International Diversification Works (in the Long Run)*

Clifford S. Asness, Roni Israelov†, John M. Liew

AQR Capital Management, LLC

Abstract

Investors and financial economists have long debated the benefits of global equity market diversification. Fans argue that diversifying globally reduces portfolio risk without harming long-term return. Some critics counter with the observation that because markets get more correlated during downturns, most of the diversification occurs on the upside when you do not need it, and vanishes on the downside when you do. Certainly, recent events give support to the critics as all markets have suffered. We argue that this observation, while true, misses the big picture. International diversification might not protect you from terrible days, months, or even years, but over longer horizons (which should be more important to investors) where underlying economic growth matters more to returns than short-lived panics or global coordinated events, it protects you quite well.

Keywords: Diversification, International Diversification, Home Bias

1. Introduction

Portfolio diversification is one of the most fundamental and important tenets of modern finance. In the context of global investing, under some very

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†Corresponding author: roni.israelov@aqr.com

basic assumptions, diversification implies that a portfolio of global equity markets should produce a superior risk-adjusted return to any one country held in isolation. Yet, contrary to what is often called the only free lunch in finance, most investors continue to hold portfolios that are either fully domestic or heavily weighted towards domestic securities: the famous *home bias*.[1]

Not surprisingly, over the years, global diversification has been the topic of much debate. An important criticism against global diversification, which is especially relevant given the recent market downturn, suggests that since global market correlations tend to go up in times of crises, diversification is weakest when investors need it the most.[2] Along the same lines, while most of these critiques have generally focused on conditional correlations, we believe a related, more relevant, and perhaps more distressing observation is simply that markets tend to crash at the same time.[3]

We do not dispute these results, only their relevance. We concur that markets exhibit co-skewness or a tendency to crash together to a disturbing degree and that this tendency impairs the ability of a globally diversified portfolio to protect investors from short systematic crashes. However, we also contend that those dismissing diversification based on this argument miss the bigger point. Investors whose planning horizon is measured in decades should not devote a great deal of anxiety to the risk of common short-term crashes. Instead, they should care more about long drawn out bear markets which can be significantly more damaging to their wealth.

Towards this point, we examine the benefit of diversification by looking at long-term holding period returns and find evidence that the observed co-skewness in markets is only a short-term phenomenon. Over the long run, markets do not exhibit the same tendency to suffer or crash together and thus, a globally diversified portfolio produces similar expected returns as

[1]For a sampling of papers on home bias, please see French and Poterba (1991), Tesar and Werner (1995), Baxter and Jermann (1997), Coval and Moskowitz (1999), Lewis (1999), Strong and Xu (2003), Karlsson and Nordén (2007), Sercu and Vanpee (2007), and Graham et al. (2009).

[2]See Odier and Solnik (1993), Erb et al. (1994), Erb et al. (1995), Longin and Solnik (1995), Longin and Solnik (2001), Karolyi and Stulz (1996), De Santis and Gerard (1997), Bekaert et al. (1998), Ang and Bekaert (2000), Ang and Chen (2002), Leibowitz and Bova (2009), and Chua et al. (2009).

[3]Hartmann et al. (2004) provide evidence in support of 'Asset Market Linkages in Crisis Periods,' the title of their paper.

single country portfolios, with lower volatility, and better worst-case events. It is natural to focus on the short-term failure of diversification during periods of distress, but we should not allow this failure to blind us to its success over the long-term.

What drives this difference between the short and long-term benefits to diversification? One hypothesis is that short-term worst cases are, at least partly, about panics and broad-based selling frenzies. Long-term results, on the other hand, tend to be more about economic performance. We examine this hypothesis by decomposing returns into two pieces (1) a component due to multiple expansion (or contraction) and (2) a component due to economic performance. We find that short-term stock returns tend to be dominated by (1), whereas long-term stock returns tend to be dominated by (2).[4]

These results are consistent with the idea that a sharp decrease in investors' appetite for risk (i.e., a panic) can explain markets crashing at the same time. However, these shocks to risk aversion are a short-lived phenomenon. Over the long-run, economic performance is what drives returns. Moreover, we show that countries exhibit significant idiosyncratic variation in long-run economic performance. Thus, country specific (not global) long-run economic performance is the most important determinant of long-run returns.

By investigating the dynamics of these return contributors, we offer additional support for the argument that global diversification can disappoint over the short-term, but over the long-term – as we should view almost everything in investing – diversification is the free (and hearty!) lunch that theory and common sense says it should be. It's ironic that many proponents of equity investing espouse its long-term benefits while those that attack the power of global diversification focus solely on its performance over days or months and ignore its long-term success.

The remainder of the paper is organized as follows. The next section briefly describes the data used in this study. After that, we provide evidence that markets tend to crash at the same time and show that as a result of

[4]Changes in valuation multiples, as Campbell and Shiller (1988) show, are driven by changes in discount rates (i.e. fear and greed) or changes in forecasted cash flows (i.e. optimism and pessimism). Although we couch this in terms of rational and irrational, all that is necessary for our argument is that discount rates covary more across countries and over shorter periods than forecasted cash flows, indeed either could move for rational or irrational reasons.

this, globally diversified portfolios, while exhibiting lower volatility, tend to produce more extreme tail events than single country portfolios. We then show that these troubling results are a short-term phenomenon that disappears over the longer term. Finally, we present evidence that short-term stock market returns are heavily influenced by multiple expansion or contraction and long-term returns are more heavily influenced by country specific economic performance.

