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Emerging and Frontier
Market Equities as Asset Class(es)

MARCH 2014 | JEFFREY N. SARET

Two Sigma Investments | Two Sigma Advisers

www.twosigma.com

ABSTRACT   Relative to developed markets, developing (emerging and frontier) markets have enjoyed 4.2x higher economic growth and 40% better equity returns over the past decade.[1] Many economic forecasters still expect these developing markets to continue to grow faster than developed markets over the next decade, albeit with a smaller growth multiplier. Nevertheless, this paper warns investors to apply a healthy dose of caution when allocating capital to developing market equities. Historically, returns from investing in less developed economies have come from two sources – compensation for currency risk and unexpectedly high growth rates. Given the role that monetary policy plays in determining exchange rates, and the (arguably) elevated expectations (5+% per year) for developing world growth rates, these two sources of returns may become difficult to forecast and potentially illusory. In addition, the diversification benefits from investing in emerging markets have declined over time, likely due in part to greater global integration of companies' input and output markets. On net, it seems that the portfolio benefits – in terms of both expected return and risk diversification – from investing in emerging and frontier market equities have diminished but not evaporated over time.

Imagine an old-time stock broker who claimed to know with certainty that a hypothetical consumer electronics company named "Pear" would soon launch a new gadget capable of revolutionizing an entire product category. Sales on the gadget would remain high, and Pear could expect stronger growth than the rest of the industry for the foreseeable future. In fact, based on the revenue growth from Pear's previous product launches, Pear might soon constitute one of the highest revenue companies in the world.

The stock broker calls a client with this information and strongly urges the client to buy shares of Pear. Most savvy investors, including many institutional investors, would naturally remain skeptical. At the very least, the investor would ponder five questions: (a) What is the level of confidence in the growth forecast? (b) Will revenue growth translate into incremental returns? (c) What were the historical return drivers, and will they persist? (d) How correlated will the future Pear returns be relative to the rest of my portfolio? and (e) What incremental benefit will allocating more to Pear provide for my overall portfolio?

While these five questions may appear obvious when talking about individual equities like Pear, otherwise sophisticated market commentators and participants frequently ignore the issues (at least in their public comments) when discussing investments in emerging and frontier markets.[2] For example, the Economist noted that, "African stock markets have been hot this year in part because of growing interest from rich-world investors who want exposure to the continent's

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[1] Developed market equity returns based on MSCI World. Emerging and frontier market indices refer to the MSCI EM and MSCI FM indices, respectively. Economic growth data based on IMF October 2013 World Economic Outlook (IMF, 2013) as well as the January 2014 World Economic Outlook Update (IMF, 2014).

[2] In academic and industry literature, the definitions of "developed," "developing," "emerging," and "frontier" markets remain somewhat arbitrary. Some group all developed markets into one category and developing markets into another without distinguishing between markets such as South Korea, where the World Bank estimates real GDP per capita was $30,801 in 2012, and Vietnam, which had GDP per capita of only $3,635. This paper applies the MSCI standards for "developed," "emerging," and "frontier" markets. For expositional simplicity, this paper occasionally employs the term "developing" market as a superset that includes both "emerging" and "frontier" markets when distinguishing between the types of markets is unnecessary. Market classifications based on the MSCI's April 2013 definitions (http://www.msci.com/products/indices/market classification.html).

fast-growing economies."[3] The chair of one of Canada's largest public pensions argued that higher growth in emerging markets justifies a larger exposure: "We better get used to two-thirds of the world's growth coming from those economies. We don't, unfortunately, have a large weighting in the emerging countries."[4] The head of a large, public pension fund association in Japan noted, "After considering the fact that emerging markets now make up a greater share of global GDP and, given their high growth, [emerging markets] can be expected to give good returns."[5] It is difficult to know whether these comments suggest tactical bets or policy shifts in an overall strategic asset allocation, but, in either case, they seem akin to the "Pear" analogy. Some asset owners justify their investments in emerging and frontier markets based (in part) on high expected GDP growth rates in those markets.

This justification may stem from a post hoc, ergo propter hoc mindset. Figure 1 plots GDP growth and equity index returns for developing (i.e., emerging and frontier) and developed markets. Between 2000 and 2013, developing markets grew 6.0% per year (compound annual growth rate) while developed markets grew 1.8% per year (IMF, 2013). Over the same period, a market-cap weighted, combined index of emerging and frontier markets (MXEF and MXFM) generated 5.5% returns while a developed market equity index (MXWO) generated a 1.2% return.[6]
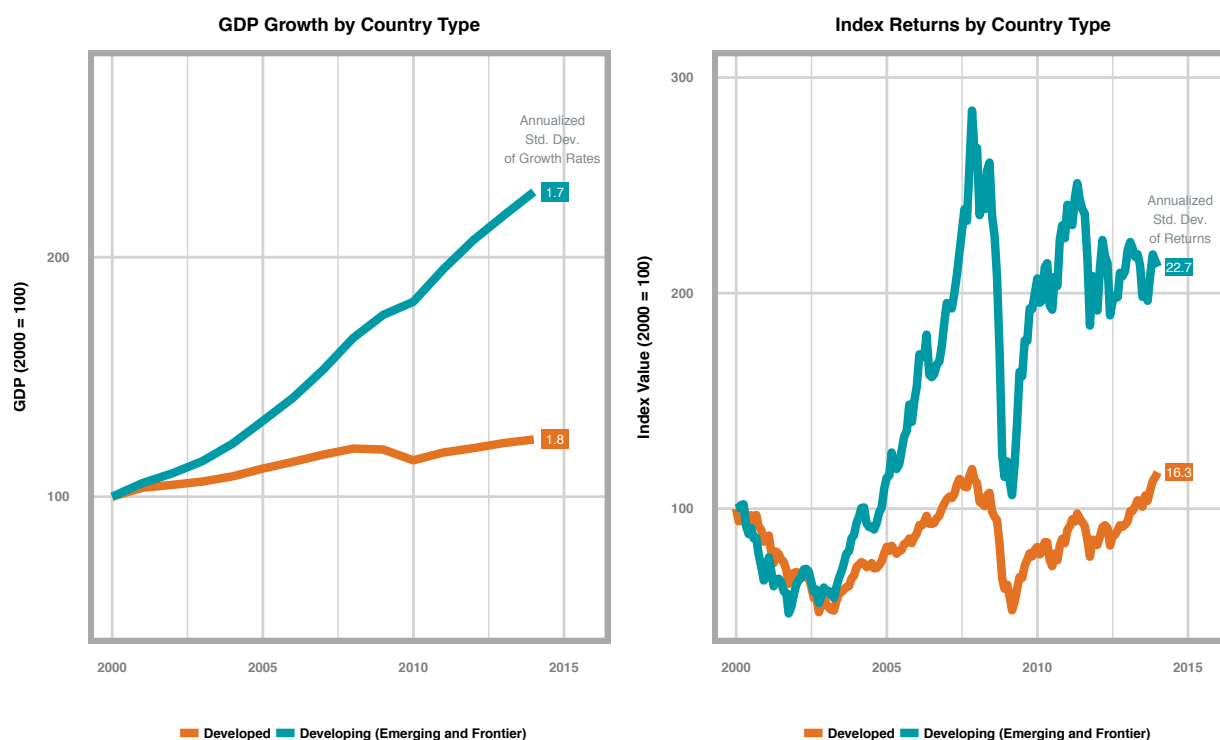

Figure 1 GDP Growth and Index Returns
GDP data from (IMF, 2013). GDP for 2013 estimated in October, 2013.
Emerging and frontier market index returns based on market cap weighted combination of MSCI Emerging Market Index (MXEF)
and MSCI Frontier Market Index (MXFM).

