

RESEARCH REPORT

Historical Performance Analysis Of Country Equity Indices

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1. INTRODUCTION

Investors analyze the investment characteristics of the available assets that they face before they make their portfolio decisions. Although there are different ways to calculate the expected return and risk of an asset, each potential investment can be classified based on these two dimensions. Popular asset pricing models assume that the average investor is risk-averse and such investors choose their final portfolio mix in a way that will maximize their expected return for a given level of risk. Another way to state this is that risk-averse investors try to take on the minimum risk they can to achieve their desired expected return. The positive relation between risk and return is one of the fundamental ideas in finance and the literature has established this trade-off for various asset classes. However, although the idea that investors are able to increase their portfolio return only by assuming additional risk is commonly accepted, it is still a question of interest which individual assets generate a higher expected return per unit risk. In this research report, the assets taken under consideration are diversified equity indices of 52 countries and the analysis compares the risk-adjusted performances of these indices based on alternative risk metrics.

The alternative risk metrics are different from each other in terms of how they approach the definition of the concept of risk. One of the most common metrics of financial risk is the standard deviation of returns which measures the dispersion of a set of data from its mean. Although well-known and commonly used, standard deviation captures both the positive deviations and the negative deviations around the mean whereas many investors are more concerned about the probability of experiencing a loss rather than a gain when they assess the risk attributes of various assets. Moreover, the standard deviation is a complete measure of risk only for normally distributed random variables whereas financial asset return distributions do not exhibit normality. Kraus and Litzenberger (1976) and Harvey and Siddique (2000) show that investors demand lower expected returns from assets which make their portfolio returns more positively skewed. Dittmar (2002) suggests a preference for lower kurtosis indicating that investors demand higher expected returns from investments that make their portfolio returns more leptokurtic. From a more practical perspective, market participants such as commercial banks, fund managers and credit rating

agencies place special emphasis on the possibility of extreme negative events when they make decisions. Collectively, these ideas suggest that downside risk should be considered as an independent determinant of security returns and this alternative concept of risk is reflected in some of the performance metrics used in this report. Another shortcoming of standard deviation is that it captures all deviations of an asset's returns around their mean regardless of the source of the fluctuations. An asset's return may be influenced by either events affecting the whole market or events which are specific to the asset. One alternative risk metric employed in the analysis focuses on this distinction.

This research report attempts to answer several questions. First, how have the returns of various country indices behaved in the past? To answer this question, descriptive statistics are presented and interpreted for a sample period covering almost 20 years. Second, how have the risk-adjusted performances of various country indices compared to each other in the past? In the analysis, five alternative performance metrics and two different sample periods are used to seek extensive answers to this question. Third, are there apparent differences between advanced and emerging markets in terms of their historical performances? Fourth, does using alternative risk metrics cause any differences in the comparative performances of the country indices? Fifth, does adjusting for risk alter the rankings between the country indices or is it sufficient to compare returns only?

2. METHODOLOGY AND DATA

2.1 Performance Metrics

The first performance measure that is used is the Sharpe ratio which is equal to the ratio of the excess return of an index to its standard deviation. The standard deviation is useful as a measure of risk since it captures the dispersion of observed returns around their means. Specifically, the Sharpe ratio is calculated as

$$Sharpe_{i,t} = \frac{R_{i,t} - R_{f,t}}{St Dev_{i,t}}$$

where $R_{i,t}$ denotes the month t return on index i and $R_{f,t}$ is the risk-free rate at the end of month t . For each month t and country index i , the monthly standard deviation is calculated as the standard deviation of daily returns during the month.

Although it is the most commonly used performance ratio, the Sharpe ratio reflects the total risk of an asset's returns and does not differentiate between an investment's upside potential and downside risk. Furthermore, the standard deviation is an accurate risk measure only if the return distribution of an index is normal. Equity return distributions exhibit asymmetries and possess fatter tails compared to the normal distribution, thus, higher-order moments such as the skewness or kurtosis of a return distribution may affect expected asset returns as mentioned earlier. Moreover, investors' differential preferences with respect to gains and losses (Kahneman and Tversky, 1979) or their willingness to maximize expected returns subject to a maximum loss constraint (Levy and Sarnat, 1972) may lend the behavior of return distributions at their left-tails additional importance for asset pricing purposes. Thus, the subsequent analysis utilizes semi-deviation and value-at-risk measures to capture downside risk.

The second performance metric used in the analysis is the Sortino ratio:

$$Sortino_{i,t} = \frac{R_{i,t} - R_{f,t}}{Semi\ Dev_{i,t}}$$

This ratio replaces the denominator of the Sharpe ratio with monthly semi-deviation which is calculated as the standard deviation of returns observed only on the days during which the return on country index i falls short of the risk-free rate in month t .

One shortcoming of the semi-deviation measure is that it considers all return realizations below the risk-free rate and does not focus exclusively on the left-tail of the return distribution which is where the large losses materialize. To take this idea into account, a nonparametric measure of value-at-risk (VaR) which measures how much the value of a country index could decline in an extreme outcome if one were to rank order possible outcomes from best to worst is constructed. VaR attempts to highlight how much an investor can expect to lose on an investment in each

period at a given probability level. In the analysis, the minimum daily return during each month is observed for each country index and multiplied by -1 so that higher magnitudes of the VaR measure corresponds to greater downside risk. Thus, the third performance measure is defined as:

$$Return\ to\ VaR_{i,t} = \frac{R_{i,t} - R_{f,t}}{VaR_{i,t}}$$

One point to highlight regarding risk measures such as standard deviation and semi-deviation is that these metrics capture both systematic and specific risk. Systematic risk reflects an investment's risk driven by the uncertainty inherent to the entire market whereas specific risk reflects an investment's risk driven by events which affect that investment specifically. Modern portfolio theory suggests that specific risk can be eliminated through efficient diversification and it is only systematic risk that investors should expect to get compensated for. Therefore, a fourth performance metric is constructed by replacing the standard deviation in the denominator of the Sharpe ratio by the beta or sensitivity of a country index with respect to the movements in the global equity markets. A monthly beta measure is calculated for each country index by regressing the daily country index returns on the daily global market returns in each month and recording the slope coefficients.

$$Treydor_{i,t} = \frac{R_{i,t} - R_{f,t}}{Beta_{i,t}}$$

Finally, the Calmar ratio is calculated for each country index by dividing the excess return during a month by the maximum drawdown during that month. Maximum drawdown is defined as the percentage difference between the highest and lowest index levels during a certain month. Conceptually, maximum drawdown is a useful risk metric since it measures the largest loss an investor may experience by going long in the index at its peak and closing the position at its trough.

$$Calmar_{i,t} = \frac{R_{i,t} - R_{f,t}}{Max\ Drawdown_{i,t}}$$

All the above-mentioned reward-to-risk ratios are calculated at the end of each month for each country index and the time-series averages of these ratios are

reported in the tables for two sample periods. The full sample starts at the beginning of 1998 and ends in February 2017. A subsample which starts at the beginning of 2008 is also considered to compare the performances of country indices during the period following the global credit crisis. All country indices have full data available during both sample periods, therefore, the reported performance metrics are directly comparable.

2.2 Data

The data for daily index returns for each country are obtained from the DataStream Global Equity Indices database. There are 52 markets for which DataStream provides daily index price information. These 52 markets are classified as either advanced or emerging based on the classification used by the International Monetary Fund (IMF). Based on this classification, 30 countries are treated as advanced: Australia, Austria, Belgium, Canada, Cyprus, Czech Republic, Denmark, Finland, France, Germany, Greece, Hong Kong, Ireland, Israel, Italy, Japan, Luxembourg, Netherlands, New Zealand, Norway, Portugal, Singapore, Slovenia, South Korea, Spain, Sweden, Switzerland, Taiwan, United Kingdom and United States. The remaining 22 countries, Argentina, Brazil, Bulgaria, Chile, China, Colombia, Hungary, India, Indonesia, Malaysia, Mexico, Pakistan, Peru, Philippines, Poland, Romania, Russia, South Africa, Sri Lanka, Thailand, Turkey and Venezuela are classified as emerging. One caveat of this classification system is that it is based on the latest definitions used by IMF, however, a certain country may graduate from being emerging to being advanced during the sample period.

