.7%	6.0%	1.2%	4.3%	3.3%	7.6%
Austria	9.0%	10.4%	4.1%	12.3%	2.2%	14.6%
Belgium	9.4%	8.4%	4.1%	16.2%	4.9%	21.0%
Canada	4.7%	5.0%	1.0%	3.2%	3.1%	6.3%
Denmark	3.9%	3.8%	1.0%	4.4%	2.6%	7.1%
Finland	7.6%	7.6%	2.5%	9.1%	3.5%	12.6%
France	6.4%	6.8%	1.7%	6.1%	3.2%	9.3%
Germany	5.7%	5.9%	1.2%	5.9%	3.4%	9.3%
Hong Kong	5.3%	5.3%	1.0%	5.0%	3.2%	8.2%
Ireland	14.6%	12.9%	8.1%	25.7%	5.2%	30.8%
Israel	5.1%	4.6%	1.8%	6.3%	2.5%	8.8%
Italy	9.4%	9.9%	3.3%	12.2%	3.9%	16.1%
Japan	3.8%	4.3%	1.4%	5.0%	1.1%	6.1%
Netherlands	7.5%	7.3%	2.0%	9.0%	5.0%	14.1%
New Zealand	6.9%	6.9%	1.5%	5.1%	4.2%	9.3%
Norway	7.1%	7.8%	2.0%	7.2%	3.5%	10.8%
Portugal	10.0%	9.7%	3.2%	12.2%	5.1%	17.3%
Singapore	6.1%	6.5%	1.6%	6.4%	3.1%	9.5%
Spain	8.0%	8.3%	2.8%	12.0%	3.8%	15.8%
Sweden	5.0%	5.2%	1.1%	5.0%	3.0%	8.0%
Switzerland	4.8%	4.8%	1.0%	4.4%	3.1%	7.5%
U.K.	7.5%	7.8%	1.3%	5.2%	5.1%	10.3%
USA	5.0%	4.8%	0.9%	4.8%	3.8%	8.6%
Brazil	7.5%	7.2%	2.7%	11.5%	3.5%	15.0%
Chile	3.9%	3.4%	1.2%	4.3%	2.3%	6.5%
China	5.5%	5.7%	1.7%	8.1%	2.1%	10.2%
Colombia	3.3%	2.9%	1.2%	5.3%	1.8%	7.1%
Czech Republic	6.3%	6.0%	3.2%	11.4%	2.0%	13.3%
Egypt	6.5%	7.2%	3.1%	11.0%	1.6%	12.5%
Greece	26.7%	19.5%	22.8%	107.4%	3.9%	111.3%
Hungary	10.5%	11.2%	4.2%	14.6%	3.4%	18.0%
India	4.4%	4.6%	1.1%	4.2%	2.0%	6.3%
Indonesia	4.0%	4.1%	1.2%	5.2%	1.5%	6.7%
Korea	6.3%	6.3%	1.5%	5.6%	3.5%	9.2%
Malaysia	4.7%	4.8%	0.8%	3.4%	2.9%	6.3%
Mexico	4.1%	4.2%	0.7%	3.9%	2.6%	6.5%
Peru	4.7%	3.9%	2.3%	9.4%	1.7%	11.2%
Philippines	4.3%	4.2%	0.7%	3.2%	2.9%	6.1%
Poland	7.4%	8.0%	2.3%	8.6%	3.6%	12.1%
Russia	13.3%	13.8%	5.7%	18.6%	4.1%	22.7%
South Africa	5.1%	5.2%	0.7%	3.4%	3.6%	7.0%
Taiwan	5.3%	5.3%	1.0%	5.5%	3.6%	9.2%
Thailand	4.7%	5.6%	2.1%	6.8%	0.8%	7.6%
Turkey	7.5%	7.4%	2.0%	8.4%	3.9%	12.4%
Argentina	9.9%	6.3%	7.9%	25.7%	1.3%	27.0%
Jordan	7.4%	7.4%	3.5%	11.1%	1.9%	12.9%
Morocco	5.1%	4.4%	1.6%	5.5%	2.6%	8.1%
Pakistan	11.5%	12.1%	4.2%	19.5%	4.3%	23.8%
Sri Lanka	6.9%	6.0%	3.0%	16.8%	3.8%	20.6%

Notes: All countries reflected are those underlying MSCI's All Country World Index ex USA. Argentina, Jordan, Morocco, and Sri Lanka are no longer part the index anymore. Qatar and UAE have been excluded because of lack of sufficient history. Data run from December 2005 through February 2016.

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

EXHIBIT 4

Comparing Actual Returns versus MCY Forecasts (as of end of December 2010) by Country for the Forecast Period 2011–2016