3 "Stockbroking in Africa: The day after the fall." August 17, 2013. http://www.economist.com/news/financeand-economics/21583649-trading-equities-old-fashioned-way-day-after-fall

4 http://www.benefitscanada.com/investments/global-investments/attitude-toward-emerging-markets-needs-tochange-28894

5 http://blogs.wsj.com/moneybeat/2013/09/11/japans-public-servants-turn-to-emerging-markets/

6 The higher return stream for emerging market equities came in part at the cost of 1.4 times greater volatility.

Yet as many market participants can attest, correlation does not prove causation. Instead, a careful decomposition of the drivers of historical and expected returns offers more valuable insights. This holds true for individual companies like Pear as well as country or regional market indices. In fact, the same five questions outlined above that an investor might ask the stock broker peddling tips about Pear applies to investing in emerging or frontier markets.

This paper seeks to address these five questions in the context of emerging and frontier market equity investing. Section I addresses the confidence in economic growth forecasts. For a two year forecast horizon, forecasts made by private sector economists seem to be statistically significant predictors of future GDP growth. Economic forecasts over a long time horizon, such as the 5-10 year horizons that many asset allocators consider, are more difficult to find. One source of data is the IMF, which began publishing its long-term GDP forecasts by country beginning in April 2008. The evidence from that data suggests that longer-term economic forecasts are noisier but not without some predictive value.

Accurately forecasting GDP growth is valuable to investors only insofar as growth translates into superior risk-adjusted portfolio returns. The remainder of the paper focuses on how GDP growth contributes to the asset allocation decision, and why investing in Pear-like markets (i.e., high growth economies) may not add much value to a portfolio. Section II seeks to dispel the commonly held myth that economies with faster GDP growth tend to generate higher equity returns. Section III delineates the sources of emerging market equity returns and shows that the majority of excess returns compensated investors for growth shocks (i.e., unexpectedly high growth) and currency risk. Section IV shows that the correlation of returns for large, publicly listed corporations in both developed and developing markets have increased over the past two decades. This is likely due to the increase in their cross-regional input and output markets (i.e., international trade). The final section summarizes the implications for investors and argues that emerging market equities still belong in a well-diversified portfolio, provided that the expected benefits from allocating to emerging and frontier market equities remain modest.

I. GDP is (somewhat) forecastable, at least over short horizons

Formulating accurate expectations about GDP growth rates often proves challenging. An old joke compares economic forecasters to broken clocks that accurately display the time exactly twice per day.[7] Perhaps a more appropriate modern joke would claim that economic forecasters are only approximately right twice per day, subject to the standard error of the forecast as well as future revisions that may occur several days after the hour in question.

The dismal science's dismal reputation for forecasting may be unjustified. Many remember large errors, such as the prominent, twentieth century economist Irving Fischer's sanguine forecast in 1929 of a "permanently high plateau" for equity prices and the overall economy just three days before the stock market crash that marked the beginning of the Great Depression. However, more run-of-the-mill forecasts that reflect consensus values tend to garner less attention but prove more accurate (Laster, Bennett and Geoum, 1999). In fact, aggregating economists' forecasts seems to create a "wisdom of crowds" perspective (Denrell and Fang, 2010).

A. Near-term economic forecasts have been relatively accurate

Numerous tests of varying complexity and robustness exist to evaluate the accuracy of macroeconomic forecasts, particularly over near-term forecast horizons. For the sake of simplicity, this paper focuses on a panel regression in which the dependent variable is annual real GDP in country *i* during year *t* (*Real GDP Growth$_{it}$*). Equation 1 codifies this simple model.

Equation 1

$$Real\ GDP\ Growth_{it} = \beta_0 Constant + \beta_1 Real\ GDP\ Growth_{i,t-1} + \beta_2 Real\ GDP\ Growth_{i,t-2} +$$

$$\beta_3 Real\ GDP\ Growth\ Forecast_{it}^{t-2} + \varepsilon_{it}$$

The independent variables include one-(*Real GDP Growth$_{it-1}$*) and two-year (*Real GDP Growth$_{it-2}$*) lagged real GDP growth and the growth forecast made two years ago for the current year *(Real GDP Growth$^{t-2}_{it}$)*. The time series covers 1991–2013 for most markets, although the panel data is an unbalanced set due to variation in the initial year in which country-specific data becomes available. Forecast data comes from Consensus Economics, which surveys private sector economists and aggregates their forecasts for real GDP by country. By aggregating the data from numerous organizations, the accuracy seems to be higher than forecasts from individual sources such as the IMF or OECD (Batchelor, 2007).

Table I reports the results and presents three main findings. First, last year's real GDP growth represents a statistically and economically significant predictor of this year's GDP growth. A one percentage point increase in last year's GDP likely portends a 0.29 (column 1) to 0.44 (column 3) percentage point increase in this year's real GDP. Real GDP growth from two years earlier is statistically but not economically as informative.[8]

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7 See, for example, an article about an economist who "correctly" predicted the 2007/2008 financial crisis as well several crises that never occurred. "That guy who called the big one? Don't listen to him" http://www.boston.com/ bostonglobe/ideas/articles/2011/01/09/that/ guy/ who/ called/ the/ big/ one/ dont/ listen/ to/ him/?page=full

8 A Breusch-Pagan (Breusch Pagan, 1980) test for serial correlation of the results fails to reject the null hypothesis that the errors are not serially correlated.