The total market index item in DataStream named TOTMK is used as the national market index for each country. TOTMK series is a value-weighted index where weightings are allocated based on market capitalization. Monthly index returns are constructed by compounding daily index returns calculated from the Return Index (RI) series associated with TOTMK. This series reflects the index values after taking dividends and distributions into account. The price data in terms of US dollars are used to construct the returns to make them comparable across countries. The risk-free rate is estimated as the return on a one-month US Treasury bill obtained from the Federal Reserve data library. The global market index used to calculate monthly betas for each country index is the

DataStream Global Market Index which covers over 10,000 stocks.

3. DESCRIPTIVE STATISTICS

Panel A of Table 1 presents descriptive statistics for 30 advanced economies between 1998 and 2017. The descriptive statistics presented are mean, median, standard deviation, minimum, maximum, skewness and kurtosis. The countries are listed in alphabetical order. Focusing on the mean returns in the first column, one can see that the highest five average returns belong to South Korea, Czech Republic, Finland, Australia and Sweden in descending order. The mean returns vary between 1.69% and 0.95% per month for these five markets. The lowest six average returns belong to Greece, Cyprus, Portugal, Japan, Slovenia and United Kingdom in ascending order with the latter two countries tied. The mean returns vary between -0.04% and 0.49% for these six markets. The second column which presents the median statistics show that there is no one-to-one correspondence between the mean and median rankings. The five markets with the highest median returns are Denmark, Czech Republic, Hong Kong, Austria and Belgium in descending order with values between 1.60% and 1.35%. The five markets with the lowest median returns are Cyprus, Slovenia, Italy, Taiwan and Portugal in ascending order with values between -0.51% and 0.56%. One notable observation is that the mean index return is greater than the median index return for only 6 advanced economies. Although the relation between the mean and median does not directly determine the skewness of a return distribution, it should be noted that only 5 advanced economies exhibit equity index return distributions with positive skewness. In other words, the left tails of the return distributions tend to be longer than the right tails for most advanced markets. The highest skewness statistics belong to South Korea (1.48) and Cyprus (1.46) whereas the lowest skewness statistics belong to Belgium (-1.05) and Netherlands (-1.00).

The panel also shows that there is a pronounced variation between the volatilities of different country indices with the highest monthly standard deviation (12.69%) being almost three times as large as the lowest monthly standard deviation (4.48%). The three highest standard deviations belong to Cyprus, South Korea and Greece whereas the three lowest standard deviations belong to United States, Switzerland and

United Kingdom. The standard deviation metric is heavily influenced by extreme positive and negative returns and the fifth and the sixth columns of the panel present the magnitudes of such extreme monthly index movements. The most extreme negative monthly returns have been observed for Cyprus, Greece and Norway with values between -28.90% and -26.50%. The most extreme positive monthly returns have been observed for South Korea, Cyprus and Greece with values between 70.76% and 31.09%. The

standard deviation, minimum and maximum statistics observed in the panel are much higher than the mean and median statistics in terms of absolute value and this observation is also manifested in the kurtosis statistics. All return distributions are leptokurtic with the highest kurtosis statistics belonging to South Korea (10.33) and Cyprus (9.88) and the lowest kurtosis statistics belonging to Japan (3.25) and Israel (3.52).

TABLE 1. Descriptive Statistics for Country Equity Indices

Panel A. Advanced Economies							
	Mean	Median	St Dev	Min	Max	Skew	Kurt
Australia	0.0097	0.0097	0.0629	-0.1673	0.1754	-0.5581	4.5973
Austria	0.0071	0.0138	0.0659	-0.1872	0.1803	-0.9731	7.1962
Belgium	0.0078	0.0135	0.0583	-0.1526	0.1602	-1.0479	7.3900
Canada	0.0084	0.0120	0.0582	-0.1458	0.2033	-0.6994	5.5363
Cyprus	0.0026	-0.0051	0.1269	-0.2890	0.6993	1.4602	9.8757
Czech Republic	0.0131	0.0153	0.0773	-0.1827	0.2359	-0.2774	4.0631
Denmark	0.0092	0.0160	0.0582	-0.1404	0.1872	-0.6839	5.4518
Finland	0.0107	0.0110	0.0842	-0.1926	0.2983	-0.0098	4.4350
France	0.0077	0.0099	0.0600	-0.1424	0.1494	-0.4526	3.6197
Germany	0.0068	0.0096	0.0629	-0.1597	0.1933	-0.4554	3.9807
Greece	-0.0004	0.0065	0.1034	-0.2829	0.3109	-0.2599	3.5579
Hong Kong	0.0084	0.0141	0.0689	-0.1553	0.2863	0.3123	4.8687
Ireland	0.0059	0.0131	0.0645	-0.1977	0.1976	-0.6940	4.7582
Israel	0.0084	0.0101	0.0638	-0.1574	0.1695	-0.3002	3.5156
Italy	0.0053	0.0053	0.0681	-0.1573	0.2135	-0.1267	3.5526
Japan	0.0045	0.0062	0.0502	-0.1213	0.1554	0.0542	3.2467
Luxembourg	0.0068	0.0086	0.0602	-0.1839	0.1840	-0.6594	5.7611
Netherlands	0.0058	0.0120	0.0615	-0.1616	0.1627	-0.9970	6.4184
New Zealand	0.0093	0.0117	0.0595	-0.1517	0.1629	-0.4431	3.5910
Norway	0.0089	0.0116	0.0761	-0.2650	0.1886	-0.7384	5.2547
Portugal	0.0034	0.0056	0.0653	-0.1471	0.1770	-0.4251	3.9717
Singapore	0.0088	0.0064	0.0687	-0.1720	0.2634	-0.0016	5.6173
Slovenia	0.0049	0.0000	0.0597	-0.1573	0.1977	-0.2489	4.8486
South Korea	0.0169	0.0079	0.1074	-0.1817	0.7076	1.4775	10.3250
Spain	0.0073	0.0113	0.0675	-0.1848	0.1983	-0.2268	3.7450
Sweden	0.0095	0.0082	0.0720	-0.1926	0.2243	-0.2581	4.2646
Switzerland	0.0069	0.0106	0.0472	-0.1224	0.1555	-0.4834	3.9592
Taiwan	0.0062	0.0055	0.0753	-0.1750	0.2821	0.2915	3.9795
United Kingdom	0.0049	0.0066	0.0486	-0.1228	0.1477	-0.3959	4.4758
United States	0.0066	0.0117	0.0448	-0.1031	0.1138	-0.6482	4.0602

TABLE 1. Descriptive Statistics for Country Equity Indices

Panel B. Emerging Economies							
	Mean	Median	St Dev	Min	Max	Skew	Kurt
Argentina	0.0070	0.0088	0.0981	-0.2838	0.3345	-0.1102	4.4351
Brazil	0.0127	0.0137	0.1066	-0.3049	0.3972	-0.0977	4.2333
Bulgaria	0.0153	0.0000	0.0967	-0.2634	0.3872	0.3932	6.0853
Chile	0.0077	0.0069	0.0609	-0.1783	0.1801	-0.5015	5.1156
China	0.0144	0.0072	0.1011	-0.2223	0.4837	0.6906	6.0383
Colombia	0.0087	0.0131	0.0801	-0.1755	0.2126	-0.0944	3.1493
Hungary	0.0084	0.0132	0.0925	-0.2599	0.2620	-0.7216	5.2722
India	0.0125	0.0141	0.0891	-0.2046	0.4201	0.0405	4.9052
Indonesia	0.0135	0.0162	0.1140	-0.3109	0.5626	0.4259	6.3850
Malaysia	0.0094	0.0104	0.0790	-0.2164	0.4615	1.1450	10.7715
Mexico	0.0089	0.0128	0.0694	-0.1516	0.1864	-0.7934	5.6912
Pakistan	0.0132	0.0129	0.0930	-0.2611	0.3284	-0.3088	6.1047
Peru	0.0096	0.0119	0.0627	-0.1433	0.1772	-0.7799	6.5449
Philippines	0.0094	0.0080	0.0773	-0.1914	0.4861	0.8251	9.9382
Poland	0.0094	0.0119	0.0932	-0.2296	0.2632	-0.2767	4.0581
Romania	0.0106	0.0119	0.1196	-0.3052	0.5078	0.0224	5.5617
Russia	0.0162	0.0174	0.1231	-0.3336	0.4837	-0.3045	6.0689
South Africa	0.0108	0.0148	0.0813	-0.2172	0.1977	-0.7024	4.7784
Sri Lanka	0.0099	0.0040	0.0751	-0.1630	0.3090	0.6796	5.1049
Thailand	0.0145	0.0158	0.0991	-0.2349	0.4089	0.4036	5.6369
Turkey	0.0127	0.0106	0.1391	-0.3486	0.7053	0.4885	6.0725
Venezuela	0.0218	0.0099	0.1761	-0.4088	1.2025	1.0063	16.7728