	CACY as of 12/31/2010	RER 10 as of 12/31/2010	CY-M as of 12/31/2010 for the period 2011–2016	2011–2016 Actual CAGR Real Returns	CY-M as of 12/31/2010 Quintile Ranking	2011–2016 Actual CAGR Real Returns Quintile Ranking
Thailand	5.1%	0.77	6.3%	2.4%	1	2
Philippines	4.0%	0.77	9.8%	4.9%	1	1
New Zealand	8.6%	0.75	5.9%	6.2%	1	1
Japan	4.5%	0.84	7.0%	7.7%	1	1
Switzerland	5.3%	0.79	4.8%	4.7%	1	1
Denmark	3.8%	0.91	7.5%	9.0%	1	1
Ireland	24.8%	0.93	8.4%	13.2%	1	1
Belgium	12.1%	0.90	4.9%	9.5%	1	1
Indonesia	3.7%	0.73	3.9%	0.0%	2	3
Korea	5.2%	0.96	1.4%	-1.8%	2	3
Mexico	3.7%	0.99	3.6%	-0.2%	2	3
Spain	8.8%	0.87	1.1%	-1.1%	2	3
South Africa	5.3%	0.72	3.0%	1.6%	2	2
Sweden	4.5%	0.88	3.3%	3.9%	2	2
France	6.8%	0.92	2.5%	3.7%	2	2
Germany	5.5%	0.93	2.7%	4.5%	2	2
Netherlands	8.0%	0.93	2.0%	6.2%	2	1
Colombia	2.3%	0.76	0.5%	-7.6%	3	5
Turkey	6.1%	0.74	-1.1%	-5.4%	3	4
Malaysia	4.3%	0.84	1.0%	-2.0%	3	3
China	4.0%	0.82	-1.5%	-4.4%	3	4
Canada	4.4%	0.82	0.9%	0.8%	3	2
Norway	6.8%	0.87	0.1%	-1.2%	3	3
United Kingdom	7.4%	1.05	0.6%	1.1%	3	2
Australia	5.8%	0.67	0.4%	0.7%	3	3
Taiwan	4.5%	0.97	-0.9%	0.2%	3	3
Egypt	5.8%	0.71	-3.1%	0.6%	4	3
Poland	6.0%	0.86	-4.5%	-6.2%	4	5
Singapore	5.3%	0.80	-3.6%	-4.4%	4	4
India	3.7%	0.73	-2.6%	-3.4%	4	4
Hong Kong	4.3%	1.01	-1.9%	-2.5%	4	4
Italy	10.5%	0.91	-2.3%	-2.4%	4	4
Israel	4.0%	0.82	-2.4%	-5.6%	4	4
Hungary	9.7%	0.84	-3.1%	1.7%	4	2
Finland	7.8%	0.92	-1.8%	0.9%	4	2
Peru	2.5%	0.77	-9.5%	-9.3%	5	5
Chile	2.7%	0.76	-4.8%	-8.6%	5	5
Czech Republic	6.0%	0.75	-5.0%	-8.2%	5	5
Greece	20.1%	0.84	-28.4%	-28.5%	5	5
Russia	11.5%	0.69	-6.8%	-5.5%	5	4
Brazil	6.0%	0.60	-9.6%	-8.6%	5	5
Austria	8.0%	0.91	-6.8%	-4.8%	5	4
Portugal	8.4%	0.91	-10.0%	-9.2%	5	5

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

EXHIBIT 5

Tranching or Grouping of Countries in the MSCI All Country World Index ex USA

MSCI All Country World Index ex. USA			
Upper Tranche	Middle Tranche	Lower Tranche	
Australia Canada France Germany Hong Kong Italy Japan Netherlands Singapore Spain Sweden Switzerland United Kingdom	Brazil China India Korea Mexico Russia South Africa Taiwan	Austria Belgium Chile Colombia Denmark Egypt Finland Greece Indonesia Ireland Israel Malaysia New Zealand	Norway Pakistan Peru Philippines Poland Portugal Qatar Thailand Turkey UAE

Notes: Pakistan was added to the benchmark in June 2017.

Sources: BGA and MSCI Inc.

In addition, we calculate the number of countries in a group with upside values of the MCY forecast, which are above the average for the group, to arrive at the group diffusion index. A diffusion index created for a group of commodity-based countries, for example, would reveal the strength of its upside performance expectations. We refer to a grouping of countries, sectors, stocks, or other investable entities by investment or economic characteristics as *tranching*, the first pillar of our GCA framework (Radha [2016]). Exhibit 5 describes the three tranches—upper, middle, and lower—we have carved out of the countries underlying the MSCI All Country World Index ex. USA universe in our CCA model.

Two examples will explain the MCY forecast measure, as well as its applications in international investing. In Exhibit 6, we plot the trend of Brazil's MCY forecasts over time. Along the bottom of the chart, the time periods advance on a monthly basis and the dates reflect the starting points of six-year forecast time horizons; the dates along the top reflect their respective end-points. Beginning in September 2011, MCY forecasts began to turn higher and carried that momentum until early 2016. This indicated that Brazil's return prospects would begin improving in mid-to-late 2017 and continue into early 2021.