Table I Real Annual GDP Growth vs. Forecasted Growth

	Dependent Variable: Real GDP Growth		
	(1)	(2)	(3)
One Year Lagged Real GDP Growth	0.292*** (0.012)		0.437*** (0.026)
Two Year Lagged Real GDP Growth	0.107*** (0.012)		−0.046* (0.025)
Forecasted Growth from Two Years Prior		1.010*** (0.040)	0.491*** (0.057)
Constant	2.334*** (0.186)	−0.301 (0.381)	0.289 (0.344)
Observations	6,143	1,658	1,656
R2	0.125	0.281	0.387
Adjusted R2	0.125	0.281	0.386

NOTES

Table reports results from a random effects panel regression of 45 countries for which Consensus Economics and IMF data exist from 1991–2013 (unbalanced panel). Data are annual. A Breusch–Pagan test for serial correlation fails to reject the null hypothesis that the errors are serially correlated (p-value 0.25). Forecasts are for two years ahead (e.g., beginning-of-year 1991 value meant to forecast 1992 GDP growth). Time period for India refers to the Indian fiscal year, while all other time periods are calendar years. Standard errors in parentheses.

*** Significant at the 1 percent level.   ** Significant at the 5 percent level.   * Significant at the 10 percent level.

Second, consensus forecasts for economic growth from two years ago also seem to offer a reasonable prediction of future growth rates. Column 2 suggests a one percentage point increase in forecasted GDP predicts a 1.01 percentage point increase in actual GDP. Even when including lagged values of real GDP (Column 3), the coefficient on forecasted growth is a statistically and economically significant 0.49 percentage points.[9]

Third, even if GDP forecasts have some predictive value, they explain approximately one third of the variation in GDP growth rates (R2 is 0.28 in column 2 and 0.39 in column 3). Part of the reason for this low R2 is that forecasters tend to better predict trends than shocks. For example, the consensus forecast made in January 2007 for 2008 U.S. GDP growth rate was 3.0%, close to the long-term mean. In reality, U.S. GDP growth in 2008 was -0.3%. The forecasts made at the beginning of 2008 for U.S. GDP growth in 2009 were even less accurate (2.5% forecast vs. -2.8% realized).

As noted earlier, there exist numerous approaches to testing the accuracy of macroeconomic forecasts, and it would overstate the case to suggest that Table I proves that macroeconomic forecasts by private sector economists have statistically validated predictive power. Other research, such as Laster et al. (1999), addresses this question in more detail. The general finding is that forecasts on GDP growth, on average, tend to be accurate in the aggregate, but

9 Higher frequency and more recent forecasts (e.g., those less than two years old) offer greater accuracy. However, most asset allocators deciding on the share of their portfolio to dedicate to emerging and frontier markets tend to make longer-term decisions (i.e., not month-to-month). Therefore, this paper restricts its analysis to the longest forecast-horizon available in the data set (approximately 2 years).

individual forecasters exhibit behavioral biases. The results in Table I are consistent with those aggregate findings. At the very least, Table I suggests that economists collectively oering GDP forecasts provide more value than a broken clock.

B. Long-term economic forecasts present even more challenges

Forecasting economic growth rates over longer time horizons (i.e., 5–10 years) proves even more challenging than near term forecasting. One source of long term growth forecasts is the IMF's biannual publication World Economic Outlook. Since 2008, the World Economic Outlook includes long-term forecasts of GDP growth rates for individual countries.

Figure 2 plots the relationship between the forecasts made in 2008 for 2013 real GDP growth (i.e., five-year forecasts), and the forecasts made in October 2013 for 2013 real GDP growth (i.e., three-month forecasts). Assuming that more recent forecasts are more accurate,[10] one way to evaluate the accuracy of the long-term forecasts is to draw a 45 degree line through the origin of the chart.[11] A value that lies on the line implies that the 2008 forecast is identical to the more recent forecast.
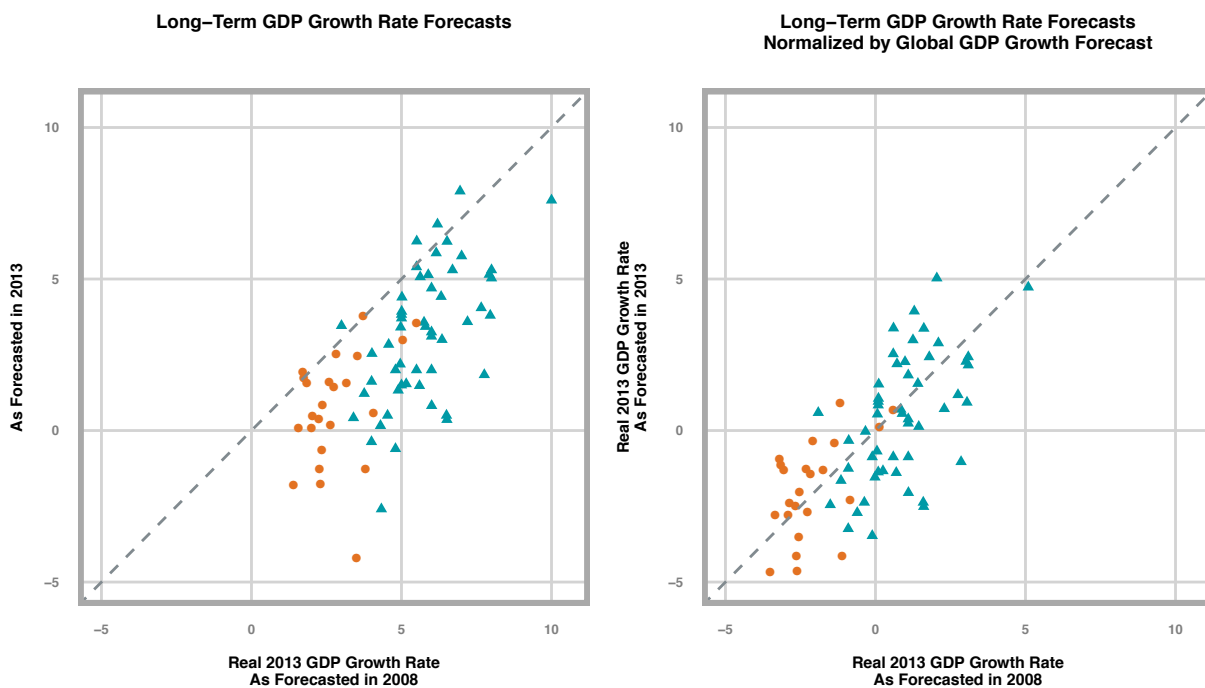

Figure 2 Realized Real GDP vs. Forecast Real GDP Growth Rates
Left panel plots the relationship between the forecasts made in 2008 for 2013 real GDP growth (i.e., five-year forecasts), and the forecasts made in October 2013 for 2013 real GDP growth (i.e., three-month forecasts). Right panel adjusts both the 2008 and 2013 values based on the mean global growth rate forecast in 2008 and 2013, respectively. GDP data from IMF (2013). Realized GDP for 2013 based on estimates using data through September, 2013.