Panel B of Table 1 presents descriptive statistics for 22 emerging economies. In the first column, the highest five average returns belong to Venezuela, Russia, Bulgaria, Thailand and China in descending order. The mean returns vary between 2.18% and 1.44% per month for these five markets. The lowest five average returns belong to Argentina, Chile, Hungary, Colombia and Mexico in ascending order. The mean returns vary between 0.70% and 0.89% per month for these five markets. In the second column, the five markets with the highest median returns are Russia, Indonesia, Thailand, South Africa and India in descending order with values between 1.74% and 1.41%. The five markets with the lowest median returns are Sri Lanka, Chile, China, Philippines and Argentina in ascending order with values between 0.40% and 0.88%. Two notable observations emerge. First, the central tendency measures for the emerging economies are higher than those for the advanced economies. Second, a higher proportion of emerging economies (8 out of 22) have mean returns that are higher than median returns compared to advanced economies. This observation is also reflected in the skewness statistics with exactly half of the emerging economies exhibiting positive skewness. The highest skewness statistics belong to Malaysia (1.15) and Venezuela (1.01) whereas the lowest skewness statistics belong to Mexico (-0.79) and Peru (-0.78).

The standard deviation statistics in the third column again show that the highest monthly standard deviation (17.61%) is almost three times as large as the lowest monthly standard deviation (6.09%). Comparing these values to those of the advanced economies, one can conclude that emerging equity markets are prone to sharper fluctuations in value with seven emerging markets having monthly standard deviations that exceed 10%. The three highest standard deviations belong to Venezuela, Turkey and Russia and the three lowest standard deviations belong to Chile, Peru and Mexico. The extreme returns are also more pronounced in absolute value for emerging economies. The most extreme negative monthly returns have been observed for Venezuela, Turkey and Russia with values between -40.88% and -33.36%. The most extreme positive monthly returns have been observed for Venezuela, Turkey and Indonesia with values between 120.25% and 56.26%. Such extreme monthly returns render the return distributions for emerging country indices

more leptokurtic with respect to advanced country indices. 11 out of 30 advanced markets have kurtosis statistics less than 4 whereas the same figure is only one for emerging markets. The highest kurtosis statistics belong to Venezuela (16.77) and Malaysia (10.77) and the lowest kurtosis statistics belong to Colombia (3.15) and Poland (4.06).

4. PERFORMANCE METRICS

Table 1 displays that, on average, emerging markets have higher mean and median returns compared to advanced markets; however, these higher returns come at the expense of higher volatility and more extreme return fluctuations. When investors make investment decisions, they do not solely rely on expected return estimates but also take how much return per unit risk an investment can generate into consideration. Therefore, this section of the research report adjusts the excess return of each country index with respect to various risk measures to make performance comparisons between markets.

4.1 Sharpe Ratios

Panels A and B of Table 2 present the Sharpe ratios for advanced and emerging economies for the full sample period, respectively. Among the advanced economies, the highest average Sharpe ratios belong to United States, Canada, Czech Republic, New Zealand and Belgium with values between 0.0642 and 0.0608. To put these numbers into context, the equity index in the United States generated a monthly mean return of 6.42 basis points per 1% standard deviation since 1998. On the other hand, the lowest average Sharpe ratios belong to Cyprus, Japan, Greece, Slovenia and Portugal with values between 0.0043 and 0.0344. These results suggest notable differences between the mean return rankings in Panel A of Table 1 and Sharpe ratio rankings. For example, among the five markets with the highest mean returns during the full sample period, only Czech Republic secures its place among the top five markets with the highest Sharpe ratios. This finding highlights the importance of risk adjustment when making investment decisions. On the other hand, there is strong consistency among the poor performers with five countries with the lowest Sharpe ratios being also at the bottom group based on the mean return rankings. The median Sharpe ratios vary between -0.0128 (Cyprus) and 0.0733 (Denmark) whereas the monthly volatility of

the Sharpe ratios are large with respect to the central tendency statistics and vary between 0.1800 (Japan) and 0.2784 (Slovenia).

Panel B of Table 2 shows that the highest average Sharpe ratios for emerging economies belong to Pakistan, India, Peru, Bulgaria and Indonesia with values between 0.0870 and 0.0605. The lowest Sharpe ratios belong to Romania, Poland, Argentina, Philippines and Sri Lanka with values between 0.0387 and 0.0415. These results suggest that emerging markets had better performances than advanced markets during the full sample period, on average. For example, United States, the best performing advanced market would not have ranked among the top three among emerging markets and Romania, the worst performing emerging market would have ranked better than seven advanced markets. The median Sharpe ratios paint a similar picture. The medians vary between 0.0281 (Sri Lanka) and 0.0773 (Peru) whereas the monthly volatility of the Sharpe ratios are again large with respect to the central tendency statistics and vary between 0.2328 (Indonesia) and 0.3351 (Colombia). These values also suggest that the monthly Sharpe ratios have been more volatile for emerging markets. Comparing the mean return rankings in Panel B of Table 1 and the Sharpe ratio rankings for emerging markets reveal a lack of consistency. Only one country, Bulgaria which is in the top five based on Sharpe ratio rankings is among the five markets with the highest mean returns. Moreover, only one country, Argentina which is in the bottom five based on Sharpe ratio rankings is among the five markets with the lowest mean returns. This result further emphasizes the need for risk-adjustment when assessing the performance of investment alternatives.

Panels A and B of Table 3 present the Sharpe ratios for advanced and emerging economies for the post-crisis period, respectively. For the advanced markets, United States again has the highest average Sharpe ratio with 0.1030 trailed by New Zealand with a Sharpe ratio of 0.0695. Ireland, Switzerland and Taiwan are newcomers to the top group compared to the full sample. These five advanced markets have an average Sharpe ratio of 0.0733. The lowest average Sharpe ratios belong to Cyprus, Slovenia, Greece, Czech Republic and Portugal with values between -0.0479 and 0.0199. These countries also rank among the bottom five in the full sample except

for Czech Republic. The median Sharpe ratios are between -0.0691 (Cyprus) and 0.0867 (United States) whereas the standard deviation of the Sharpe ratios are between 0.1605 (Japan) and 0.2608 (Singapore). The range for the mean and median statistics across advanced markets is wider compared to the full sample.

For the emerging markets, Venezuela, Pakistan, Philippines, Thailand and Argentina have the highest average Sharpe ratios with values between 0.1565 and 0.0692. Only one market, Pakistan, retains its place among the top five between the two sample periods. These five emerging markets have an average Sharpe ratio of 0.1021 which is higher than that for advanced markets. The five markets with the lowest Sharpe ratios are Bulgaria, Poland, Romania, Hungary and Colombia with values between -0.0059 and 0.0324. It is only Romania and Poland that also rank among the bottom five in the full sample. The median Sharpe ratios are between -0.0194 (Poland) and 0.1587 (Venezuela) whereas the standard deviation of the Sharpe ratios are between 0.2047 (China) and 0.3689 (Venezuela). Similar to the advanced markets, the range for the mean and median Sharpe ratios is wider compared to the full sample. One final observation is that Poland which has the second lowest mean Sharpe ratio would not have ranked in the bottom five among the advanced markets. These observations suggest that emerging markets had better standard deviation-adjusted performances than advanced markets after the global credit crisis.