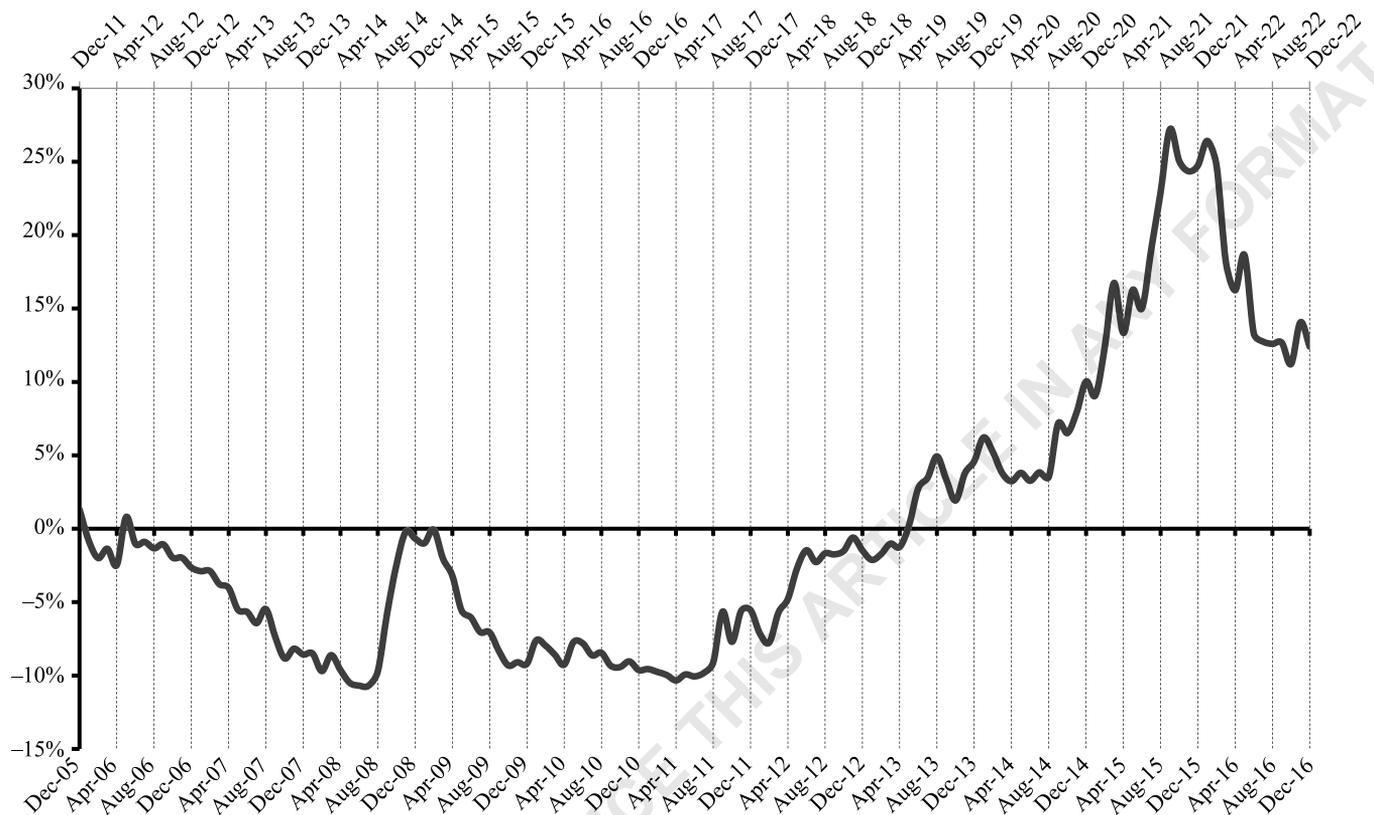
Exhibit 7 shows the diffusion index of the commodity-based and export-oriented countries that make up the middle tranche, of which (thick black line) Brazil is a part. It plots the three-month moving average of the diffusion index and depicts the average strength of the upside performance expectations of the middle tranche. Along the bottom of the chart, the time periods are advanced on a monthly basis, and the dates reflect the starting points of six-year forecast time horizons; the dates along the top reflect their respective end points. The index began to rise from the lows in December 2010 to the strength recorded currently. Looking at the top of the chart for the corresponding six-year forward dates gives a sense of when this group of markets was expected to begin showing strength, which was around late 2016. As of November of 2016, all countries in this group, barring Mexico, had posted ample gains on a year-to-date basis.

Let us summarize the characteristics of MCY forecast and what function they perform for the GCA framework and the country yield forecasting mechanism:

1. The MCY forecast is always expressed on a CAGR basis.
2. The MCY forecast is more a comparative measure and less a specific point-in-time forecast measure.

EXHIBIT 6

MCY Forecast Predicts Improved Outlook for Brazil in the Next Five Years



Notes: The vertical lines indicate the forecast horizons, starting from the dates listed on the x-axis at the bottom and ending on the dates listed on the x-axis at the top. Real returns are nominal returns adjusted for inflation. Data through December 2016.

Sources: BGA calculations, MSCI, and IMF.

Therefore, it is used in our GCA framework to compare the average forward six-year real returns expectations of a country to that of the other countries in the universe at a given point in time. Given the efficacy of the measure, it is appropriate to use the measure to rank the countries on a relative basis.

3. As outlined earlier, we use the MCY forecast measure to rank countries in our investment universe on a relative basis to group them into quintiles. Quintile one accommodates countries having the highest MCY forecasts, and quintile five accommodates countries having the lowest MCY forecasts. The countries occupying the first two quintiles are expected to perform exceptionally well for the next six years.
4. MCY forecast is a real (adjusted for inflation) measure, and if the average inflation projection for the

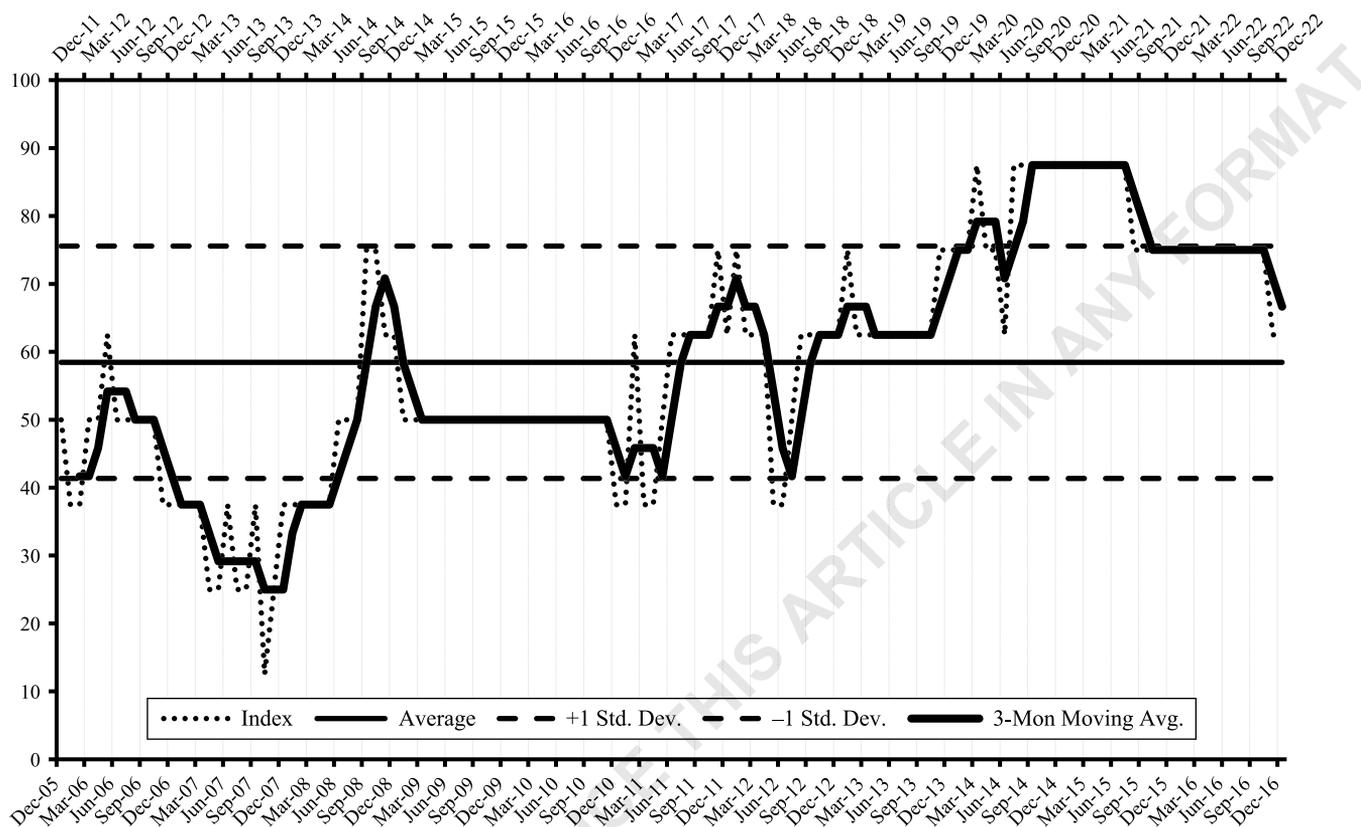
forecast period is added to it, then the measure for the nominal equity return expectations can be obtained as well.