10 A hopefully reasonable assumption given that the October 2013 forecast includes the first three quarters 2013 data for the majority of markets.

11 Alternatively, one could compare 2008 forecasts for 2012 against actual 2012 results. The conclusions remain unchanged, but the time horizon shortens to less than five years.

One obvious implication from Figure 2 is that forecasters in 2008 were too optimistic. Forecasts made in 2008 were greater than zero for every country, while the 2013 estimates show a handful of negative expected growth rates. Forecasts for all but three countries fall below the 45 degree line, consistent with the global economic recession and tepid recovery. A second implication is that, on average, growth forecasts for developing markets (blue triangles) exceeded growth forecasts for developed markets (orange circles) in both 2008 and 2013.

For many investors, the actual growth rate is less important than relative growth. In other words, it may be sufficient to know that developing markets will rank higher than developed markets on the global growth rate charts without knowing the mean global growth rate. The right panel of Figure 2 adjusts both the 2008 and 2013 values based on the mean global growth rate forecast in 2008 and 2013, respectively. Based on this metric, the IMF forecasts seem more accurate. The relative ranking of growth rates by country is more stable with a nearly even distribution of values above and below the 45 degree line. Again, the data suggests that developing markets were correctly forecast to grow faster than developed markets.

While the IMF's long-term forecasts may prove directionally accurate, they are not precise. The root mean square error of the forecasts equals 2.5. An ordinary least squares regression (not reported) shows that the 2008 forecast is a statistically significant predictor of the 2013 value, but the R^2 of only 0.43 indicates the forecast is noisy.[12] Based on this data, and the findings on the accuracy of short-term economic forecasts, it seems that economists offer forecasts significantly more accurate than a random guess, but uncertainty about the future makes the longer-term forecasts seem more like useful guides than precise charts.

II. GDP growth does not translate into equity returns

Even if GDP growth is predictable within a reasonable margin of error, knowing future growth rates is only helpful if growth translates into equity returns. The evidence supporting this hypothesis is spotty. Fama and French (1998) study global equity markets and find that "value" stocks return 5–8% more than "growth" stocks. At the individual equity level, growth may erode margins or inefficiently utilize capital, thereby destroying value (Koller, Goedhart and Wessels, 2010). A similar concept holds at the country level. A country's economy can grow without generating positive equity returns. For example, some high growth countries inefficiently utilize resources by overinvesting in infrastructure. Some countries also distribute a larger share of economic surpluses to non-equity investors (e.g., managers, labor, consumers, or the government).

Figure 3 plots country-specific returns in USD against country growth rate since the beginning of the century for 25 developed markets and 24 developing markets. Table II reports the regression results depicted by the solid lines in the chart. A simple linear regression shows a positive but statistically insignicant result (column 1 reports a coefficient

12 Using 2008 forecasts for 2012 real GDP generates an R^2 of 0.44.

Table II Returns vs. Real GDP Growth (2000–2013)

|	Dependent Variable: Annualized Returns in USD	
	(1)	(2)
Real GDP Growth (annualized)	0.653	0.210
	(0.522)	(0.645)
Developed Markets (Indicator Variable)	−6.453***	−9.797***
	(2.064)	(3.549)
Real GDP Growth * Developed Markets		1.258
		(1.088)
Constant	7.621***	9.588***
	(2.541)	(3.051)
Observations	49	49
R2	0.416	0.433
Adjusted R2	0.390	0.395

NOTES

Table reports results from an ordinary least squares regression of 49 countries from 2000–2013. Data for real GDP growth come from the IMF (2013). GDP growth rates for 2013 estimated based on data through September 2013. Return data based on the MSCI's country indices (in USD). Standard errors in parentheses.

*** Significant at the 1 percent level.   ** Significant at the 5 percent level.   * Significant at the 10 percent level.

Figure 3 Returns vs. Real GDP (2000–2013)
GDP data come from IMF (2013). GDP for 2013 estimated using data through September, 2013.
Country specific return data based on MSCI country indices.
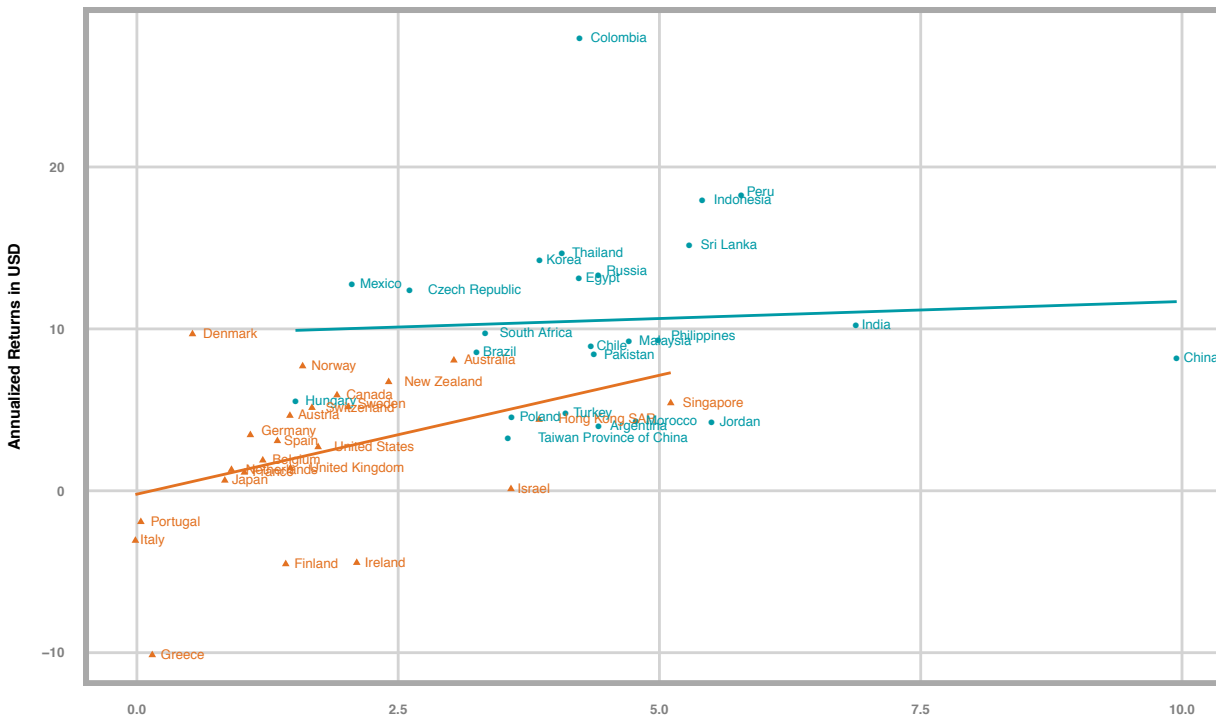
value of 0.65 but standard error of 0.52), implying an ambiguous relationship between growth and equity returns. The correlation between real GDP growth and equity market returns for developed markets is larger (coffiecient of 1.26 in column 2) but not statistically dierent than the value for emerging markets. The mean annualized growth rate for emerging markets is 6.45 percentage points (with a standard deviation of 2.06 percentage points) higher than the mean growth rate for developed markets during this period.