TABLE 2. Sharpe Ratios for Country Equity Indices (Full Sample)

Panel A. Advanced Economies			
	Mean	St Dev	Median
United States	0.0642	0.2003	0.0572
Canada	0.0638	0.2401	0.0577
Czech Republic	0.0629	0.2588	0.0593
New Zealand	0.0618	0.2539	0.0643
Belgium	0.0608	0.2281	0.0566
Australia	0.0587	0.2276	0.0607
Austria	0.0583	0.2433	0.0599
Denmark	0.0580	0.2156	0.0733
Norway	0.0575	0.2327	0.0433
Singapore	0.0564	0.2542	0.0389
Finland	0.0548	0.2171	0.0386
Ireland	0.0547	0.2210	0.0554
France	0.0546	0.2112	0.0404
South Korea	0.0542	0.2289	0.0278
Israel	0.0537	0.2331	0.0394
Sweden	0.0532	0.2063	0.0280
Switzerland	0.0521	0.2096	0.0601
Netherlands	0.0521	0.2131	0.0473
Spain	0.0500	0.2312	0.0449
Hong Kong	0.0497	0.2268	0.0555
United Kingdom	0.0490	0.1989	0.0308
Germany	0.0490	0.2271	0.0399
Italy	0.0433	0.2292	0.0175
Taiwan	0.0386	0.2358	0.0230
Luxembourg	0.0383	0.2361	0.0412
Portugal	0.0344	0.2571	0.0260
Slovenia	0.0337	0.2784	0.0130
Greece	0.0264	0.2503	0.0200
Japan	0.0250	0.1800	0.0195
Cyprus	0.0043	0.2725	-0.0128

TABLE 2. Sharpe Ratios for Country Equity Indices (Full Sample)

Panel B. Emerging Economies			
	Mean	St Dev	Median
Pakistan	0.0870	0.3058	0.0772
India	0.0700	0.2675	0.0718
Peru	0.0673	0.3232	0.0773
Bulgaria	0.0620	0.2937	0.0484
Indonesia	0.0605	0.2328	0.0660
Russia	0.0584	0.2372	0.0573
Thailand	0.0561	0.2577	0.0628
South Africa	0.0559	0.2377	0.0547
Venezuela	0.0558	0.3310	0.0403
Malaysia	0.0550	0.2698	0.0710
Mexico	0.0547	0.2389	0.0411
Brazil	0.0542	0.2715	0.0438
Chile	0.0511	0.2897	0.0335
Hungary	0.0459	0.2428	0.0411
China	0.0457	0.2329	0.0286
Turkey	0.0429	0.2362	0.0348
Colombia	0.0429	0.3351	0.0649
Sri Lanka	0.0415	0.3334	0.0281
Philippines	0.0409	0.2678	0.0432
Argentina	0.0405	0.2806	0.0323
Poland	0.0401	0.2615	0.0416
Romania	0.0387	0.2745	0.0457

TABLE 3. Sharpe Ratios for Country Equity Indices (Post-Crisis Sample)

Panel A. Advanced Economies			
	Mean	St Dev	Median
United States	0.1030	0.2059	0.0867
New Zealand	0.0695	0.2565	0.0857
Ireland	0.0658	0.2009	0.0699
Switzerland	0.0645	0.2150	0.0725
Taiwan	0.0637	0.2221	0.0807
Singapore	0.0622	0.2608	0.0377
Denmark	0.0606	0.1991	0.0440
Belgium	0.0596	0.2012	0.0432
Netherlands	0.0579	0.2099	0.0765
Hong Kong	0.0562	0.2118	0.0585
United Kingdom	0.0562	0.2001	0.0448
Sweden	0.0536	0.1744	0.0297
South Korea	0.0518	0.2165	0.0299
Germany	0.0511	0.2205	0.0338
Australia	0.0509	0.2281	0.0685
France	0.0507	0.2071	0.0193
Japan	0.0489	0.1605	0.0473
Canada	0.0467	0.2197	0.0303
Israel	0.0464	0.2265	0.0067
Norway	0.0457	0.2068	0.0192
Finland	0.0407	0.2096	0.0385
Spain	0.0386	0.2204	0.0451
Austria	0.0383	0.2276	0.0484
Italy	0.0350	0.2072	0.0225
Luxembourg	0.0308	0.2067	0.0341
Portugal	0.0199	0.2336	0.0012
Czech Republic	0.0185	0.2284	-0.0047
Greece	-0.0061	0.2260	-0.0144
Slovenia	-0.0112	0.2456	-0.0189
Cyprus	-0.0479	0.2583	-0.0691

TABLE 3. Sharpe Ratios for Country Equity Indices (Post-Crisis Sample)

Panel B. Emerging Economies			
	Mean	St Dev	Median
Venezuela	0.1565	0.3689	0.1587
Pakistan	0.1124	0.3009	0.1239
Philippines	0.0920	0.2316	0.0589
Thailand	0.0806	0.2323	0.0889
Argentina	0.0692	0.2770	0.0369
Indonesia	0.0652	0.2141	0.0736
Sri Lanka	0.0606	0.3509	0.0302
Malaysia	0.0580	0.2495	0.0785
Peru	0.0560	0.3570	0.0219
India	0.0469	0.2497	0.0487
Mexico	0.0468	0.2192	0.0334
China	0.0409	0.2047	0.0285
Chile	0.0404	0.2584	0.0318
Turkey	0.0404	0.2350	0.0213
South Africa	0.0375	0.2065	0.0427
Brazil	0.0354	0.2334	0.0296
Russia	0.0344	0.2171	0.0211
Colombia	0.0324	0.2790	0.0334
Hungary	0.0312	0.2132	0.0269
Romania	0.0297	0.2664	0.0365
Poland	0.0269	0.2280	-0.0194
Bulgaria	-0.0059	0.2857	0.0068

4.2 Sortino Ratios

Tables 4 and 5 present Sortino ratio rankings for advanced and emerging markets for the full and post-crisis sample periods, respectively. Since many patterns are similar for the standard deviations and medians between the performance metrics, the subsequent discussion will focus on the means. Panel A of Table 4 shows that the highest average Sortino ratios for advanced economies belong to Czech Republic, Austria, New Zealand, Singapore and Norway with values between 0.1893 and 0.1639. Only Czech Republic and New Zealand rank among the top group in Panel A of Table 2 for Sharpe ratios. Moreover, only Czech Republic is among the five markets with the highest mean returns in Panel A of Table 1. These results stress both the importance of risk-adjustment and the choice of the risk measure when assessing investment performance. On the other hand, Cyprus, Japan, Portugal and Greece continue to rank in the bottom five similar to the mean return and Sharpe ratio rankings. The average Sortino ratios vary between 0.0795 and 0.1216 for this group. For the emerging economies in Panel B of Table 4, the highest average Sortino ratios belong to Venezuela, Pakistan, Sri Lanka, Bulgaria and Peru with values between 0.6046 and 0.2203. Of these five countries, Bulgaria, Pakistan and Peru rank among the top five based on Sharpe ratios in Panel B of Table 2 but only Bulgaria and Venezuela rank among the top five based on mean returns in Panel B of Table 1. The lowest average Sortino ratios belong to China, Russia, Mexico, Poland and Turkey with values between 0.1255 and 0.1388. Of these five countries, only Poland ranks among the bottom five based on Sharpe ratios in Panel B of Table 2 and only Mexico ranks among the bottom five based on mean returns in Panel B Table 1. Moreover, China and Russia have two of the highest five mean returns in the full sample period which again testifies that risk-adjustment is indispensable to get a complete picture of investment performance. Finally, comparing the Sortino ratios between advanced and emerging economies in the full sample, one can see that Czech Republic, the advanced market with the highest average Sortino ratio would have ranked seventh among emerging markets and China, the emerging market with the lowest average Sortino ratio would have surpassed ten advanced markets.

For the post-crisis sample, Panel A of Table 5 shows that the highest average Sortino ratios for advanced economies belong to United States, Singapore, New Zealand, Norway and Taiwan with values between 0.2335 and 0.1611. The lowest average Sortino ratios belong to Cyprus, Greece, Slovenia, Italy and Portugal with values between -0.0384 and 0.0862. For both groups, at least three out of five countries also rank among the top or bottom five based on Sharpe ratios in Panel A of Table 3. In Panel B of Table 5, for emerging economies, the highest average Sortino ratios are observed for Venezuela, Pakistan, Philippines, Sri Lanka and Thailand with values between 1.2494 and 0.2174. Only Sri Lanka is not among the markets with the top five Sharpe ratios in Panel B of Table 3. The lowest average Sortino ratios are observed for Bulgaria, Brazil, South Africa, China and Poland with values between 0.0798 and 0.1096. Only Bulgaria is among the countries with the bottom five Sharpe ratios in Panel B of Table 3. Two additional points are worth noting. First, the range for the average Sortino ratios is wider in the post-crisis period for both advanced and emerging markets. Second, emerging markets have a better performance during the post-crisis period. The two advanced markets with the highest Sortino ratios, United States and Singapore would have ranked fifth and seventh among emerging markets, respectively. The two emerging markets with the lowest Sortino ratios, Bulgaria and Brazil would have surpassed three and six advanced markets, respectively.