5. The rolling monthly MCY forecast values of a country are used to assess the trend of the monthly average compounded equity-return expectations of that country over six-year periods—that is, if the return expectations of a country are rising, declining, or flat.
6. By averaging the MCY forecasts of the countries in a tranche, we can obtain the MCY forecast for the overall tranche. Likewise, the MCY forecast can be derived for all the tranches in the GCA model¹⁸—upper, middle, and lower.

¹⁸ The GCA model referred to in the article is otherwise called the G-CAM™.

EXHIBIT 7

Diffusion Index—Middle Tranche



Notes: Data through December 2016. Middle tranche is composed of Brazil, China, India, Korea, Mexico, Russia, South Africa, and Taiwan.

Sources: BGA calculations, MSCI, and IMF.

7. By determining the number of countries in a tranche that have a positive MCY forecast and are greater in magnitude than the absolute average of MCY forecasts of the countries underlying the tranche, we arrive at a diffusion index for the tranche. The index reveals the strength of the positive return expectations of a tranche at a given point in time. Thereby, we would have three diffusions indexes, published monthly, one for each tranche.

IRELAND

An example will help further elucidate the characteristics and functions of the MCY forecast and the support it offers to the GCA framework. Let us look at Exhibit 8, which plots the trend of Ireland's MCY forecasts over time. Along the bottom of the chart, the time periods advance on a monthly basis, and the dates

reflect the starting points of six-year forecast time horizons; the dates along the top reflect their respective end-points. The vertical grid lines in the chart link together the ends of forecast horizon periods. Any point on the line chart is the real average compound return forecast for the next six years starting from the date listed on the bottom of the grid line and ending on the date listed on the top of the grid line. One can see the rising trend of MCY forecasts since the middle of June 2006 through December 2008, which should largely translate to strong equity performance for Ireland generally from June 2012 through December 2014. Although the trend has stalled since December 2008, Ireland remained in positive territory until December 2011. Therefore, we would expect Ireland to deliver positive real returns from 2014 through 2016. After 2011, Ireland's CY-M has hovered in the negative territory, and therefore, we should expect subpar returns from Ireland for the remaining years of

EXHIBIT 8 MCY Forecast, Ireland



Notes: Data run through December 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.

Sources: BGA calculations, MSCI, and IMF.

this decade. As of June 30, 2017, MSCI Ireland has returned 76.60% in U.S. dollars on a gross basis for the trailing six years, confirming the robust forecast derived from the trend of MCY forecast values over the period June 2006 through December 2011.

To summarize, this chart depicts the rolling forward compounded average equity-performance expectations (across six-year intervals) of Ireland on an inflation-adjusted basis, giving investors a broad strategic cue on medium-term allocations to Ireland in their international equity portfolios. This illustrative outline helps us understand how to frame expectations through an MCY forecast at the country level. Moreover, it aids the reconciliation of the short-term country-level expectations, divulged by our periodic GCA model country allocation

recommendations, and the medium-term expectations delivered by the country yield forecasting mechanisms through the MCY forecast measures of the countries. This reconciliation is one of the most critical active elements of our enhanced index approach.