Choosing a longer time horizon or different data set tells a similar story—statistical tests do not find a robust, positive relationship between real GDP growth and equity returns. Henry and Kannan (2008) considered the equity market returns for 19 emerging markets over 30 years (1976–2005).[13] Not only did they find a statistically insignificant relationship between economic growth and equity returns, but the sign of the relationship is negative (i.e., countries that enjoyed higher real GDP growth suffered lower equity returns). Dimson, Marsch and Staunton (2002, 2011) and Ritter (2005, 2012)[14] study an even longer time series (1900–2011), though those studies focus on equity returns primarily for developed markets as of the beginning of the 20th century.[15] Dimson et al. (2011) and Ritter (2012) report a negative correlation between equity returns and GDP growth over both the full time period (1900–2011), the period following World War II (1950–2011), and the "modern" economic era (1970–2011). Ritter (2012) also considered the results for 15 emerging markets from 1988-2011[16] and still found a negative correlation.

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13 The countries in their data set include Argentina, Brazil, Chile, China, Colombia, India, Indonesia, Jordan, Korea, Malaysia, Mexico, Nigeria, Pakistan, Philippines, South Africa, Thailand, Turkey, Venezuela, and Zimbabwe.

14 Ritter (2005, 2012) uses the same data as Dimson et al. (2002, 2011) but considered local currency and constant currency returns.

15 Countries in Dimson et al. (2011) include: Australia, Belgium, Canada, Denmark, Finland, France, Germany, Ireland, Italy, the Netherlands, New Zealand, Norway, Japan, South Africa, Spain, Sweden, Switzerland, the United Kingdom, and the United States.

16 The emerging markets include Argentina, Brazil (1993–2011), Chile, China (1993–2011), India (1993–2011), Jordan, Malaysia, Philippines, Portugal, Russia (1995–2011), South Korea, Taiwan, Thailand, and Turkey.

III. The Sources of Emerging Market Equity Returns: Growth Shocks and Currency Risk

If not faster real GDP growth, then another explanation must exist for the excess returns that emerging and frontier market equities have generated relative to their developed market peers as shown by Table II and described in the academic literature.[17] Numerous potential explanations exist, including liquidity differences and irrationality in the markets. Without taking a view on the validity of those arguments in the short-term, neither may be compelling for a long-term investor. Increasing wealth in developing markets and decreasing cross-border trading costs arguably would shrink the liquidity differences over time (barring any regulatory hurdles). Forecasting markets to remain predictably irrational over a longer horizon, while perhaps not implausible based on the behavioral finance and behavioral economics literature, seems at least as difficult as forecasting long-term GDP growth rates. Instead, this paper focuses on two explanations that (hopefully) present a more intuitively sound explanation for the excess returns – gains from unexpectedly high economic growth and compensation for assuming currency risk.

A. Unexpected economic growth lifts equity prices

Despite the weak and possibly negative relationship between real GDP growth and equity market returns as depicted in Figure 3, growth benefits country-specific equity indices as much as growth lifts individual companies like the fictitious Pear. But like Pear, the role growth plays in equity prices depends on what expectations for future growth have already been factored into equity prices.

Measuring the market expectations for future GDP growth rates embedded in current equity prices is difficult, if not impossible. As a proxy, this paper uses the mean value of Consensus Economics' two-year forward growth forecasts. The value for the unexpected growth "shock" is then calculated as the difference between actual and forecast growth rates.

Table III estimates a regression model (equation 2) that tests the relationship between economic growth, growth shocks, and equity index returns in 77 markets from 2000–2013. As a control variable, the models reported in Table III also include lagged index returns. Unlike the random effects panel regressions reported in Table I, a Breusch-Pagan test of serial correlation rejects the null hypothesis that serial correlation is not biasing the results (i.e., including lagged GDP and lagged returns induces serial correlation in the error term). As a result, the regression model in Table III applies an Arellano and Bond (1991) style GMM estimator for panel data.[18]

Equation 2

$$Annualized\ Index\ Returns_{it} = \beta_0\,Constant + \beta_1\,Annualized\ Index\ Returns_{i,t-1}+$$

$$\beta_2\,Real\ GDP\ Growth_{it} + \beta_3\,Unexpected\ Growth\ \text{``Shock''}_{it}^{t-2} + \varepsilon_{it}$$

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[17] The coefficient on the Developed Markets Indicator Variable in Table II is negative in both columns 1 and 2, implying that, on average, annual equity returns between 2000 and 2013 were 6-10% higher per year in emerging and frontier markets than in developed markets after controlling for differences in growth rates. This excess return for investing in developing markets is discussed extensively in the academic literature. See, for example, Damodaran (2013) and Bekaert, Harvey and Lundblad (2006).

[18] The Arellano Bond System GMM model is a dynamic panel data technique similar in some ways to a vector autoregression (VAR) model and an instrument variable model. The Arellano Bond GMM model uses longer lags of the independent variables as exogenous instruments.

Table III GMM Estimate of Annual Returns vs. Real GDP Growth (2000–2013)

| | Dependent Variable: Annualized Index Returns in USD | | |
	(1)	(2)	(3)
Lagged Index Returns	−0.055	−0.022	−0.038
	(0.052)	(0.071)	(0.062)
Real GDP Growth	1.291		−6.480
	(0.845)		(5.072)
Unexpected Growth "Shock"		1.967***	7.951*
		(0.689)	(4.826)
Wald test	2.769	8.175	6.467*

NOTES

Table reports results from an Arrellano-Bond System GMM estimator of 77 countries from 2000 – 2013 (unbalanced panel with N=918). Data for real GDP growth comes from the IMF's World Economic Outcomes (October 2013). GDP for 2013 estimated using data through September. Return data based on the MSCI's country indices (in USD). Data on GDP growth forecasts comes from two-year ahead consensus views from Consensus Economics. Standard errors in parentheses.

*** Significant at the 1 percent level.   ** Significant at the 5 percent level.   * Significant at the 10 percent level.

The results in Table III are consistent with the hypothesis that expected growth rates do not have a statistically significant effect on equity returns, but unexpectedly high (low) growth rates generate positive (negative) equity returns. Similar to Table II, the first column of Table III shows a positive but statistically insignificant relationship between real GDP growth and index returns. However, columns 2 and 3 show that when real GDP growth rates exceed expected growth rates by 1% per year (i.e., when there is a positive economic shock), equity returns increase by 1.97% to 7.95% per year. The results are statistically significant.