2. Data

Our analysis utilizes local currency denominated total returns, exchange rates, and inflation across 22 countries: Australia, Austria, Belgium, Canada, Denmark, Finland, France, Germany, Greece, Hong Kong, Ireland, Italy, Japan, Netherlands, Norway, Portugal, Singapore, Spain, Sweden, Switzerland, U.K., and U.S. The data is aggregated from multiple sources.

Global Financial Data (GFD) provides local currency denominated total returns for the following 13 countries: Australia, Belgium, Canada, Finland, France, Germany, Italy, Japan, Netherlands, Spain, Sweden, U.K., and U.S. The GFD data for the Netherlands ends July 30, 2004 and we append the series with returns from Datastream. The remaining 9 countries' returns are from Datastream.

Spot exchange rates for Canada and Ireland are from CANSIM. Spot exchange rate data for France, Germany, Japan, U.K., and the U.S. for the period beginning December 1949 and ending December 1969 are from GFD. The remaining exchange rate data are from Datastream.

Finally, we employ Consumer Price Index (CPI) data for each country using a combination of GFD and Datastream. For Japan we use CPI data from GFD for December 1949 through December 1969 and from Datastream for January 1970 through May 2004. For Germany and the U.K. we use CPI data from GFD for December 1949 through February 1961 and from Datastream for March 1961 through May 2004. GFD supplies France's CPI from December 1949 through May 2004 and Datastream completes the sample. All the remaining countries' CPI data for the full respective samples are from Datastream.

3. The Diversification Debacle . . . Markets Crash Together

To examine the benefits of diversification, we consider two candidate portfolios for an investor in each home country:

1. **Local Portfolio:** This represents the portfolio held by a home biased investor. We use the local stock market index as our proxy for this portfolio. Also, in all the analysis that follows, the returns to this portfolio are expressed in real terms, adjusting for local inflation.
2. **Global Portfolio:** This represents the portfolio held by an investor who chooses to diversify globally. We use an equal-weight portfolio of all stock market indices as our proxy for this portfolio; we do not hedge foreign currency exposure and we express returns in real terms, adjusting for the home country's inflation. Note, the real returns to this global portfolio are not the same from each country's perspective due to differences in currency returns and inflation.

As a starting point, let's examine how well global diversification protects investors from the worst periods in their home market.

Table 1 presents the performance of the global portfolios during the worst monthly, quarterly, and annual return for each of the 22 countries in our sample. Global portfolios tend to outperform local portfolios during local portfolios' worst periods, but they are almost always down. Looking across all the countries, the average worst monthly, quarterly and annual local return is -27.5%, -38.8%, and -54.5% and in those periods, the global portfolios average -17.0%, -28.3%, and -35.5% respectively. Better, but not impressive. Especially in light of the fact that since we start by choosing the worst period for the local portfolio, and then look at the global portfolio's performance in the same period, the local portfolio should be heavily biased to look worse. They do look worse, but not by a margin that would make one a great fan of global diversification.

These results are consistent with the well documented observation that correlations across countries rise within bear markets.[5] However, while much of the research in this area has focused on conditional variation in correlations, a related and we believe more direct observation is simply that markets seem to crash at the same time. Simultaneous crashes can pose a problem for global diversification by creating more severe tail events in global portfolios compared to local portfolios. To examine this, we compare the individual worst cases for each of the local and the global portfolios separately.

[5]See Erb et al. (1994), Erb et al. (1995), Longin and Solnik (1995), Longin and Solnik (2001), Karolyi and Stulz (1996), De Santis and Gerard (1997), Bekaert et al. (1998), Ang and Bekaert (2000), and Ang and Chen (2002).

Table 2 presents the individual worst months and rolling years for each of the local and global portfolios (from each country's local perspective).[6] Obviously, unlike Table 1, these months do not necessarily correspond. We compare the local portfolios' worst months (years) to the global portfolios' worst months (years) whenever they may occur. We report the return, the standard deviation event of that return considering the full data set, and the empirical skewness of the return series in question. On average, the worst monthly (yearly) return for the local portfolios is -27.5% (-54.5%) whereas the worst monthly return for the global portfolios is -23.9% (-48.7%). The global portfolio is better. However, global portfolios have significantly lower volatility than local portfolios, so the -23.9% monthly and -48.7% yearly return for the global portfolios are considerably more surprising events! You can see this by looking at the average standard deviation event of the worst month (year) and average skewness of the portfolios. The average standard deviation event of the worst month (year) is -4.7 (-2.7) for the local portfolios and -5.6 (-3.3) for the global portfolios. The average monthly (yearly) skewness for the local portfolios is -0.6 (-0.2) and for the global portfolios is -1.1 (-0.7). As we would expect, simultaneous market crashes cause the global portfolios to experience worse risk adjusted crashes.

Diversification's success in reducing volatility makes the global portfolio more negatively skewed in the presence of market co-skewness. This has practical consequences. Because diversification reduces volatility, the global portfolio requires greater leverage to achieve the same risk as the local portfolio. If you were to lever the global portfolio to achieve this, in a crash you would likely do even worse with the global portfolio than you would have had you only invested locally. While we may marvel at the irony, this is not a great advertisement for holding a global portfolio!

[6] Worst local monthly returns are concentrated around the 1987 crash. 13 of 22 countries experience their worst months during this event. Worst annual returns are slightly less concentrated. Six countries experience their worst years around the end of 1974 and nine countries experience their worst years around the end of 2008. We consider worst years in addition to worst months as a robustness check. Worst years are both less concentrated and concentrated around different events than worst months.

4. Remember What's Important . . . Longer Horizon Returns

Now, let's step back and think about the bigger picture. Short sharp crashes are certainly painful, but ultimately investors should care about long-term wealth creation and preservation. So let's look at the above analysis of worst cases, but look at it in the context of long-horizon returns.