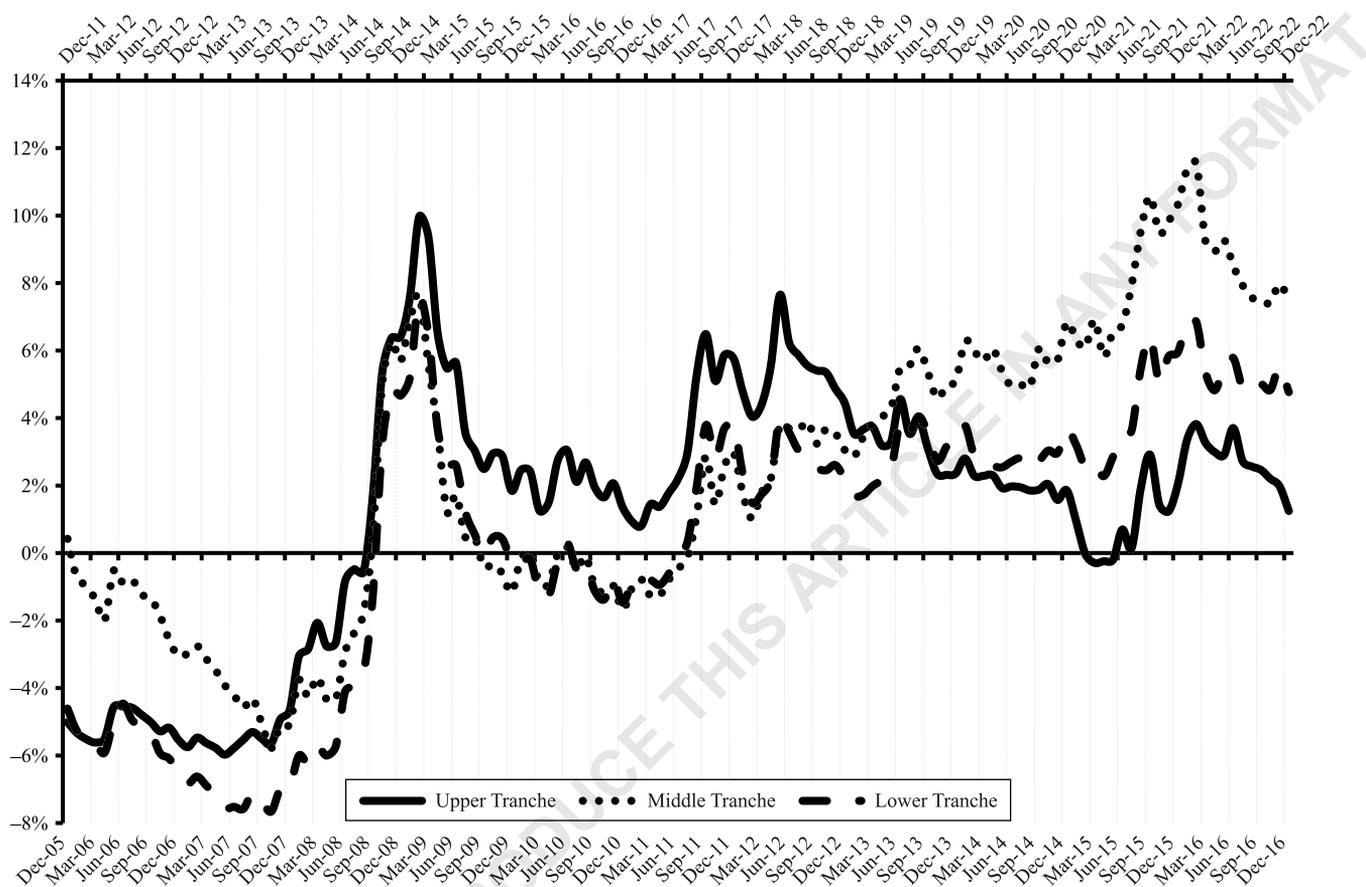
The medium-term country yield forecast charts like Exhibit 8 for all the countries in our universe can be accessed online in the supplementary section.

MCY FORECAST FOR THE TRANCHES

Exhibit 9 charts the MCY forecast for all the tranches outlined in GCA model. The MCY forecast of a tranche is the simple average of the medium-term country forecasts of the countries underlying the

EXHIBIT 9

Average of MCY Forecasts of Countries under Each Tranche—Upper Tranche, Middle Tranche, and Lower Tranche



Note: Data run through December 2016.

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

tranche, and it depicts, at a given point in time, the average performance expectations of these countries over the six successive years. As shown in this chart, the trend of the MCY forecast of the upper tranche, identified by the thick black line, predicts robust years of performance from 2012 through 2013 and many years of underperformance for the rest of this decade. The predictions unveiled for 2012 and 2013 have been confirmed by the outstanding returns delivered in those years by MSCI World Index ex. USA. So far in this decade, 2012 and 2013 have been the only years in which the index has delivered remarkable returns.

This illustrative outline of the application of an MCY forecast on the tranches helps frame expectations at the tranche level and aids establishing the

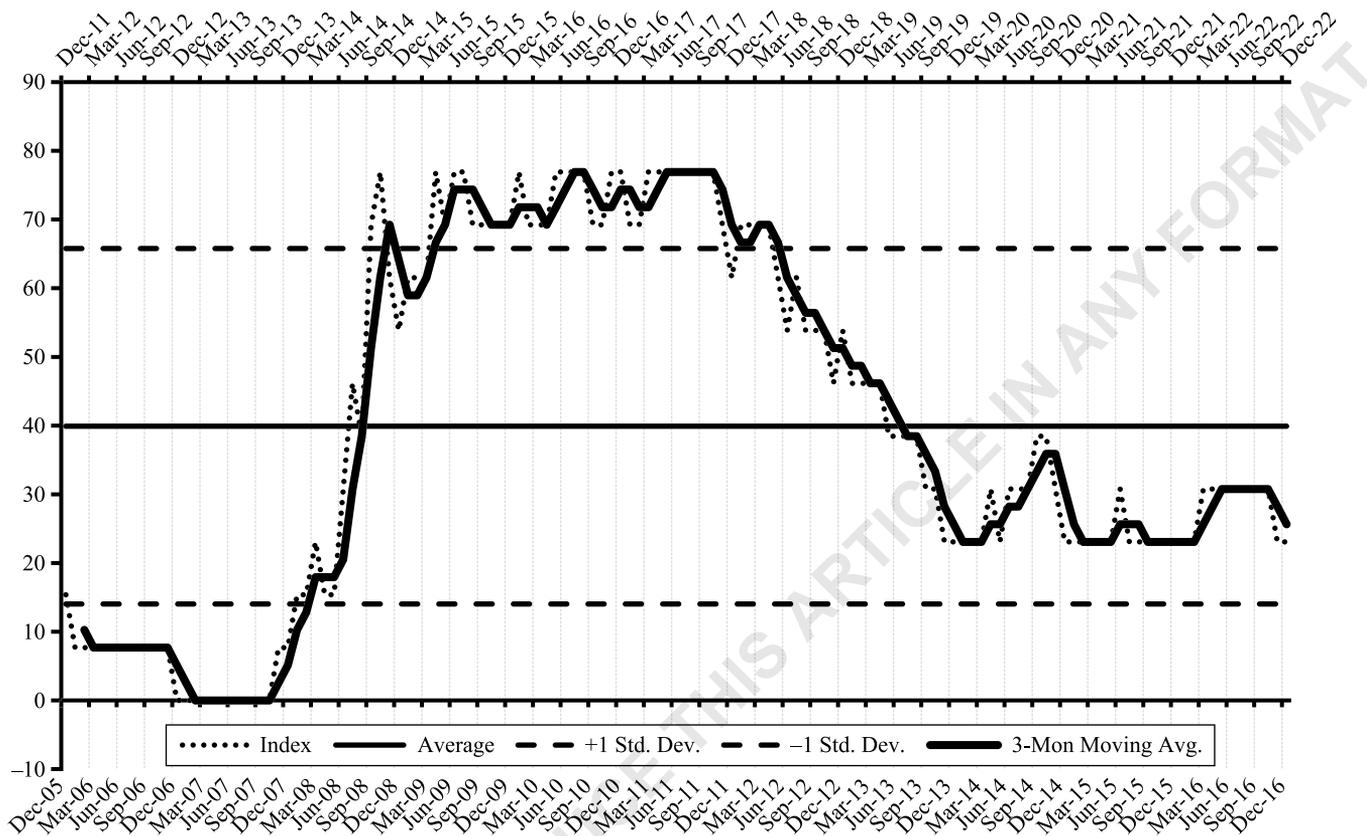
tranche weights, which is a critical input component that feeds into the GCA model. Establishing tranche weights is another element of the active component of our enhanced index approach. The chart reveals that the middle tranche (the dotted black line) is going to be the best performer in the coming years of this decade, followed by the lower tranche (the dashed black line).