The main implication of Table III is that equity prices already incorporate information on expected growth rates. However, growth that exceeds expectations has a positive effect on prices. These results should not surprise proponents of (broadly) efficient markets. If the IMF's five-year forecast (IMF, 2013) for real GDP growth reflects the market's consensus views, then this implies that growth in emerging and frontier markets will contribute positively to equity returns only if growth in those countries (on aggregate) exceeds 5% per year, ceteris paribus. Unfortunately, correctly predicting the magnitude and timing of "shocks" challenges many forecasters.

B. Investors are compensated for bearing currency risk

In addition to unexpectedly high growth rates, the second major source of equity returns in developing markets has been currency movements. Figure 4 depicts the standard emerging market index returns (blue) as well as an equivalent but currency-hedged (grey) index. The MSCI Emerging Market FX Hedge uses one-month forwards to eliminate the currency risk embedded in the MSCI Emerging Market Index. Consistent with the textbook finance models that suggest investors earn premiums for assuming some risks, the unhedged returns have earned a positive premium over the hedged returns since the second quarter of 2004.[19] Between the second quarter of 2004 and December 2013, the

unhedged emerging markets index generated returns of 208%, while the hedged emerging market index returned only 173%. Over that same period, the developed markets index returned 57%.

Perhaps more surprising is the fraction of overall returns from the MSCI Emerging Markets Index that can be attributed to currency risk. Table IV reports the results from an ordinary least squares regression (equation 3) that tries to dis-entangle the role of currency risk in emerging market equity returns. The dependent variable is daily returns from the MSCI Emerging Markets Index, and (similar to Figure 4) the independent variables include the returns from purchasing one-month forwards (i.e., investing in the MSCI FX Hedge indices) to hedge out currency risk (Currency Hedge) and the returns from the MSCI World Index (Developed Market Returns).

Equation 3

$$Emerging\ Market\ Index\ Returns_t = \beta_0\ Constant + \beta_1\ Emerging\ Market\ Currency\ Hedge_t +$$

$$\beta_2\ Developed\ Market\ Index\ Returns_t + \varepsilon_t$$

Over the full time series available, March 2004–December 2013, the R2 from a regression that just includes the Currency Hedge variable explains 64% of the variation in the overall market index (column 1). Not only is the currency hedge a strong predictor of the index returns, data suggest that it would be more capital efficient to invest in the hedge itself. The coefficient estimate is 3.00, implying that a $0.33 investment in currency futures could generate the same expected return as investing $1.00 in the index. Adding the equity market returns from the developed market index increases the R2 to 73% (column 2).

The results are directionally consistent across different time periods. Columns 3 and 4 report the results from the same regression over the pre-economic crisis period (i.e., before 2007), while columns 5 and 6 estimate the regression model using post-crisis data. The R2 is higher during the later periods, indicating that emerging market equity returns are increasingly driven by currency exposure and not equity exposures. Whether that result is driven by a fundamental change in the markets or a transitory, but not brief, uptick due to the financial crisis and related central bank policies remains to be seen.

The implication for investors is that the excess returns from emerging market equity investments is substantially and, perhaps increasingly, driven by currency risk. Since currency risk is a nominal factor, a long-term investment in emerging markets is effectively equivalent to a long-term bet on emerging market monetary policy. For many, there exist more capital efficient approaches to placing bets on monetary policy than simple equity investing (e.g., sovereign debt and currencies).

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19 Q2 2004 is the first period that MSCI reports data on the MSCI Emerging Market FX Hedged index. Unfortunately, no such off-the-shelf solution exists for the MSCI Frontier Market Index. In the interests of ensuring that the analyses and data in this paper are (relatively) easy to replicate, the results presented include only data from emerging markets and not frontier markets.

Table IV Emerging Market Returns vs. Emerging Market Currency Risk and Developed Market Returns

Dependent Variable: Emerging Markets Index Daily Returns in USD						
	March 2004– Dec. 2013		March 2004– Dec. 2006		January 2007–Dec. 2013	
	(1)	(2)	(3)	(4)	(5)	(6)
Currency Hedge	3.002***	2.081***	2.332***	1.614***	3.133***	2.203***
	(0.045)	(0.050)	(0.095)	(0.092)	(0.050)	(0.059)
Developed Market Returns		0.479***		0.746***		0.440***
		(0.017)		(0.045)		(0.019)
Constant	0.000	0.000	0.000	0.000	–0.000	–0.000
	(0.000)	(0.000)	(0.000)	(0.000)	(0.000)	(0.000)
Observations	2,544	2,544	717	717	1,827	1,827
R2	0.641	0.730	0.456	0.609	0.678	0.754
Adjusted R2	0.641	0.730	0.455	0.608	0.678	0.754

NOTES
Table reports results from an ordinary least squares regression from March 2004–December 2013. Emerging market returns correspond to the MSCI

Emerging Markets Index. Currency exposure correspond to the MSCI Emerging Markets FX Hedge Index. Developed market returns correspond to MSCI World Index. Data come from Bloomberg.
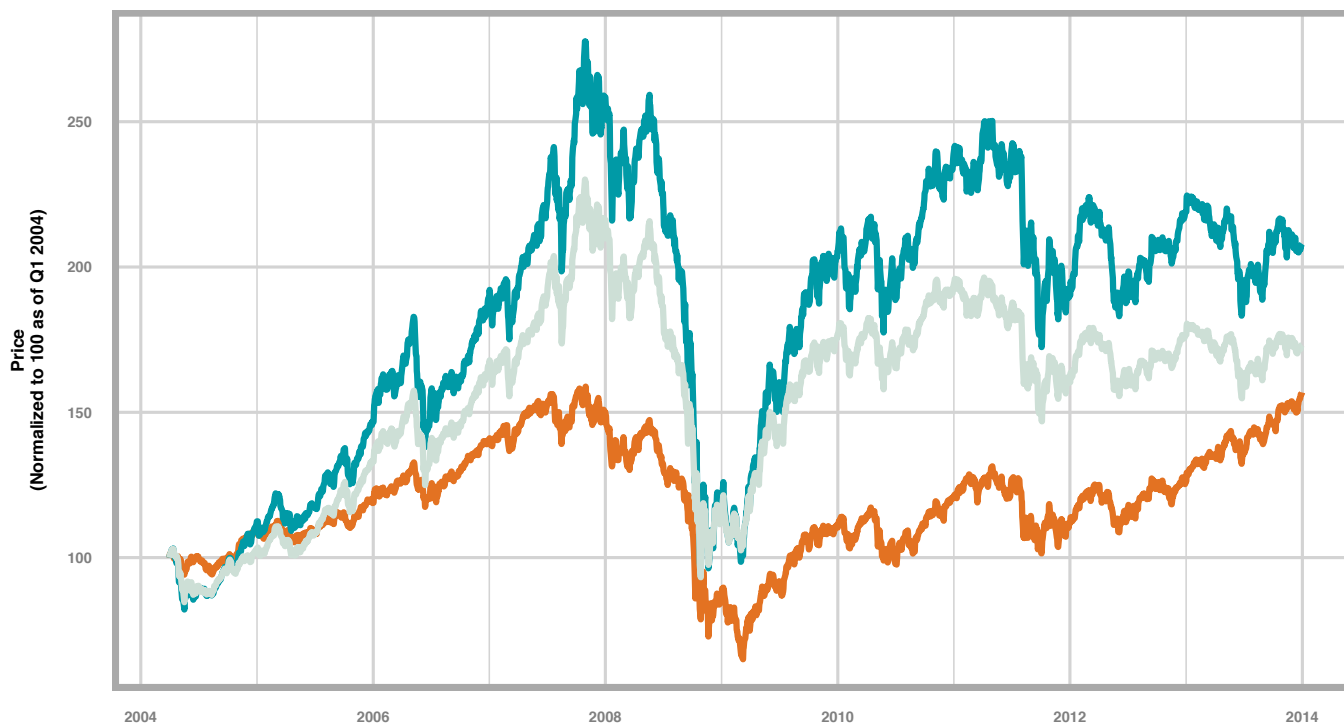
*** Significant at the 1 percent level.