Figure 1 converts Tables 1 and 2 into a graph and goes from looking only at the worst months and years to looking at the worst periods of varying length. To describe the figure, let's start at the point where the x-axis equals one month. This corresponds to the monthly part of the two tables. The blue line at one-month shows the average worst single month for the local portfolios (-27.5%), the pink line shows the average global portfolio performance in the same month (-17.0%), and the orange line shows the average worst single month for the global portfolios (-23.9%). As we saw in the tables, the benefit to holding a global portfolio vs. a local portfolio when looking at a one-month horizon is not so exciting. The corresponding observation in Figure 1 is that at one month the three lines are very close together. Add on top of that the increased negative skewness of the global portfolio and staying at home seems pretty appealing.

However, the story starts to change as we consider longer horizons. First, looking at the blue line, it is clear that long-horizon worst cases can be significantly worse than one month crashes. So as a starting point, it's again fair to say that people should be more concerned with protecting against long-term bad performance than short sharp crashes. Second, while perhaps obvious, we see from the pink line that during these periods of local crisis, the global portfolio is an attractive alternative, a result that is particularly true over longer horizons. Finally, look at what happens to the gap between the worst cases for the global portfolios and the local portfolios (i.e., the gap between the orange line and the blue line). At a one-month holding period there is very little difference. The global portfolios experience worst cases on par with the local portfolios. But over longer horizons, the gap widens considerably and the worst cases for the global portfolios are significantly better than the worst cases for the local portfolios.[7]

For clarity let's go through a specific example. At 60 months the blue

[7] A potential concern is that worst case scenarios overstate the result. For robustness, we also consider the 1st and 10th worst percentiles. As expected, the magnitudes of the losses are reduced. However, the conclusions are not affected.

line is at -57% which represents the average worst five year loss for local portfolios across all countries (these five year losses do not come at the same time). So, if you think history is any guide to the future, *if you invest in a single country*, it's likely that eventually you'll experience a five year period where your real wealth is down nearly 60%. At the same times these local portfolios experienced their worst five year losses, their global portfolio counterparts lost an average of 14%, as shown by the pink line. Unlike their relatively weak showing over the short-term, over the long-term, global portfolios offer significant protection against local crashes or downturns. But again, the pink line is perhaps overselling. The blue vs. orange comparison is most telling. The average worst five year global portfolio performance is about -38% (the orange line at 60 months). While nothing to celebrate, -38% is a world of difference from -57%, particularly considering the power of compounding. Again, unlike what we saw over the short-term, over the long-term we see a significant improvement in worst cases of the global portfolios vs. the local portfolios. We believe those evaluating their portfolios at five year horizons would be pretty excited and thankful for the benefits of global diversification, perhaps going as far as saying it saved their financial bacon precisely when it was needed most![8]

Figure 2 plots the average skewness for the local portfolios at different time horizons, Figure 3 plots the average skewness for the global portfolios, and Figure 4 plots the difference between Figures 3 and 2 (i.e. the average skewness of the global portfolios minus that of the local portfolios). Again, starting where the x-axis equal one month, corresponding to the tables above, you see in the solid line that both the local and global portfolios are on average negatively skewed at -0.7 and -1.2 respectively and as we saw above, monthly returns to the global portfolios are more negatively skewed than those of the local portfolios. The dashed lines correspond to 95% bootstrapped confidence intervals for the skews and difference in skews. We reject

[8]The quintessential example of this phenomenon is Japan during the 1990s. Over this decade, Japan's equity market lost 40% in real terms. At the same time, the global portfolio from Japan's perspective appreciated 131%. In fact, a potential critique is that our results are driven by Japan's underperformance in the 1990s. We maintain that the conclusions from our analysis are relevant since Japan's performance in the 1990s is a real event and there is little reason to believe it is not repeatable from another country's perspective. However, we have verified and are comforted by the fact that our results are robust to the omission of Japan, thanks to our wide 22 country cross-section.

the hypothesis that the estimate is zero when zero is not enveloped by the bands. Figure 4 shows that at short horizons, we have strong statistical confidence that globally diversified portfolios are more negatively skewed than their local counterparts. However, as we go to longer horizons, this difference goes away. When holding periods reach 3.5 years, we begin to fail to reject the hypothesis that their skews are the same (and the absolute differences get very small). In fact, at longer horizons the skewness of global portfolio returns is (slightly) higher than that of local returns.[9]

As we saw above with the worst cases, when looking at longer holding periods, three things happen. The negative skewness of the local portfolios, and the negative skewness of the global portfolios, and the difference in skewness between the global and local portfolios all go towards zero.

In sum, even though markets tend to crash together making the global portfolio more negatively skewed than the local portfolio, this is a short-term phenomenon. The long-term skewness of the global portfolios are not statistically distinguishable from either zero or the skewness of the local portfolios.

5. Why Is Diversification So Much Stronger In The Long Run?

The analysis presented thus far suggests that the benefit to diversification in down markets depends on investment horizon. Over the short run, pain is fairly well distributed across markets and diversification is at its weakest. However, over longer periods there are meaningful differences in realized returns. Why is this the case?

One hypothesis is that short-term returns are more influenced by short-term changes in risk aversion (crashes could result from a global spike in risk aversion as people panic at the same time), whereas long-term returns are driven more by realized economic performance. Moreover, unlike short-term crashes which tend to affect all countries together, long-term economic performance tends to be more variable across countries.