DIFFUSION INDEXES FOR THE TRANCHES

The final application of MCY forecast is to determine the number of countries underlying a tranche whose MCY forecast values are positive and above the MCY forecast for the entire tranche to arrive at

EXHIBIT 10

Diffusion Index—Upper Tranche



Notes: Data through December 2016. The upper tranche is composed of Australia, Canada, France, Germany, Hong Kong, Italy, Japan, Netherlands, Singapore, Spain, Sweden, Switzerland, and the United Kingdom.

Sources: BGA calculations, MSCI, and IMF.

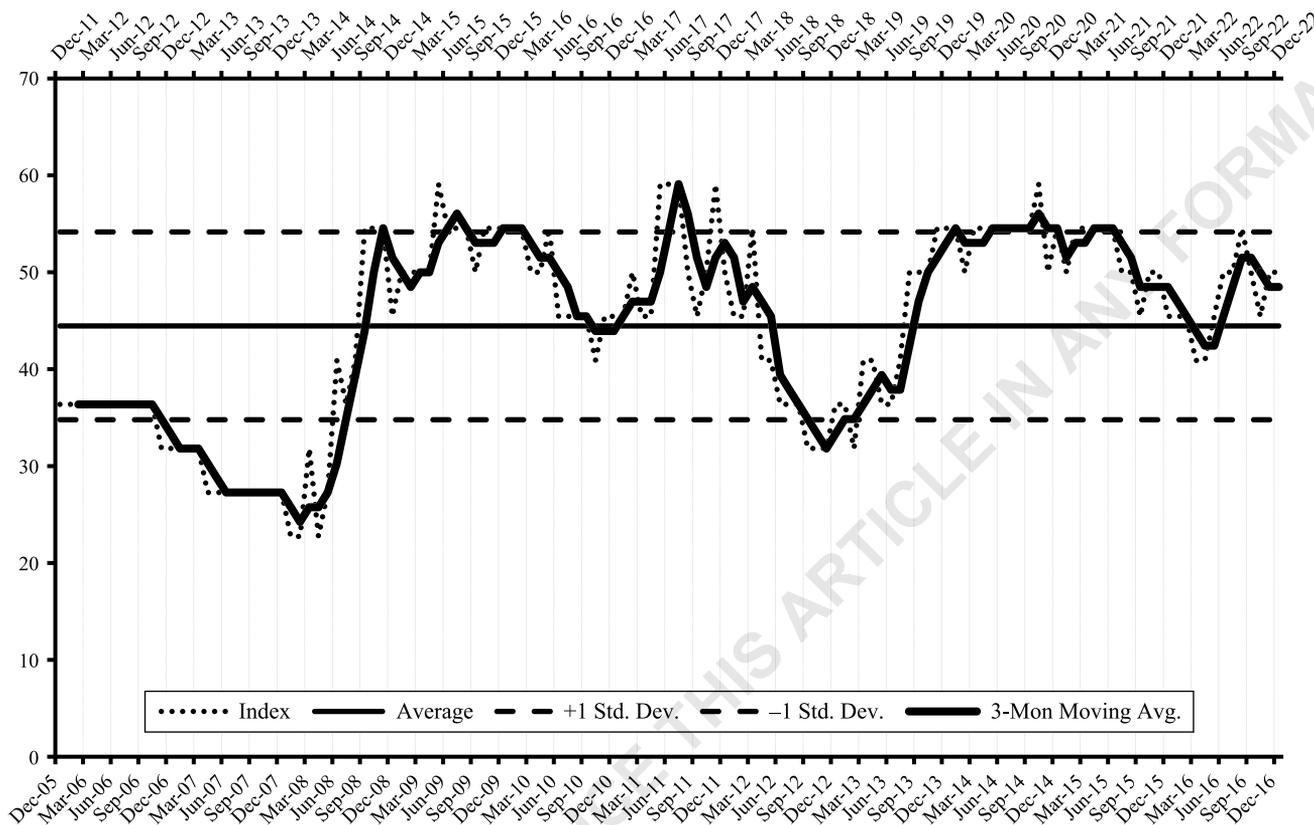
a diffusion index for the tranche. The diffusion index emphasizes the strength of the above-average positive return expectations of each tranche over the next six years at a given point in time. As expected, we have developed three diffusion indexes, one each for the three of the tranches—upper tranche diffusion index, middle tranche diffusion index, and lower tranche diffusion index. These indexes are reflected in Exhibits 10, 7, and 11, respectively. Let us take the example of the upper tranche chart in Exhibit 10: The dotted black line is the actual diffusion index, and the thick black line is the three-month moving average trend of the index. The horizontal black line is the trailing 120-month average of the diffusion index spread across 10 full calendar years, while the horizontal dashed black lines are $+1/-1\sigma$ band lines, with σ being the trailing 120-month

(nonannualized) volatility of the index spread across 10 full calendar years. When comparing the three exhibits, one can clearly discern that the diffusion indexes do point to a relatively better performance of the upper tranche from 2014 through 2016. Comparative analysis of the diffusion indexes is another mechanism for establishing tranche weights of the GCA model.