TABLE 4. Sortino Ratios for Country Equity Indices (Full Sample)

Panel A. Advanced Economies			
	Mean	St Dev	Median
Czech Republic	0.1893	0.5765	0.1065
Austria	0.1739	0.5275	0.1004
New Zealand	0.1685	0.4885	0.1111
Singapore	0.1648	0.5505	0.0677
Norway	0.1639	0.5611	0.0635
Canada	0.1542	0.4618	0.0807
Israel	0.1489	0.4633	0.0669
Australia	0.1481	0.4544	0.0916
Finland	0.1474	0.4470	0.0557
Denmark	0.1462	0.4237	0.0987
Ireland	0.1450	0.4411	0.0900
United States	0.1447	0.4176	0.0920
Luxembourg	0.1433	0.4953	0.0592
Belgium	0.1405	0.4471	0.0889
Netherlands	0.1377	0.4528	0.0699
France	0.1353	0.4392	0.0718
Sweden	0.1326	0.4196	0.0479
Switzerland	0.1323	0.4309	0.1022
Spain	0.1291	0.4800	0.0726
Germany	0.1289	0.4788	0.0585
United Kingdom	0.1235	0.4093	0.0540
South Korea	0.1234	0.4497	0.0431
Slovenia	0.1229	0.5812	0.0187
Taiwan	0.1227	0.4753	0.0427
Hong Kong	0.1219	0.4260	0.0827
Greece	0.1216	0.6505	0.0357
Portugal	0.1199	0.5075	0.0420
Italy	0.1145	0.4753	0.0265
Japan	0.0809	0.3701	0.0364
Cyprus	0.0795	0.5605	-0.0150

TABLE 4. Sortino Ratios for Country Equity Indices (Full Sample)

Panel B. Emerging Economies			
	Mean	St Dev	Median
Venezuela	0.6046	2.7173	0.0585
Pakistan	0.3080	1.2907	0.1171
Sri Lanka	0.2505	0.8903	0.0417
Bulgaria	0.2357	0.7252	0.0703
Peru	0.2203	0.6692	0.1114
Colombia	0.1920	0.7023	0.1027
Indonesia	0.1840	0.5296	0.0988
Philippines	0.1809	0.8716	0.0715
Thailand	0.1714	0.5437	0.1161
India	0.1700	0.5954	0.1082
Chile	0.1678	0.5797	0.0612
Malaysia	0.1618	0.5508	0.1167
South Africa	0.1614	0.5035	0.0976
Romania	0.1557	0.5857	0.0679
Argentina	0.1520	0.6122	0.0420
Brazil	0.1495	0.5378	0.0663
Hungary	0.1434	0.5067	0.0670
Turkey	0.1388	0.5143	0.0572
Poland	0.1348	0.5139	0.0643
Mexico	0.1339	0.4438	0.0672
Russia	0.1260	0.6854	0.0941
China	0.1255	0.4626	0.0559

TABLE 5. Sortino Ratios for Country Equity Indices (Post-Crisis Sample)

Panel A. Advanced Economies			
	Mean	St Dev	Median
United States	0.2335	0.4953	0.1326
Singapore	0.1964	0.6192	0.0676
New Zealand	0.1776	0.4869	0.1388
Norway	0.1653	0.6555	0.0525
Taiwan	0.1611	0.4682	0.1160
Ireland	0.1570	0.4027	0.1098
Denmark	0.1529	0.4141	0.0861
Netherlands	0.1474	0.4268	0.1225
Switzerland	0.1471	0.4266	0.1315
United Kingdom	0.1470	0.4486	0.0816
Belgium	0.1399	0.3896	0.0737
South Korea	0.1377	0.5042	0.0441
Hong Kong	0.1319	0.4073	0.0930
Sweden	0.1301	0.3428	0.0515
Australia	0.1277	0.4208	0.0981
France	0.1261	0.4028	0.0308
Austria	0.1246	0.4661	0.0712
Japan	0.1231	0.3541	0.0675
Israel	0.1214	0.4275	0.0131
Germany	0.1194	0.4014	0.0547
Finland	0.1187	0.4256	0.0538
Canada	0.1039	0.3699	0.0410
Spain	0.0989	0.4408	0.0726
Luxembourg	0.0936	0.3642	0.0405
Czech Republic	0.0907	0.4871	-0.0085
Portugal	0.0862	0.4415	0.0015
Italy	0.0850	0.3703	0.0337
Slovenia	0.0489	0.5026	-0.0340
Greece	0.0282	0.4267	-0.0189
Cyprus	-0.0384	0.4587	-0.1048

TABLE 5. Sortino Ratios for Country Equity Indices (Post-Crisis Sample)

Panel B. Emerging Economies			
	Mean	St Dev	Median
Venezuela	1.2494	3.9326	0.1880
Pakistan	0.4652	1.8147	0.2045
Philippines	0.2950	1.1556	0.0982
Sri Lanka	0.2609	0.8762	0.0488
Thailand	0.2174	0.5123	0.1671
Peru	0.1974	0.6819	0.0213
Indonesia	0.1788	0.4734	0.1358
Argentina	0.1768	0.4976	0.0531
India	0.1550	0.6324	0.0881
Colombia	0.1435	0.5718	0.0526
Malaysia	0.1412	0.4291	0.1429
Chile	0.1396	0.5141	0.0603
Turkey	0.1260	0.5009	0.0295
Romania	0.1236	0.4959	0.0624
Russia	0.1195	0.4540	0.0347
Hungary	0.1169	0.4706	0.0403
Mexico	0.1122	0.4127	0.0554
Poland	0.1096	0.4853	-0.0266
China	0.1053	0.3858	0.0461
South Africa	0.1010	0.4148	0.0856
Brazil	0.0920	0.4428	0.0479
Bulgaria	0.0798	0.6328	0.0078

4.3 Return-to-VaR Ratios

To obtain a sense of how extreme downside risk impacts index performance, Tables 6 and 7 present return-to-VaR ratio rankings for advanced and emerging markets for the full and post-crisis sample periods, respectively. The discussion continues to focus on the means of the ratios and performance comparisons are done with respect to the Sharpe ratio rankings. Other pairwise comparisons between the performance metrics are left to the reader. Panel A of Table 6 shows that the highest average return-to-VaR ratios for advanced economies belong to New Zealand, Spain, Australia, Canada and Czech Republic with values between 0.1196 and 0.0956. Australia and Czech Republic are among the top group based on mean returns in Panel A of Table 1 whereas New Zealand, Canada and Czech Republic are among the top group based on Sharpe ratios in Panel A of Table 2. The lowest average return-to-VaR ratios belong to Japan, Cyprus, United Kingdom, Sweden and Germany with values between 0.0389 and 0.0665. Among these five markets, only Japan and Cyprus are both in the bottom group based on mean return and Sharpe ratio rankings in Panel A of Tables 1 and 2. In fact, Sweden, the country with the fifth highest mean return in the full sample period has the fourth lowest return-to-VaR ratio. For the emerging economies in Panel B of Table 6, Venezuela, Bulgaria, Peru, Pakistan and India have the highest average return-to-VaR ratios with values between 1.3248 and 0.1413. Four of these countries except Venezuela are among the top group based on Sharpe ratio rankings in Panel B of Table 2; however, only Bulgaria and Venezuela are among the top group based on mean return rankings in Panel B of Table 1. The lowest return-to-VaR ratios belong to Turkey, Hungary, Poland, China and Russia with values between 0.0702 and 0.0769. Of these five countries, only Poland ranks among the bottom five based on Sharpe ratios in Panel B of Table 2 and only Hungary ranks among the bottom five based on mean returns in Panel B Table 1. Moreover, China and Russia, two countries with the highest mean returns are in the bottom group based on return-to-VaR ratio rankings. The need for risk-adjustment and the importance of the choice of the risk metric continue to manifest themselves based on these results. Finally, comparing the return-to-VaR ratios of advanced and emerging markets in the full sample period, one can observe that emerging markets continue their

dominance. New Zealand, the advanced market with the highest return-to-VaR ratio would have ranked seventh among emerging markets whereas Turkey, the emerging market with the lowest return-to-VaR ratio would have surpassed eleven advanced markets.

For advanced markets in the post-crisis sample, in Panel A of Table 7, United States, Canada, Taiwan, New Zealand and Singapore have the highest average return-to-VaR ratios with values between 0.1238 and 0.0894. Cyprus, Greece, Slovenia, Czech Republic and Portugal have the lowest average return-to-VaR ratios with values between -0.0022 and 0.0477. These rankings exhibit a high level of similarity to the Sharpe ratio rankings in Panel A of Table 3. This correspondence does not extend to the emerging markets presented in Panel B of Table 7. Only Venezuela and Pakistan are common in the top group and only Poland and Hungary are common in the bottom group based on Sharpe and return-to-VaR ratio rankings. The range for the average return-to-VaR ratios are again wider during the post-crisis sample period. Furthermore, emerging markets continue to have better extreme downside risk-adjusted performances in the recent sample period. United States, the advanced market with the highest return-to-VaR ratio would have ranked seventh among emerging markets whereas Hungary, the emerging market with the lowest return-to-VaR ratio would have surpassed six advanced markets.