[9]We perform 50,000 bootstraps using the circular bootstrap for dependent data as suggested by Politis and Romano (1992) using a 49-month block size as determined through the automatic block-length selection algorithm for dependent data as suggested by Politis and White (2004). The 49-month block size was selected by looking at the dependence in 2nd moments in addition to the dependence in 1st moments. The 50,000 bootstraps are used to construct both the bias-corrected skewness estimate and the corresponding 95% confidence bands.

To empirically examine this hypothesis, we decompose country stock market returns across two dimensions (see the appendix for the math): (1) the return due to multiple expansion vs. the return due to economic performance and (2) the returns due to common global performance vs. the returns due to country specific performance. By combining the two decompositions we obtain a four-term decomposition of a country's total return:

1. Country specific multiple expansion
2. Country specific economic performance
3. Global multiple expansion
4. Global economic performance

If (3), the global multiple expansion return, explains substantial variability in short-term stock returns, then "people panicking at the same time," can have an important impact on short-term country returns as the sharp increase in risk aversion should lead to sharp multiple contraction across the board. Our hypothesis is that while (3) may be important over the short-term, (2) and (4) should be more important over the long-term. Moreover, to the extent that (2) dominates (4), global diversification should be more beneficial when viewed over the long-term.[10]

We estimate the variance of these four terms for holding periods ranging from one quarter to 15 years. The proportional variance, which is defined as the variance of each return component divided by the sum of the four components' variances, is plotted in Figure 5.[11]

Figure 5 provides evidence in favor of our hypothesis. Over the short-term, returns are primarily driven by multiple expansion. Both country specific and global multiple expansion together explain 81% of quarterly returns whereas country specific and global economic performance explains only 19%.

[10]One could extend our discussion to cover the topic of "de-coupling" so in vogue these days. One way to view our results is over the short-term de-coupling does not protect you from a year like 2008, but over the long-term de-coupling is entirely possible if not likely. Of course our results do not tell you which direction de-coupling occurs (sorry China fans!).

[11]The proportional variances approximate a variance decomposition. They do not represent a true variance decomposition because they do not take into account the co-variances between the four terms. For our purpose, however, we believe this representation is adequate because we are primarily interested in how the magnitude of these four sources of return changes with holding period. Co-variance would not significantly alter the insight.

While the common global multiple expansion component of returns isn't the highest, it still explains 34% of the variation and is substantially higher than either of the economic performance components. At that level of explanatory power, it is not that surprising that if globally investors panic at the same time and that causes global multiples to contract, markets will crash together.[12]

However, as we elongate the holding period, multiple expansion becomes a less important component of returns and economic performance becomes a more important component. Moreover, it is not the common global component of economic performance that explains most of long-term stock market returns. Country specific economic performance dominates long-term performance, going from explaining about 16% of quarterly returns to 43% of 15-year returns and rising quite linearly in time. These results strongly support the hypothesis that long-term returns are more about a country's economic performance and that long-term economic performance is quite variable across countries.

Let's use the Japan example again (while reminding readers that our results are not beholden to Japan). Japan's disastrous 1990s did not happen because of a panic or globally coordinated rise in risk aversion, it happened because of a decade long idiosyncratic economic disaster. Our results say that while this event may be extreme, it's directionally quite normal, and precisely what international diversification protects you against. Essentially, it's quite arrogant for any investor to think their country can't be the next decade's 1990s Japan, and thus behooves any investor to diversify this possibility away. They just shouldn't expect it to protect them from short-term crashes!

6. Conclusion

Over the short-term, global diversification can disappoint. Markets tend to crash at the same time and as a result, globally diversified portfolios are more negatively skewed. Critics argue that international diversification offers little protection vs. purely domestic portfolios and can in fact be more dangerous if investors rely upon their long-term reduced volatility.

[12]Note, the 34% is an average number over all periods, we cannot do a variance decomposition over only crashes, but we suspect the contribution of the global multiple change in these periods to be far higher.

We argue that this critique misses the point. While short-term common crashes can be painful, long-term returns are far more important to wealth creation and destruction. We show that over the long-term, markets do not have the same tendency to crash at the same time. This is not surprising as even though market panics can be important drivers of short-term returns, over the long-term, country specific economic performance dominates. Diversification protects investors against the adverse effects of holding concentrated positions in countries with poor long-term economic performance. Let us not diminish the benefits of this protection.

In a nutshell, international diversification works on a portfolio. Ignoring it is quite simply imprudent.

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Table 1: Global Portfolio Performance During Local Portfolios' Worst

This table reports the time and magnitude of the worst one, three, and twelve month local total real return in each of the 22 countries considered in our analysis over the period beginning January 1950 and ending December 2008. The concurrent equal-weight globally diversified real total return is also reported. Foreign investments are not hedged against currency movements. The final two rows report the average and median of the respective statistic.