** Significant at the 5 percent level.

* Significant at the 10 percent level.

Figure 4 Emerging Market Returns vs. Currency-Hedged Emerging Market Returns.
MSCI Emerging Market FX Hedge uses one-month forwards to eliminate the currency risk embedded in the MSCI Emerging Market Index (MXEF).

IV. Correlation between regions has increased

Some investors look to emerging market equities as a way to diversify risk. Mathematically, adding additional assets into the portfolio mix, provided the additional assets are not perfectly correlated with existing assets, improves the efficient frontier of a portfolio optimized according to Markowitz' modern portfolio theory. However, the diversification benefit that may come from investing in emerging markets seems to be decreasing over time.

A. Correlations between developed and developing markets have increased since 1992

Correlations between developing, emerging, and frontier markets have not been steady over time, but they seem to be trending higher. Figure 5 plots the running five-year correlations between the MSCI Developed Market Index returns and MSCI Emerging Market Index returns (blue line). Returns are calculated on a monthly basis. Not surprisingly, correlations increased sharply during the two periods of global economic turmoil that began in 1997 (Asian Financial Crisis) and 2007 (Great Recession). However, correlations remained elevated following each of those periods and have generally increased since 1992. During 2013, monthly correlations averaged 90.6%. To put that in context, the correlation between US (Bloomberg Ticker: MXUS) and UK (MXGB) equities averaged 87.1% during 2013, and the correlation between US and Canadian (MXCA) equities averaged 74.5%. Based on this simple metric,

Figure 5 Correlation of MSCI Emerging Markets and Frontier Market Indices to MSCI World Index.
**Running five year correlations based on monthly returns.**
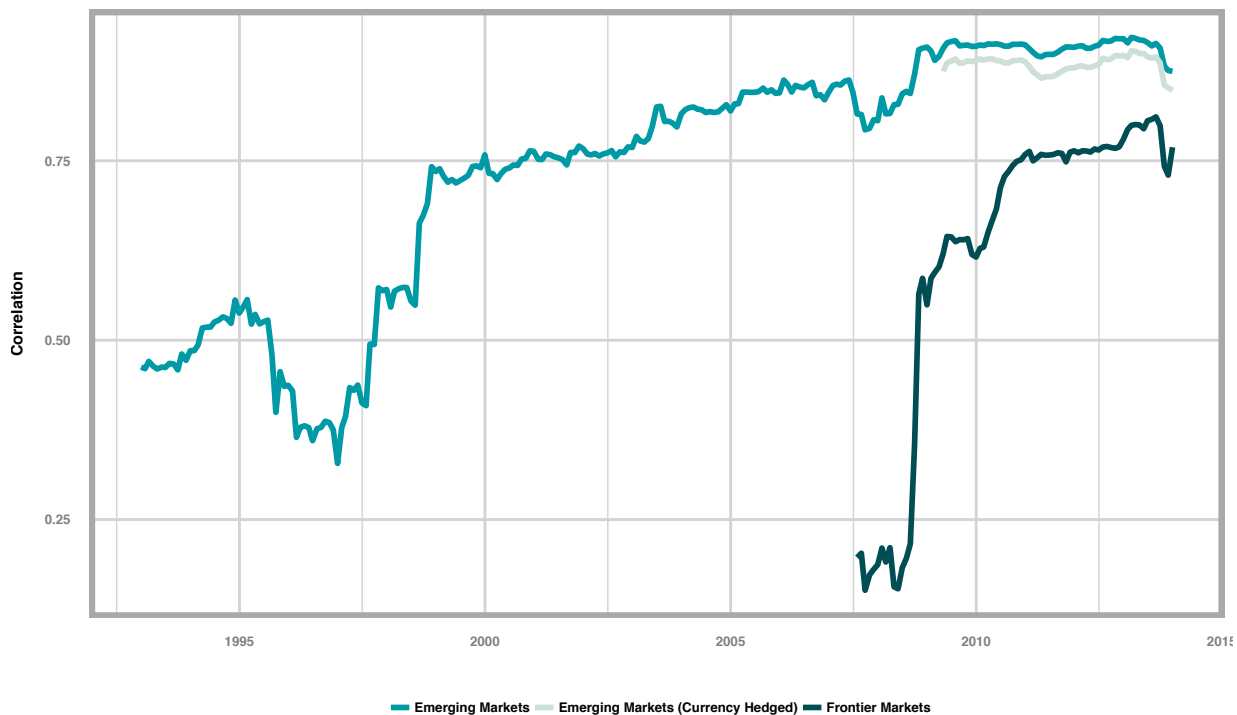
it would seem that a U.S. equity investor would derive greater risk diversification by investing in British or Canadian equities than emerging market equities.

The correlation between MSCI Frontier Market Index (dark blue line) and MSCI Developed Market Index (light blue line) is less clear. Over most of the time series available, correlations exceeded 50%. Over the past two years, rolling monthly correlations usually exceeded 75%. However, correlations prior to September 2008 remained below 30%. It is possible that the high levels of correlation are due to the global economic turmoil, although one might then expect the correlations to have trended down after 2011. A longer time series is likely necessary to better identify the trend in frontier equity market correlation to global equity markets.