TABLE 6. Return-to-VaR Ratios for Country Equity Indices (Full Sample)

Panel A. Advanced Economies			
	Mean	St Dev	Median
New Zealand	0.1196	0.5113	0.0435
Spain	0.1125	0.6764	0.0296
Australia	0.1025	0.4780	0.0417
Canada	0.1002	0.4045	0.0378
Czech Republic	0.0956	0.2665	0.0469
Austria	0.0890	0.2447	0.0405
Norway	0.0856	0.2437	0.0227
Hong Kong	0.0825	0.2310	0.0347
Singapore	0.0820	0.2306	0.0253
United States	0.0808	0.2118	0.0384
South Korea	0.0786	0.2225	0.0229
Ireland	0.0770	0.2190	0.0348
Slovenia	0.0768	0.2727	0.0089
Belgium	0.0765	0.2037	0.0373
Taiwan	0.0747	0.2392	0.0158
Luxembourg	0.0744	0.2507	0.0254
Denmark	0.0739	0.1911	0.0487
Italy	0.0726	0.2370	0.0113
Israel	0.0718	0.2085	0.0263
Switzerland	0.0700	0.2031	0.0420
France	0.0694	0.1888	0.0284
Finland	0.0694	0.1942	0.0218
Netherlands	0.0688	0.1913	0.0302
Portugal	0.0684	0.2275	0.0181
Greece	0.0669	0.2690	0.0130
Germany	0.0665	0.1972	0.0269
Sweden	0.0645	0.1833	0.0213
United Kingdom	0.0640	0.1821	0.0206
Cyprus	0.0597	0.2823	-0.0066
Japan	0.0389	0.1501	0.0131

TABLE 6. Return-to-VaR Ratios for Country Equity Indices (Full Sample)

Panel B. Emerging Economies			
	Mean	St Dev	Median
Venezuela	1.3248	9.2287	0.0339
Bulgaria	0.4624	4.5931	0.0381
Peru	0.1484	0.5091	0.0544
Pakistan	0.1443	0.3378	0.0518
India	0.1413	0.5420	0.0476
Sri Lanka	0.1404	0.4614	0.0171
Colombia	0.1189	0.3476	0.0457
Chile	0.1150	0.3747	0.0245
Argentina	0.1101	0.3991	0.0230
Indonesia	0.1012	0.3437	0.0400
Brazil	0.0981	0.3108	0.0298
Malaysia	0.0968	0.2933	0.0565
Philippines	0.0911	0.2940	0.0317
South Africa	0.0898	0.2709	0.0348
Thailand	0.0889	0.2463	0.0445
Romania	0.0861	0.2819	0.0271
Mexico	0.0770	0.2070	0.0290
Russia	0.0769	0.2038	0.0405
China	0.0761	0.2302	0.0211
Poland	0.0732	0.2299	0.0260
Hungary	0.0706	0.2113	0.0299
Turkey	0.0702	0.2182	0.0260

TABLE 7. Return-to-VaR Ratios for Country Equity Indices (Post-Crisis Sample)

Panel A. Advanced Economies			
	Mean	St Dev	Median
United States	0.1238	0.2609	0.0600
Canada	0.1050	0.5517	0.0150
Taiwan	0.0953	0.2561	0.0464
New Zealand	0.0945	0.2346	0.0579
Singapore	0.0894	0.2396	0.0252
Switzerland	0.0838	0.2205	0.0519
South Korea	0.0799	0.2483	0.0236
Ireland	0.0770	0.1936	0.0505
United Kingdom	0.0742	0.1956	0.0330
Netherlands	0.0725	0.1846	0.0566
Norway	0.0719	0.2387	0.0171
Belgium	0.0703	0.1788	0.0251
Denmark	0.0702	0.1760	0.0350
Hong Kong	0.0699	0.1850	0.0403
Germany	0.0675	0.1840	0.0224
Australia	0.0674	0.1837	0.0425
Spain	0.0667	0.2639	0.0298
France	0.0662	0.1751	0.0182
Austria	0.0638	0.1983	0.0359
Sweden	0.0595	0.1519	0.0200
Finland	0.0584	0.1786	0.0215
Italy	0.0560	0.1759	0.0129
Japan	0.0534	0.1387	0.0273
Israel	0.0514	0.1714	0.0042
Luxembourg	0.0488	0.1603	0.0179
Portugal	0.0477	0.1928	0.0010
Czech Republic	0.0452	0.1936	-0.0032
Slovenia	0.0337	0.2089	-0.0130
Greece	0.0218	0.1794	-0.0082
Cyprus	-0.0022	0.1888	-0.0469

TABLE 7. Return-to-VaR Ratios for Country Equity Indices (Post-Crisis Sample)

Panel B. Emerging Economies			
	Mean	St Dev	Median
Venezuela	2.9388	13.7913	0.1685
Sri Lanka	0.1729	0.5670	0.0183
Peru	0.1726	0.6865	0.0105
Pakistan	0.1529	0.2950	0.0751
India	0.1461	0.7261	0.0354
Argentina	0.1314	0.4055	0.0288
Philippines	0.1222	0.3191	0.0470
Thailand	0.0990	0.2110	0.0729
Indonesia	0.0821	0.1980	0.0521
Colombia	0.0748	0.2507	0.0222
Malaysia	0.0738	0.1892	0.0636
Chile	0.0714	0.2292	0.0216
Romania	0.0674	0.2257	0.0236
Turkey	0.0660	0.2223	0.0128
South Africa	0.0654	0.2673	0.0273
Mexico	0.0641	0.1891	0.0232
Bulgaria	0.0633	0.2956	0.0097
Russia	0.0605	0.1936	0.0179
Brazil	0.0604	0.2039	0.0207
Poland	0.0594	0.2131	-0.0128
China	0.0592	0.1793	0.0191
Hungary	0.0505	0.1796	0.0171

4.4 Treynor Ratios

Tables 8 and 9 present Treynor ratio rankings for advanced and emerging markets for the full and post-crisis sample periods, respectively. Panel A of Table 8 shows that Singapore, Ireland, Austria, Norway and Finland have the highest average Treynor ratios with values between 0.3354 and 0.0009 whereas Luxembourg, Israel, Cyprus, New Zealand and Denmark have the lowest average Treynor ratios with values between -1.9402 and -0.0041. Among these advanced economies, only Finland ranks among the top five and only Cyprus ranks among the bottom five based on mean returns in Panel A of Table 1. Moreover, none of the markets in the top five based on Sharpe ratio rankings in Panel A of Table 2 and Treynor ratio rankings are common and it is only Cyprus that is common for the bottom five. New Zealand, the market with the fourth highest Sharpe ratio has the fourth lowest Treynor ratio. For the emerging markets in Panel B of Table 8, India, Thailand, Argentina, Poland and Russia have the highest average Treynor ratios with values between 0.0071 and 0.0014 whereas Venezuela, Pakistan, Bulgaria, Sri Lanka and Brazil have the lowest average Treynor ratios with values between -0.0477 and -0.0049. Comparing these rankings to those for Sharpe ratios in Panel B of Table 2, only India retains its place in the top five and only Sri Lanka retains its place in the bottom five. Two countries among those with the highest five Sharpe ratios, Pakistan and Bulgaria are among the bottom five based on the Treynor ratio rankings. These results suggest that adjusting for systematic risk in the form of beta rather than total risk in the form of standard deviation has a big impact on the performance comparisons between market indices. Focusing on Panel B of Table 1, one can also see that two of the five countries with the highest mean returns, Venezuela and Bulgaria are in the bottom group based on Treynor ratio rankings and there is no common country at the bottom five between mean return and Treynor ratio rankings.