Exhibit 12 is a snapshot of the MCY forecasts of the countries in the GCA model as of the end of 2016, ranked by their performance expectations over the next six years. As can be seen, more countries from the middle and lower tranches are in the upper half of the table, pointing decisively to better performance expectations from these tranches in the next six years. The previously mentioned implementations of MCY forecasts and the diffusion indexes, which together form

EXHIBIT 11

Diffusion Index—Lower Tranche



Notes: Data through December 2016. The middle tranche is composed of Austria, Belgium, Chile, Columbia, Denmark, Egypt, Finland, Greece, Indonesia, Ireland, Israel, Malaysia, New Zealand, Norway, Peru, Philippines, Poland, Portugal, Thailand, and Turkey.

Sources: BGA calculations, MSCI, and IMF.

the country yield forecast mechanism, shape the active component of our enhanced index approach.

CONCLUSION

With the recent proliferation of single-country exchange-traded funds (ETFs), country selection has become more important for advisors and retail investors because it allows them to express their international market views just through country outlooks, without getting bogged down in selecting individual stocks. Single-country ETFs are nothing but baskets of equity securities passively tracking their respective country indexes. Single-country ETFs afford easy, cost-effective, modular access to international country markets.

Now let's look at how advisors can use MCY forecast for selecting countries in their international portfolios. Exhibit 12 lists the MCY forecasts for all the countries¹⁹ in the MSCI ex-USA benchmark as of the end of the calendar year 2016. We rank the countries in descending order of MCY forecast and then categorize them on a quintile basis. We recommend choosing the countries in the upper quintiles one and two and then allocating to them equally. Alternatively, advisors may allocate to the countries in proportion to their percentile ranking, with higher percentile countries receiving higher weights in the portfolio. At the end of 2016, advisors using the quintile approach would have chosen exposures to Colombia, Peru, Israel, Indonesia, Chile,

¹⁹ Qatar and UAE are excluded due to limited data history.

EXHIBIT 12

MCY Forecast as of End of December 2016 for the Period 2017–2022

	CACY as of 12/31/2010	RER 10 as of 12/31/2010	CY-M as of 12/31/2010 for the period 2011–2016	2011–2016 Actual CAGR Real Returns	CY-M as of 12/31/2010 Quintile Ranking	2011–2016 Actual CAGR Real Returns Quintile Ranking
Thailand	5.1%	0.77	6.3%	2.4%	1	2
Philippines	4.0%	0.77	9.8%	4.9%	1	1
New Zealand	8.6%	0.75	5.9%	6.2%	1	1
Japan	4.5%	0.84	7.0%	7.7%	1	1
Switzerland	5.3%	0.79	4.8%	4.7%	1	1
Denmark	3.8%	0.91	7.5%	9.0%	1	1
Ireland	24.8%	0.93	8.4%	13.2%	1	1
Belgium	12.1%	0.90	4.9%	9.5%	1	1
Indonesia	3.7%	0.73	3.9%	0.0%	2	3
Korea	5.2%	0.96	1.4%	-1.8%	2	3
Mexico	3.7%	0.99	3.6%	-0.2%	2	3
Spain	8.8%	0.87	1.1%	-1.1%	2	3
South Africa	5.3%	0.72	3.0%	1.6%	2	2
Sweden	4.5%	0.88	3.3%	3.9%	2	2
France	6.8%	0.92	2.5%	3.7%	2	2
Germany	5.5%	0.93	2.7%	4.5%	2	2
Netherlands	8.0%	0.93	2.0%	6.2%	2	1
Colombia	2.3%	0.76	0.5%	-7.6%	3	5
Turkey	6.1%	0.74	-1.1%	-5.4%	3	4
Malaysia	4.3%	0.84	1.0%	-2.0%	3	3
China	4.0%	0.82	-1.5%	-4.4%	3	4
Canada	4.4%	0.82	0.9%	0.8%	3	2
Norway	6.8%	0.87	0.1%	-1.2%	3	3
United Kingdom	7.4%	1.05	0.6%	1.1%	3	2
Australia	5.8%	0.67	0.4%	0.7%	3	3
Taiwan	4.5%	0.97	-0.9%	0.2%	3	3
Egypt	5.8%	0.71	-3.1%	0.6%	4	3
Poland	6.0%	0.86	-4.5%	-6.2%	4	5
Singapore	5.3%	0.80	-3.6%	-4.4%	4	4
India	3.7%	0.73	-2.6%	-3.4%	4	4
Hong Kong	4.3%	1.01	-1.9%	-2.5%	4	4
Italy	10.5%	0.91	-2.3%	-2.4%	4	4
Israel	4.0%	0.82	-2.4%	-5.6%	4	4
Hungary	9.7%	0.84	-3.1%	1.7%	4	2
Finland	7.8%	0.92	-1.8%	0.9%	4	2
Peru	2.5%	0.77	-9.5%	-9.3%	5	5
Chile	2.7%	0.76	-4.8%	-8.6%	5	5
Czech Republic	6.0%	0.75	-5.0%	-8.2%	5	5
Greece	20.1%	0.84	-28.4%	-28.5%	5	5
Russia	11.5%	0.69	-6.8%	-5.5%	5	4
Brazil	6.0%	0.60	-9.6%	-8.6%	5	5
Austria	8.0%	0.91	-6.8%	-4.8%	5	4
Portugal	8.4%	0.91	-10.0%	-9.2%	5	5

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

Thailand, Malaysia, China, Brazil, Singapore, India, Turkey, Japan, South Africa, Egypt, and Korea.