B. Drivers of long-term correlations likely to persist

There are numerous potential explanations to explain the increase in the long-term correlation trend. One potential explanation is that companies in developing markets derive an increasingly large share of their revenue from developed markets, and developed market companies are increasingly earning revenue from developing market customers. For example, the largest company (by weight) in the MSCI Emerging Markets Index (as of December 31, 2013) was Samsung Electronics. Samsung has become the world's largest manufacturer of smartphones.[20] More than 54% of Samsung's revenue comes from North America and Europe. The second largest manufacturer of smartphones is Apple, one of the developed world's largest companies by market capitalization. Apple derives a similar proportion (60%) of its

Figure 6 Share of Revenue from Developed Markets.
Data from Bloomberg.

20 http://www.gartner.com/newsroom/id/2573415
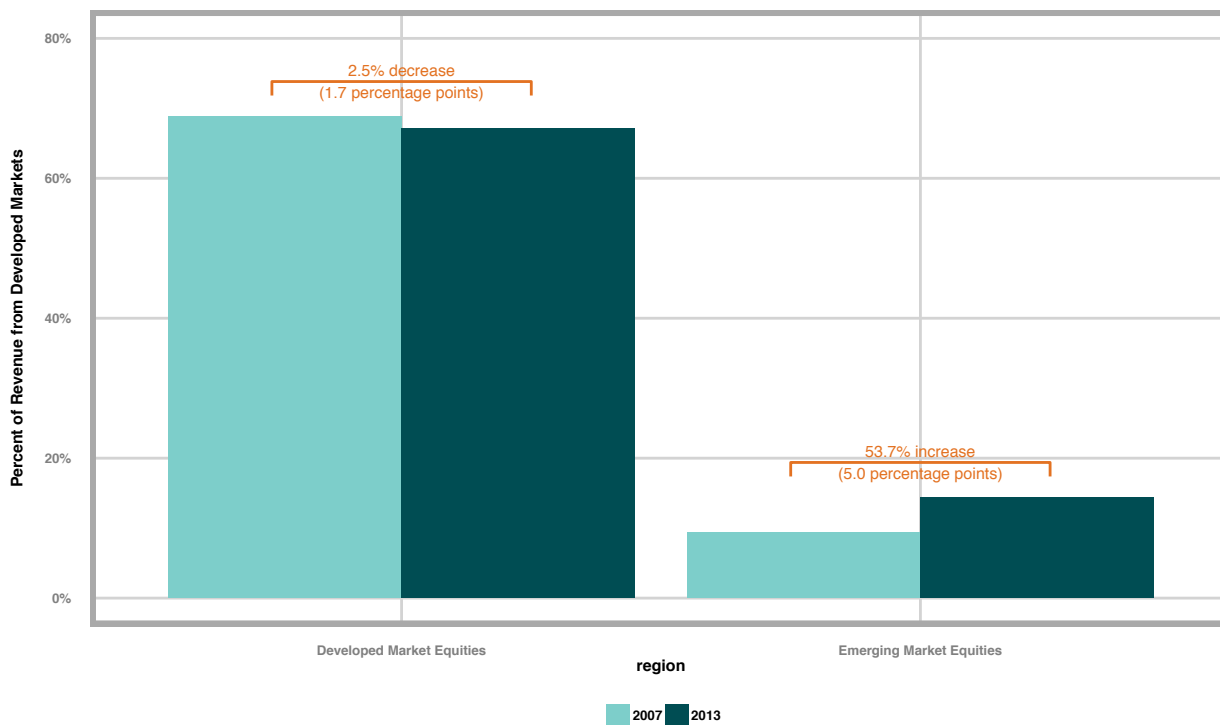
revenue from North America and Europe. Both companies have generally sourced their components from suppliers in developed markets (e.g., cover glass from U.S. based Corning) and developing markets (e.g., gyroscopes from ST Microelectronics).21 In other words, the world's largest companies increasingly operate in a global, not national, marketplace. It should not surprise that their equity performances reflect that trend as well.

Comprehensive and reliable data to support the hypothesis that publicly listed equities increasingly derive their revenues from global markets are difficult to find. Some companies self-report their sales by geography, but there is (typically) no requirement to disclose that information. Even among companies that do break out their revenue, there exists no common aggregation standard (e.g., some companies report sales to the Middle East while others group the Middle East along with Europe and Africa in the EMEA region).

Data from Bloomberg attempts to compile what information is available, and the results are consistent with the hypothesis that both developed and emerging market companies increasingly earn revenues from outside their region. While the data may be noisy, and it would be unrealistic to derive precise estimates from what limited and imprecise data is available, the changes over the past five years are nonetheless telling (Figure 6). Between 2007 and 2013, the share of revenue for emerging market companies coming from developed markets increased by 54% (from a base of 8%) while the share of revenue for developed market companies coming from developed markets fell by 2.5% (from a base of 69%). The results are not sensitive to changes in the disclosure policies of companies. Recalculating the results (not pictured) by excluding revenue that Bloomberg classifies as "unassigned" to a region paints a similar picture: emerging market companies significantly increased their revenue from developed market customers while developed market companies slightly increased their revenue from developing market customers.

V. Conclusion and implications for investors

Many find the economic growth potential from emerging and frontier markets exciting. More than half of the world's economic growth over the next five years will come from developing markets. Between 2000 and 2018, developing markets' share of real global GDP is expected to grow from 37% to 54% (IMF, 2013).

However, even if these GDP growth forecasts turn out to be directionally accurate – and the empirical evidence on economic forecasts suggest they will be – that does not necessarily imply that investors will benefit from allocating more capital to the equities listed in these economies. An analysis of emerging and frontier market equity returns supports the findings of the academic literature. Expected economic growth does not translate into equity returns. The superior returns from developing market equities largely came from unexpected growth and currency risk.

Based on these findings, investors must confront two questions that seem even more difficult to answer than the ones posed at the beginning of this paper. First, what growth rate for emerging and frontier economies does the market currently expect, and what growth rate do I anticipate those economies achieving? Second, am I willing to bear currency risk and hope that the global monetary authorities will behave in such a way as to generate sustained currency depreciation in developed economies, or should I instead hedge my exposure and accept lower returns?

Emerging and frontier market equity returns also appear increasingly correlated to developed market equity returns. Some of that trend may be due to greater integration of companies in both developed and developing markets. Cross-regional trade in input and output markets may contribute to greater correlation. Barring a major reversal in economic internationalization akin to the 1920s and 1930s, cross-country and cross-regional economic integration seem set to increase for the foreseeable future.

Most long-term investors cite two main reasons for investing in a given asset class: because investors expect to generate higher returns, or because allocating to those assets improves the risk profile of the overall portfolio. Along both of those dimensions, the benefits from investing in emerging and frontier market equities have diminished – although certainly not evaporated – over time.

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