For the post-crisis sample, in Panel A of Table 9, the highest average Treynor ratios for advanced economies belong to New Zealand, Taiwan, Hong Kong, Ireland and United States with values between 0.0031 and 0.0007. Cyprus, Czech Republic, Greece, South Korea and Japan have the lowest average Treynor ratios with values between -0.0067 and -0.0007. Comparing these rankings to those for

Sharpe ratios in Panel A of Table 3, one can observe a greater level of correspondence compared to the full sample. Four of the countries are common in the top group whereas three of the countries are common in the bottom group. However, adjusting for risk is still important since none of the five markets with the highest mean returns in Panel A of Table 1 are among the five markets with the highest Treynor ratios. In fact, South Korea and Czech Republic, the advanced markets with the highest mean returns have two of the five lowest Treynor ratios. For emerging markets, in Panel B of Table 9, Philippines, Indonesia, Thailand, Argentina and Colombia have the highest average Treynor ratios with values between 0.0048 and 0.0013 whereas Venezuela, Bulgaria, Sri Lanka, Pakistan and India have the lowest average Treynor ratios with values between -0.1040 and -0.0009. Compared to the Sharpe ratio rankings in Panel B of Table 3, three of the countries are common in the top group whereas only Bulgaria is common in the bottom group. Venezuela and Pakistan, two countries with the highest Sharpe ratios are among the five countries with the lowest Treynor ratios. Colombia, one of the five countries with the lowest Sharpe ratios are among the five countries with the highest Treynor ratios. One final observation is that, despite some outliers, advanced and emerging economies exhibit comparable performances based on their Treynor ratios both in the full and the post-crisis sample periods.

TABLE 8. Treynor Ratios for Country Equity Indices (Full Sample)

Panel A. Advanced Economies			
	Mean	St Dev	Median
Singapore	0.3354	5.1054	0.0003
Ireland	0.0034	0.0664	0.0006
Austria	0.0012	0.0245	0.0006
Norway	0.0011	0.0112	0.0005
Finland	0.0009	0.0066	0.0004
Canada	0.0007	0.0036	0.0005
Hong Kong	0.0006	0.0129	0.0007
Switzerland	0.0005	0.0076	0.0006
Australia	0.0005	0.0110	0.0008
Taiwan	0.0004	0.0319	0.0005
United States	0.0004	0.0020	0.0005
France	0.0003	0.0023	0.0003
Spain	0.0002	0.0031	0.0004
United Kingdom	0.0002	0.0022	0.0003
Netherlands	0.0002	0.0039	0.0004
Germany	0.0001	0.0026	0.0003
Italy	0.0001	0.0032	0.0001
Japan	-0.0001	0.0199	0.0003
Belgium	-0.0004	0.0070	0.0005
Sweden	-0.0004	0.0130	0.0003
Czech	-0.0007	0.0268	0.0006
South Korea	-0.0020	0.0171	0.0004
Greece	-0.0022	0.0365	0.0003
Portugal	-0.0026	0.0314	0.0002
Slovenia	-0.0030	0.0563	-0.0006
Denmark	-0.0041	0.0744	0.0009
New Zealand	-0.0065	0.1391	0.0007
Cyprus	-0.0307	0.3275	-0.0002
Israel	-0.0668	1.0090	0.0005
Luxembourg	-1.9402	29.4430	0.0005

TABLE 8. Treynor Ratios for Country Equity Indices (Full Sample)

Panel B. Emerging Economies			
	Mean	St Dev	Median
India	0.0071	0.0948	0.0006
Thailand	0.0035	0.0673	0.0007
Argentina	0.0019	0.0444	0.0007
Poland	0.0015	0.0150	0.0003
Russia	0.0014	0.0097	0.0007
Indonesia	0.0011	0.0327	0.0010
China	0.0009	0.0455	0.0002
Mexico	0.0006	0.0036	0.0005
Hungary	0.0006	0.0150	0.0004
Malaysia	0.0004	0.0350	0.0008
Romania	0.0000	0.0293	0.0011
Peru	-0.0002	0.0207	0.0001
Turkey	-0.0003	0.0253	0.0005
Chile	-0.0003	0.0085	0.0001
Philippines	-0.0004	0.0303	0.0005
South Africa	-0.0016	0.0208	0.0003
Colombia	-0.0037	0.0407	0.0007
Brazil	-0.0049	0.1100	0.0004
Sri Lanka	-0.0094	0.1594	0.0001
Bulgaria	-0.0115	0.0767	-0.0006
Pakistan	-0.0144	0.4090	-0.0003
Venezuela	-0.0477	0.5027	-0.0013

TABLE 9. Treynor Ratios for Country Equity Indices (Post-Crisis Sample)

Panel A. Advanced Economies			
	Mean	St Dev	Median
New Zealand	0.0031	0.0331	0.0014
Taiwan	0.0030	0.0167	0.0013
Hong Kong	0.0011	0.0049	0.0006
Ireland	0.0007	0.0033	0.0006
United States	0.0007	0.0022	0.0008
Denmark	0.0004	0.0026	0.0008
Sweden	0.0004	0.0021	0.0003
Belgium	0.0003	0.0030	0.0004
Singapore	0.0003	0.0056	0.0004
Norway	0.0003	0.0025	0.0002
Australia	0.0003	0.0040	0.0007
Luxembourg	0.0003	0.0043	0.0005
United Kingdom	0.0003	0.0021	0.0003
Canada	0.0002	0.0025	0.0003
Netherlands	0.0002	0.0025	0.0004
Israel	0.0002	0.0050	0.0002
France	0.0002	0.0023	0.0001
Finland	0.0001	0.0024	0.0003
Germany	0.0001	0.0025	0.0003
Austria	0.0001	0.0029	0.0004
Spain	0.0001	0.0028	0.0003
Italy	0.0001	0.0025	0.0001
Portugal	0.0000	0.0031	0.0000
Switzerland	-0.0002	0.0078	0.0007
Slovenia	-0.0006	0.0170	-0.0001
Japan	-0.0007	0.0257	0.0007
South Korea	-0.0010	0.0107	0.0003
Greece	-0.0011	0.0077	-0.0002
Czech	-0.0030	0.0260	0.0003
Cyprus	-0.0067	0.0679	-0.0005

TABLE 9. Treynor Ratios for Country Equity Indices (Post-Crisis Sample)

Panel B. Emerging Economies			
	Mean	St Dev	Median
Philippines	0.0048	0.0342	0.0012
Indonesia	0.0027	0.0221	0.0009
Thailand	0.0026	0.0088	0.0016
Argentina	0.0023	0.0122	0.0010
Colombia	0.0013	0.0114	0.0006
China	0.0012	0.0063	0.0004
Turkey	0.0007	0.0052	0.0003
Romania	0.0007	0.0165	0.0004
Malaysia	0.0007	0.0188	0.0011
Chile	0.0005	0.0038	0.0004
Hungary	0.0003	0.0041	0.0002
Mexico	0.0003	0.0027	0.0003
South Africa	0.0002	0.0027	0.0004
Brazil	0.0002	0.0031	0.0004
Peru	0.0001	0.0105	0.0002
Russia	-0.0001	0.0048	0.0003
Poland	-0.0001	0.0037	-0.0001
India	-0.0009	0.0159	0.0006
Pakistan	-0.0018	0.0414	-0.0004
Sri Lanka	-0.0095	0.1591	0.0000
Bulgaria	-0.0186	0.1024	-0.0003
Venezuela	-0.1040	0.7536	-0.0004

4.5 Calmar Ratios

Tables 10 and 11 present Calmar ratio rankings for advanced and emerging markets for the full and post-crisis sample periods, respectively. In Panel A of Table 10, for advanced economies, the highest average Calmar ratios belong to United States, New Zealand, Denmark, Belgium and Ireland with values between 0.2182 and 0.2070. None of the five countries with the highest mean returns in Panel A of Table 1 are among this group; however, United States, New Zealand and Belgium are among the five markets with the highest Sharpe ratios in Panel A of Table 2. The lowest Calmar ratios belong to Cyprus, Greece, Japan, Slovenia and Taiwan with values between 0.0312 and 0.1266. Except for Taiwan, these markets are also in the bottom five based on mean return rankings in Panel A of Table 1 and Sharpe ratio rankings in Panel A of Table 2. For the emerging markets in Panel B of Table 10, the highest average Calmar ratios belong to Pakistan, India, Peru, Indonesia and Mexico with values between 0.2410 and 0.1958 whereas the lowest average Calmar ratios belong to Poland, Argentina, Sri Lanka, Hungary and Romania with values between 0.1315 and 0.1418. Comparing these rankings to the mean return rankings in Panel B of Table 1, none of the countries are common in the top group and only Hungary and Argentina are common in the bottom group. However, comparing these rankings to the Sharpe ratio rankings in Panel B of Table 2, four countries are common in both the top and bottom groups. The top five advanced markets in Panel A of Table 10 have an average Sharpe ratio of 0.2130 and the top five emerging markets in Panel B of Table 10 have a similar average Sharpe ratio of 0.2159. However, emerging markets have a better performance when one focuses at the bottom of the rankings. Poland, the emerging market with the lowest average Calmar ratio would have surpassed six advanced markets.