	Worst One-Month Return			Worst Three-Month Return			Worst One-Year Return		
	End Month	Local Return	Global Return	End Month	Local Return	Global Return	End Month	Local Return	Global Return
Australia	Oct 1987	-43.2	-17.8	Dec 1987	-41.7	-24.3	Sep 1974	-47.6	-35.4
Austria	Oct 2008	-30.2	-16.3	Nov 2008	-56.9	-32.7	Dec 2008	-67.0	-48.1
Belgium	Oct 1987	-31.1	-20.9	Nov 2008	-37.8	-32.4	Nov 2008	-52.9	-48.1
Canada	Oct 1987	-22.7	-20.7	Nov 2008	-31.2	-31.6	Jun 1982	-45.3	-14.2
Denmark	Oct 2008	-17.7	-16.4	Nov 2008	-36.4	-32.9	Dec 2008	-46.0	-48.8
Finland	Feb 2001	-27.3	-6.5	Aug 2001	-38.6	-12.2	Aug 2001	-55.6	-24.6
France	Oct 1987	-22.0	-24.2	Nov 1987	-31.1	-26.1	Sep 1974	-53.0	-37.1
Germany	Sep 2002	-24.9	-12.4	Sep 2002	-36.6	-20.7	Mar 2003	-54.4	-35.8
Greece	Oct 2008	-29.9	-16.4	Nov 2008	-44.5	-33.9	Dec 2008	-64.9	-48.5
Hong Kong	Oct 1987	-43.8	-21.2	Dec 1987	-41.8	-23.5	Jul 1998	-56.2	13.9
Ireland	Sep 2008	-22.7	-13.3	Nov 2008	-46.3	-32.2	Dec 2008	-70.6	-48.1
Italy	Jun 1981	-19.9	2.1	Nov 2008	-28.9	-32.3	Dec 2008	-47.6	-48.6
Japan	Jan 1958	-26.0	-1.4	Nov 2008	-34.3	-49.1	Oct 2008	-47.2	-59.5
Netherlands	Oct 1987	-23.4	-25.5	Nov 1987	-34.4	-27.4	Mar 2003	-49.7	-36.6
Norway	Oct 1987	-29.8	-22.8	Nov 2008	-49.6	-25.9	Nov 2008	-57.2	-43.3
Portugal	Nov 1987	-32.7	-7.0	Dec 1987	-63.0	-31.0	Sep 1988	-72.4	-17.0
Singapore	Oct 1987	-38.1	-21.4	Nov 1987	-43.4	-22.3	Oct 1974	-64.9	-40.3
Spain	Oct 1987	-25.7	-25.8	Sep 1990	-29.0	-23.9	Sep 1977	-49.8	-0.4
Sweden	Sep 1990	-22.4	-13.0	Sep 1990	-33.8	-24.2	Oct 2008	-47.0	-43.8
Switzerland	Oct 1987	-23.6	-26.4	Dec 1987	-34.3	-35.1	Sep 1974	-42.1	-42.2
U.K.	Oct 1987	-26.3	-25.5	Nov 1987	-30.5	-28.8	Nov 1974	-60.8	-34.1
U.S.	Oct 1987	-21.4	-20.9	Nov 1987	-30.1	-20.0	Sep 1974	-47.5	-41.0
Average		**-27.5**	**-17.0**		**-38.8**	**-28.3**		**-54.5**	**-35.5**
Median		**-25.9**	**-19.3**		**-36.5**	**-28.1**		**-53.0**	**-40.6**

Table 2: Worst Months and Years for Local and Global Portfolios

This table reports the the worst one month and one year local total real return in each of the 22 countries considered in our analysis over the period beginning January 1950 and ending December 2008. The concurrent equal-weight globally diversified real total return is also reported. The size of the event (related to the appropriately scaled monthly volatility) and the empirical skewness of the return series is also reported. Foreign investments are not hedged against currency movements. The final two rows report the average and median of the respective statistic.

	Worst One-Month Return						Worst One-Year Return					
	Local			Global			Local			Global		
	Return	σ Event	Skew	Return	σ Event	Skew	Return	σ Event	Skew	Return	σ Event	Skew
Australia	-43.2	-9.0	-2.4	-17.8	-4.7	-0.4	-47.6	-2.9	-0.7	-40.4	-3.1	-0.2
Austria	-30.2	-5.2	-0.9	-25.2	-5.6	-1.2	-67.0	-3.3	0.3	-48.1	-3.1	-0.8
Belgium	-31.1	-7.2	-1.2	-20.9	-5.4	-1.2	-52.9	-3.5	-0.6	-48.8	-3.6	-0.9
Canada	-22.7	-5.2	-1.0	-20.7	-5.7	-1.0	-45.3	-3.0	-0.6	-43.8	-3.5	-0.4
Denmark	-17.7	-3.3	-0.4	-25.3	-5.5	-1.2	-46.0	-2.5	-0.1	-48.8	-3.1	-0.9
Finland	-27.3	-4.4	-0.2	-23.3	-5.4	-0.8	-55.6	-2.6	0.0	-49.2	-3.3	-0.7
France	-22.0	-4.1	-0.4	-24.2	-6.1	-1.0	-53.0	-2.8	-0.5	-48.0	-3.5	-0.7
Germany	-24.9	-4.7	-0.7	-25.7	-5.8	0.2	-54.4	-3.0	-0.1	-48.1	-3.2	-0.7
Greece	-29.9	-3.2	0.7	-26.4	-5.3	-0.9	-64.9	-2.0	0.5	-48.5	-2.8	-0.7
Hong Kong	-43.8	-5.0	-0.9	-24.9	-5.3	-1.3	-56.2	-1.8	-0.4	-54.9	-3.4	-0.4
Ireland	-22.7	-3.7	-0.8	-16.2	-3.4	-1.0	-70.6	-3.3	-1.5	-48.1	-2.9	-0.8
Italy	-19.9	-3.1	0.1	-24.2	-5.8	-1.1	-47.6	-2.1	0.4	-48.6	-3.4	-0.8
Japan	-26.0	-4.5	-0.4	-30.0	-7.0	-1.8	-47.2	-2.4	0.1	-60.7	-4.1	-0.8
Netherlands	-23.4	-4.7	-0.8	-25.5	-6.1	-1.2	-49.7	-2.9	-0.5	-48.5	-3.3	-0.7
Norway	-29.8	-4.0	-0.8	-22.8	-5.2	-1.0	-57.2	-2.2	0.1	-43.3	-2.9	-0.7
Portugal	-32.7	-3.5	0.7	-24.5	-5.0	-1.4	-72.4	-2.2	1.3	-47.9	-2.8	-0.6
Singapore	-38.1	-4.4	-0.3	-22.4	-5.2	-1.4	-64.9	-2.2	-0.4	-54.2	-3.6	-0.6
Spain	-25.7	-4.8	-0.5	-25.8	-6.1	-1.0	-49.8	-2.7	-0.2	-48.2	-3.3	-0.5
Sweden	-22.4	-3.8	-0.3	-23.6	-5.9	-0.9	-47.0	-2.3	0.2	-43.8	-3.2	-0.4
Switzerland	-23.6	-4.8	-0.8	-26.4	-5.3	-1.3	-42.1	-2.5	-0.4	-52.7	-3.0	-0.8
U.K.	-26.3	-5.1	-0.1	-25.5	-6.5	-1.3	-60.8	-3.4	-1.0	-41.4	-3.1	-0.5
U.S.	-21.4	-5.1	-0.7	-23.7	-6.1	-1.4	-47.5	-3.3	-0.6	-54.2	-4.0	-0.6
Average	**-27.5**	**-4.7**	**-0.6**	**-23.9**	**-5.6**	**-1.1**	**-54.5**	**-2.7**	**-0.2**	**-48.7**	**-3.3**	**-0.7**
Median	**-25.9**	**-4.6**	**-0.6**	**-24.4**	**-5.5**	**-1.1**	**-53.0**	**-2.6**	**-0.3**	**-48.4**	**-3.2**	**-0.7**