The method of country selection using the MCY forecast is very simple, and therefore, advisors can easily implement it effortlessly. Also, because the MCY forecast measure is a slow-moving indicator, users may track it quarterly rather than daily. It also limits turnover of

countries in international portfolios. Another advantage is that this approach can be implemented inexpensively using single-country ETFs to create international portfolios. This may make it particularly appropriate for use with low-net-worth clients, primarily millennials, who are eager to obtain low-cost international equity exposure.

APPENDIX

EXHIBIT A1

Robustness Check of Coefficients and Residual Country Yield of Country-Yield-Forecasting Mechanisms

	A	t-stat	B	t-stat	(CAC Yield)Ø	t-stat	Adjusted R ²
Argentina	3.696	8.550	0.111	1.497	-0.349	-3.627	0.717
Australia	3.185	42.445	-0.030	-3.002	-0.145	-17.902	0.979
Austria	1.904	41.179	-0.052	-2.277	-0.177	-8.902	0.979
Belgium	1.799	38.844	-0.155	-4.450	-0.066	-2.139	0.98
Brazil	1.913	6.376	0.226	6.295	-0.309	-9.781	0.665
Canada	3.706	27.564	-0.040	-1.780	-0.108	-6.476	0.957
Chile	4.288	4.593	0.128	2.284	-0.224	-4.156	0.419
China	3.306	24.998	-0.207	-6.910	0.047	1.625	0.942
Colombia	1.904	3.553	0.027	1.085	-0.003	-0.110	0.231
Czech Republic	3.687	9.753	0.194	4.150	-0.315	-8.498	0.708
Denmark	5.137	33.273	-0.108	-3.529	-0.042	-1.529	0.968
Egypt	4.115	18.394	0.055	2.018	-0.282	-8.615	0.936
Finland	2.730	31.731	-0.130	-4.836	-0.120	-4.692	0.971
France	2.939	41.453	-0.052	-2.549	-0.127	-6.635	0.982
Germany	3.226	41.390	-0.056	-3.010	-0.103	-5.751	0.982
Greece	1.032	11.039	-0.245	-5.915	-0.162	-4.688	0.814
Hong Kong	2.746	25.382	-0.087	-2.635	-0.021	-0.505	0.964
Hungary	1.235	26.894	0.114	4.592	-0.263	-14.263	0.955
India	4.780	37.703	0.080	4.215	-0.251	-14.693	0.975
Indonesia	4.154	11.128	0.084	1.146	-0.098	-1.848	0.834
Ireland	1.308	33.416	-0.299	-6.920	-0.031	-0.878	0.974
Israel	6.143	12.572	0.117	4.101	-0.365	-8.673	0.841
Italy	2.247	26.958	-0.092	-2.776	-0.167	-5.651	0.957
Japan	6.307	21.219	0.061	1.360	-0.255	-4.655	0.952
Jordan	2.154	9.006	0.028	0.669	-0.268	-5.878	0.775
Korea	1.458	5.024	0.014	0.346	-0.057	-2.343	0.665
Malaysia	3.044	28.899	0.041	2.790	-0.113	-7.727	0.956
Mexico	3.020	11.352	-0.174	-3.109	0.103	1.913	0.765
Morocco	5.557	15.739	0.060	1.511	-0.322	-12.253	0.953
Netherlands	2.449	43.283	-0.123	-4.909	-0.085	-3.846	0.98
New Zealand	3.195	26.120	-0.115	-4.966	-0.124	-6.983	0.947
Norway	2.131	32.401	-0.040	-1.932	-0.100	-5.574	0.964
Pakistan	1.536	38.866	-0.274	-6.876	0.072	1.906	0.975
Peru	5.358	7.760	0.774	6.932	-0.871	-7.498	0.682
Philippines	4.700	14.710	-0.318	-10.266	0.158	5.649	0.866
Poland	2.336	40.654	-0.072	-4.904	-0.116	-9.250	0.981

(continued)

EXHIBIT A1 (continued)

Robustness Check of Coefficients and Residual Country Yield of Country-Yield-Forecasting Mechanisms

	A	t-stat	B	t-stat	(CAC Yield)Ø	t-stat	Adjusted R ²
Portugal	1.417	11.954	-0.059	-1.817	-0.163	-5.675	0.797
Russia	1.318	34.863	0.065	3.048	-0.258	-17.660	0.97
Singapore	2.867	35.101	0.061	3.450	-0.207	-10.658	0.973
South Africa	3.782	36.962	0.013	1.065	-0.153	-16.517	0.98
Spain	2.962	21.356	-0.090	-2.767	-0.150	-5.290	0.929
Sri Lanka	1.588	18.054	-0.181	-5.017	0.057	1.516	0.976
Sweden	3.863	46.619	-0.015	-0.865	-0.129	-7.519	0.983
Switzerland	3.722	33.690	-0.093	-4.152	-0.076	-3.312	0.976
Taiwan	3.201	40.780	-0.106	-3.307	-0.044	-1.214	0.981
Thailand	2.230	12.464	0.010	0.249	0.015	0.405	0.804
Turkey	2.196	17.119	0.095	1.978	-0.193	-5.428	0.883
U.K.	2.303	39.642	-0.054	-3.837	-0.107	-8.843	0.979

Notes: All countries reflected here are countries underlying MSCI's All Country World Index ex USA. Argentina, Jordan, Morocco, and Sri Lanka are no longer part of the index. Qatar and UAE have been excluded because of lack of sufficient history. Data run from December 2005 through December 2016.

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

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