Panel A of Table 11 shows that the advanced markets with the highest Calmar ratios in the post-crisis sample period are United States, Ireland, New Zealand, Switzerland and Denmark with values between 0.2721 and 0.2042. Only Denmark is not among the top group based on the Sharpe ratio rankings in Panel A of Table 3. The five advanced markets with the lowest Calmar ratios are Cyprus, Greece, Slovenia, Portugal and Czech Republic with values between -0.1426 and 0.0717. These are exactly the five advanced markets with the lowest Sharpe ratios in Panel A of Table 3. For the emerging economies in Panel B of Table 11, Venezuela, Pakistan, Philippines, Thailand and Indonesia have the highest average Calmar ratios with values between 0.4311 and 0.2341 whereas the lowest average Calmar ratios belong to Bulgaria, Poland, Russia, Brazil and Hungary with values between 0.0010 and 0.1065. Comparing these rankings to the Sharpe ratio rankings in Panel B of Table 3, four markets are common in the top group and three markets are common in the bottom group. These results suggest that standard deviation and maximum drawdown capture similar dimensions of risk. Two more observations are worth noting. First, the range for the average Calmar ratios is wider in the post-crisis period for both advanced and emerging markets. Second, emerging markets have higher Calmar ratios in the post-crisis period. The top five emerging markets have an average Calmar ratio of 0.3040 compared to 0.2321 for the advanced markets. Similarly, the bottom five emerging markets have an average Calmar ratio of 0.0717 compared to -0.0073 for the advanced markets.

TABLE 10. Calmar Ratios for Country Equity Indices (Full Sample)

Panel A. Advanced Economies			
	Mean	St Dev	Median
United States	0.2182	0.6604	0.2953
New Zealand	0.2153	0.6996	0.3017
Denmark	0.2135	0.6628	0.2848
Belgium	0.2109	0.6610	0.2903
Ireland	0.2070	0.6665	0.2337
Canada	0.2060	0.6791	0.2834
Austria	0.2057	0.6892	0.3004
Switzerland	0.2009	0.6266	0.3040
Australia	0.2005	0.6769	0.2263
Czech Republic	0.1986	0.7108	0.2950
Netherlands	0.1967	0.6567	0.2681
France	0.1948	0.6646	0.2236
Singapore	0.1947	0.7086	0.1593
United Kingdom	0.1874	0.6486	0.1510
Hong Kong	0.1816	0.6776	0.2370
Norway	0.1797	0.6792	0.1850
Sweden	0.1718	0.6489	0.1202
Germany	0.1714	0.6805	0.2017
South Korea	0.1701	0.7194	0.1158
Finland	0.1679	0.6660	0.1688
Luxembourg	0.1611	0.6844	0.1879
Spain	0.1598	0.6735	0.1995
Israel	0.1581	0.6823	0.1730
Italy	0.1437	0.6913	0.1090
Portugal	0.1312	0.7006	0.1271
Taiwan	0.1266	0.7062	0.1008
Slovenia	0.1083	0.7070	0.0598
Japan	0.1043	0.6076	0.0966
Greece	0.0907	0.7157	0.1150
Cyprus	0.0312	0.7654	-0.0622

TABLE 10. Calmar Ratios for Country Equity Indices (Full Sample)

Panel B. Emerging Economies			
	Mean	St Dev	Median
Pakistan	0.2410	0.7495	0.3036
India	0.2258	0.7438	0.3220
Peru	0.2091	0.7566	0.3535
Indonesia	0.2077	0.7336	0.2652
Mexico	0.1958	0.6886	0.1604
Venezuela	0.1924	0.8253	0.2104
Russia	0.1861	0.7313	0.2182
Thailand	0.1847	0.7327	0.2558
Brazil	0.1745	0.7515	0.1554
South Africa	0.1743	0.6831	0.2433
Bulgaria	0.1733	0.7551	0.1973
Malaysia	0.1683	0.7314	0.3171
Turkey	0.1640	0.7434	0.1286
Philippines	0.1640	0.6950	0.1865
China	0.1541	0.7025	0.1351
Chile	0.1527	0.7019	0.1394
Colombia	0.1502	0.7378	0.2653
Romania	0.1418	0.7615	0.1747
Hungary	0.1413	0.7058	0.1718
Sri Lanka	0.1327	0.7605	0.1104
Argentina	0.1317	0.7295	0.1189
Poland	0.1315	0.7304	0.1586

TABLE 11. Calmar Ratios for Country Equity Indices (Post-Crisis Sample)

Panel A. Advanced Economies			
	Mean	St Dev	Median
United States	0.2721	0.6558	0.3926
Ireland	0.2376	0.6724	0.2873
New Zealand	0.2321	0.7013	0.3517
Switzerland	0.2146	0.6509	0.3231
Denmark	0.2042	0.6600	0.1844
Taiwan	0.1937	0.6762	0.2967
Belgium	0.1920	0.6498	0.2576
United Kingdom	0.1797	0.6425	0.2271
Australia	0.1795	0.6737	0.2691
Hong Kong	0.1700	0.6170	0.2378
Netherlands	0.1682	0.6576	0.2939
Singapore	0.1676	0.7085	0.1603
Japan	0.1627	0.5761	0.2070
Sweden	0.1543	0.6312	0.1121
Canada	0.1529	0.6796	0.1047
Germany	0.1470	0.6826	0.1372
South Korea	0.1380	0.6757	0.1337
France	0.1371	0.6660	0.0856
Austria	0.1353	0.6970	0.1876
Norway	0.1327	0.6690	0.0992
Luxembourg	0.1201	0.6706	0.1176
Finland	0.1168	0.6565	0.1586
Israel	0.1124	0.6557	0.0005
Spain	0.1058	0.6737	0.2088
Italy	0.1034	0.6780	0.0929
Czech Republic	0.0717	0.7125	-0.0427
Portugal	0.0688	0.6807	-0.0278
Slovenia	-0.0129	0.6876	-0.1041
Greece	-0.0217	0.7043	-0.0909
Cyprus	-0.1426	0.7098	-0.3236

TABLE 11. Calmar Ratios for Country Equity Indices (Post-Crisis Sample)

Panel B. Emerging Economies			
	Mean	St Dev	Median
Venezuela	0.4311	0.8726	0.6991
Pakistan	0.3374	0.7207	0.4902
Philippines	0.2590	0.6494	0.2532
Thailand	0.2584	0.6913	0.4084
Indonesia	0.2341	0.6795	0.3345
Malaysia	0.1979	0.6857	0.3238
Argentina	0.1823	0.7223	0.1085
Mexico	0.1574	0.6577	0.1121
India	0.1555	0.7011	0.1907
China	0.1475	0.6551	0.0993
Turkey	0.1349	0.7041	0.0519
Peru	0.1342	0.7488	0.0651
South Africa	0.1226	0.6394	0.1694
Sri Lanka	0.1220	0.7831	0.1070
Chile	0.1212	0.6995	0.0922
Romania	0.1085	0.7573	0.1309
Colombia	0.1084	0.7341	0.1666
Hungary	0.1065	0.6993	0.0994
Brazil	0.0960	0.7123	0.0624
Russia	0.0960	0.7016	0.0634
Poland	0.0590	0.6982	-0.0944
Bulgaria	0.0010	0.7131	0.0084

| Conclusion

This research report investigates the relative risk-adjusted performances of various country-specific equity indices around the world for a longer sample period that starts in 1998 and a post-crisis sample period that starts in 2008. Different risk metrics which capture different dimensions of risk are used in the calculations of the performance metrics. Several major observations emerge from the analysis. First, emerging markets have higher mean and median returns compared to advanced markets in the full sample period, but they also have more dispersed return distributions with higher volatilities and more extreme monthly movements. Second, the central tendency statistics for both the return and the performance series are lower in absolute magnitude

compared to the standard deviation statistics. Third, the importance of risk-adjustment is evident since there is often a big discrepancy between the mean return and performance rankings. Fourth, for most performance metrics, emerging markets have a better risk-adjusted performance both in the full and post-crisis sample periods. Fifth, the range for the performance metrics are generally wider in the post-crisis sample period compared to the full sample period. Sixth, the choice of the risk measure used in the performance metrics matters. It is not uncommon to see a market which ranks favorably for one performance metric to rank unfavorably for another performance metric.

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