Figure 1: Local vs. Globally Diversified Risk-Adjusted Returns

This figure plots, across the dimension of return horizon, the cross-sectional average worst local return, the cross-sectional average global return during the concurrent period of the worst local return, and the cross-sectional average worst global return across 22 countries over the period beginning January 1950 and ending December 2008. Foreign investments within the global portfolios are not hedged against currency movements.

Figure 2: Average Local Portfolio Skewness

This figure plots the cross-sectional average (across 22 countries) skewness of total real local continuously compounded returns across holding periods of 1 to 60 months. The solid blue line graphs the skewness and the dashed blue lines are its bootstrapped 95 percent confidence intervals. We perform 50,000 bootstraps using the *circular bootstrap* for dependent data as suggested by Politis and Romano (1992) using a 49-month block size as determined through the *automatic block-length selection algorithm for dependent data* as suggested by Politis and White (2004).

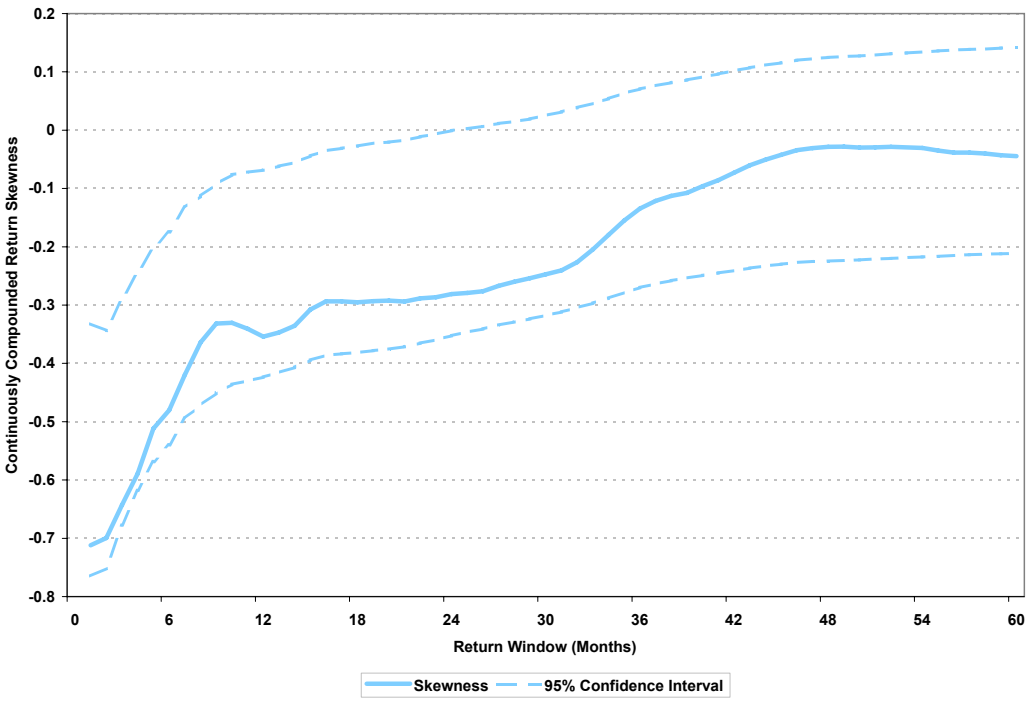


Figure 3: Average Global Portfolio Skewness

This figure plots the cross-sectional average (across 22 countries) skewness of equal-weight globally diversified real continuously compounded returns from the local investors' perspectives across holding periods of 1 to 60 months. Foreign investments within the globally diversified portfolios are not hedged against currency fluctuations. The solid blue line graphs the skewness and the dashed blue lines are its bootstrapped 95 percent confidence intervals. We perform 50,000 bootstraps using the *circular bootstrap* for dependent data as suggested by Politis and Romano (1992) using a 49-month block size as determined through the *automatic block-length selection algorithm for dependent data* as suggested by Politis and White (2004).

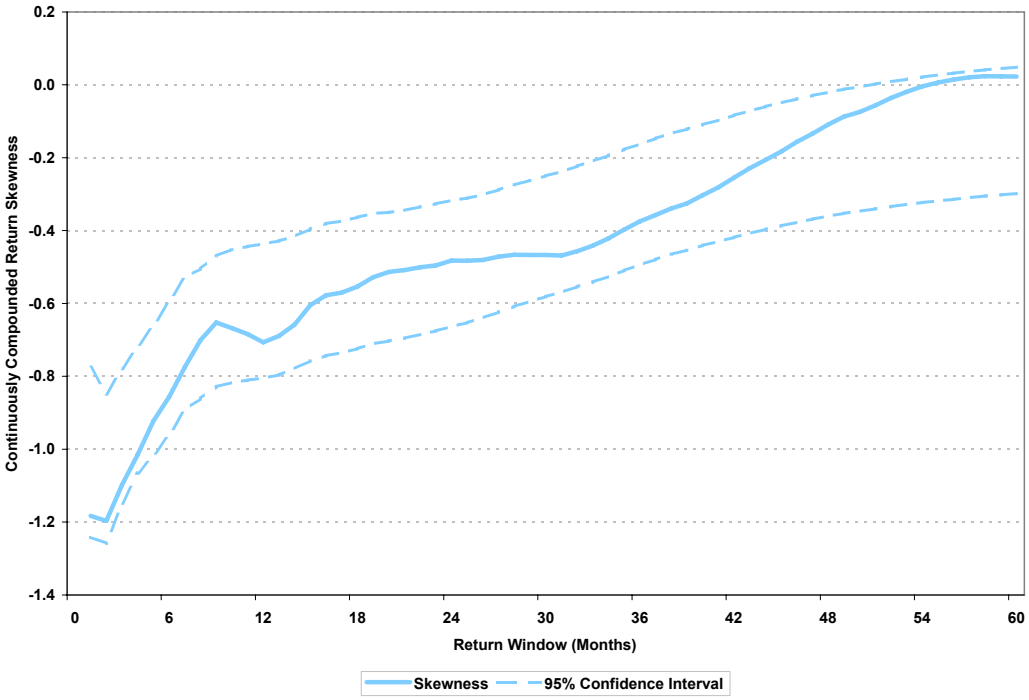


Figure 4: Average Global Portfolio Skewness Minus Average Local Portfolio Skewness

This figure plots the cross-sectional average (across 22 countries) skewness of equal-weight globally diversified real continuously compounded returns from the local investors' perspectives minus that of local returns across holding periods of 1 to 60. Foreign investments within the globally diversified portfolios are not hedged against currency fluctuations. The solid blue line graphs the difference in skews and the dashed blue lines are its bootstrapped 95 percent confidence intervals. We perform 50,000 bootstraps using the *circular bootstrap* for dependent data as suggested by Politis and Romano (1992) using a 49-month block size as determined through the *automatic block-length selection algorithm for dependent data* as suggested by Politis and White (2004).

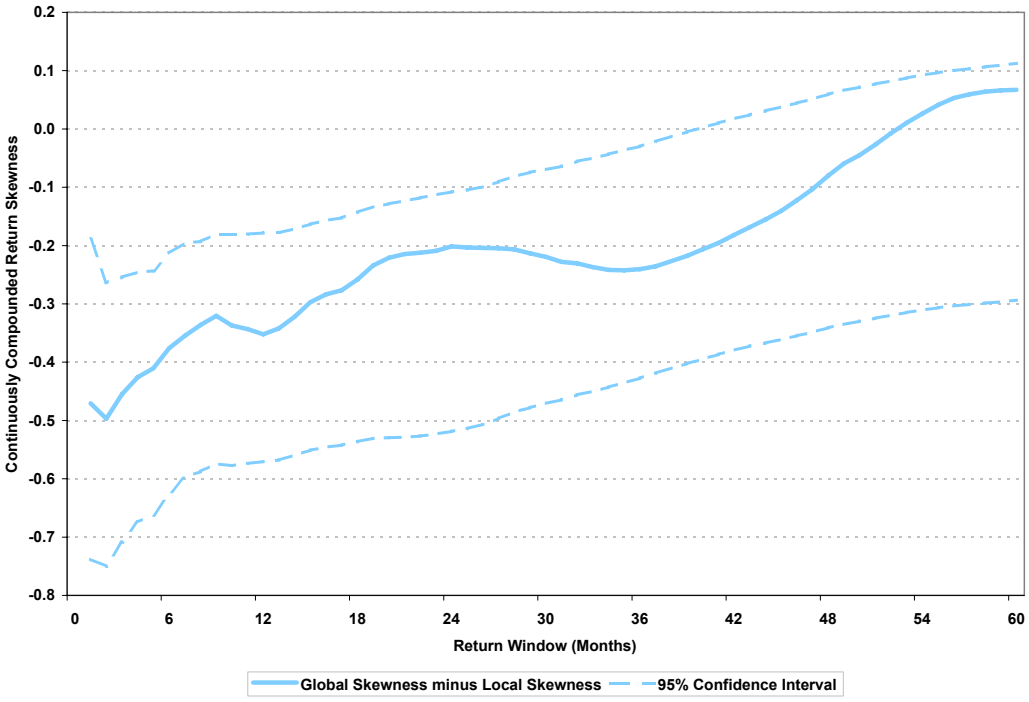
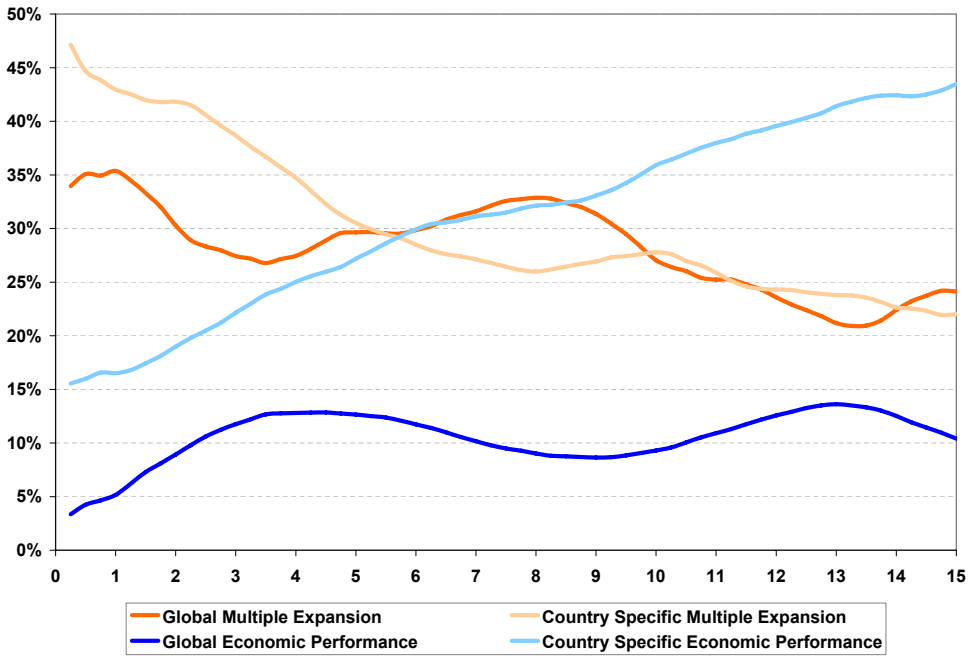


Figure 5: Variance Decomposition: Multiple Expansion and Growth

This graph plots a variance decomposition of 22 countries' local returns over the period beginning January 1950 through December 2008 into four components: (1) Country specific multiple expansion, (2) Country specific economic performance, (3) Global multiple expansion, and (4) Global economic performance. The details of the decomposition are provided in the appendix. The x-axis is the return horizon in years and the y-axis is the percentage of total variance contributed by the respective component.



Appendix A. Measuring Multiple Expansion vs. Economic Performance

Let p_t^i and d_t^i denote log prices and dividends respectively for country i, $v_t^i \equiv p_t^i - d_t^i$ denote the log valuation multiple, and $r_{t-k,t}^i$ represent the k period total return for country i, where dividends are reinvested monthly. Further, define the log dividend yield as $y_t^i = \log(1 + D_t^i/P_t^i)$ where D_t^i represents the dividends paid on country i from period $t-1$ to t and P_t^i represents the price of country i's stock market at time t. Then the decomposition is reflected below:[13]

$$r_{t-k,t}^i = \left(v_t^i - v_{t-k}^i\right) + \left(d_t^i - d_{t-k}^i\right) + y_{t-k,t}^i \quad \text{where} \quad y_{t-k,t}^i = \sum_{j=0}^{k-1} y_{t-j}^i \tag{A.1}$$

1. $\left(v_t^i - v_{t-k}^i\right)$ is the component of the return over k periods due to a change in valuation multiples. This component reflects changes in risk aversion or changes in forecasted future dividend growth.
2. $\left(d_t^i - d_{t-k}^i\right)$ is the component of the return over k periods due to dividend growth. $y_{t-k,t}^i$ is the total accumulated dividends paid during the k periods. We combine these two components into a single component which reflects economic performance.

As Campbell and Shiller (1988) show, changes in valuation multiples may be attributed to either (1) changes in expected future growth rates or (2) changes in discount rates. If risk aversion spikes, then prices drop to reflect the increase in discount rates. We do not attempt to further decompose multiple expansions that occur due to changes in discount rates or changes in expected cash flows (this is not easy!).

Economic performance, on the other hand, is all about realizations. Even if valuation multiples remain fixed, an increase in dividends will associate with higher prices and thus a positive return. Accumulated dividend yield is the actual cash flow received over the holding period; this is as *real* as it gets, cash in the pocket.

[13] To see the decomposition, take the log of $R_t = \frac{P_t + D_t}{P_{t-1}} = \frac{P_t\left(1+\frac{D_t}{P_t}\right)}{P_{t-1}} = \frac{\frac{P_t}{D_t}\left(1+\frac{D_t}{P_t}\right)}{\frac{P_{t-1}}{D_{t-1}}} \frac{D_t}{D_{t-1}}$ and sum over the k periods.

Measuring Common Global vs. Country Specific Performance

To examine this, we also decompose returns in to a common and an idiosyncratic component.

$$r^i_{t-k,t} = \overline{r}_{t-k,t} + \left(r^i_{t-k,t} - \overline{r}_{t-k,t}\right). \tag{A.2}$$

This simple decomposition provides (1) $\overline{r}_{t-k,t}$, the average return across all countries which we call the global component of returns and (2) $\left(r^i_{t-k,t} - \overline{r}_{t-k,t}\right)$, a country's return in excess of the global return which we call the country specific component of returns.

Combining the two decompositions leads to:

$r^i_{t-k,t}$	=	$(\overline{v}_t - \overline{v}_{t-k})$	Global multiple expansion
	+	$(\overline{d}_t - \overline{d}_{t-k}) + \overline{y}_{t-k,t}$	Global economic performance
	+	$(v^i_t - \overline{v}_t) - (v^i_{t-k} - \overline{v}_{t-k})$	Country specific multiple expansion
	+	$(d^i_t - \overline{d}_t) - (d^i_{t-k} - \overline{d}_{t-k}) + (y^i_{t-k} - \overline{y}_{t-k})$	Country specific economic performance