The Diminishing Benefits Of Naïve International Portfolio Diversification Following The 1997 Asian Financial Crisis

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ABSTRACT

Naïve international diversification has been fundamental to portfolio management over the past 30 years, but the benefits appear to be significantly diminished following the 1997 Asian financial crisis. Using monthly return data covering the period from 1970 through 2004, we found rising correlations between U.S. and international equity markets exceeding 0.85 since July 1997. Even the return correlation of emerging countries recently has reached almost 0.80. We also found a significant reduction in the variance of the international return correlation after the financial crisis. Portfolio managers should not expect to receive the same benefits from international portfolio diversification as that obtained prior to the Asian financial crisis.

INTRODUCTION

*P*ortfolio diversification can be described simply as an investment strategy that seeks to combine assets in a portfolio with returns that are less than perfectly positively correlated in an effort to lower portfolio risk without sacrificing return. Naive diversification goes further by suggesting a strategy whereby a portfolio manager invests randomly in a number of different assets with the expectation that the variance of the expected return on the portfolio is lowered. Following the seminal work of Markowitz (1952), Grubel (l968) applied the concepts of modern portfolio theory to international investing and a number of subsequent empirical studies have confirmed the advantages of naïve international portfolio diversification. Levy and Sarnat (1970), Lessard (1973), Solnik (1974), and others found that the benefits of internationally diversified portfolios stem from the fact that the co-movements between different national equity markets have been relatively low with reported correlations of about 0.40. While most research focused on developed countries, Kasa (1994) studied emerging market returns and reported much more volatility than developed markets and lower correlations of about 0.20 with U.S. market returns.

Naïve international diversification has been a fundamental portfolio management strategy over the past 30 years. However, is the concept still valid following the globalization trend that began after the Asian financial crisis? If there has been an increased correlation between the returns of world stock markets, wouldn't this sharply lower the diversifying properties of international equities? It is the purpose of this study to address this question by investigating the recent relationship between U.S. and international stock market returns and to determine if the Asian crisis was a triggering event that resulted in increased equity correlation. The logic behind the question is related to the common perception that developed and emerging markets have been moving more in parallel with the U.S. stock market since the beginning of the Asian financial crisis in 1997.

While earlier studies found a low degree of correlation across international stock markets, it has been reported recently that this relationship has been changing. King, Sentana and Wadhwani (1994) found greater integration of world stock market returns in the period following the U.S. stock market crash of 1987. Campbell (1995) reported on the low correlation between returns in emerging and developed country stock markets and implied that the investors would benefit from diversification in emerging country markets. He also noted that the correlation between the emerging market returns appeared to be increasing relative to the U.S. market over time. Siegel (2002)

reported a significant increase in the correlations between world equity returns after the mid-1990s. He showed stock return correlation coefficients between the United States and the developed countries in Europe, Australia, and the Far East have risen from about 0.40 in the 1970s to almost 0.80 in the late 1990s. Brooks and Del Negro (2004) found further evidence that the return relationship between U.S. and world equity markets has grown significantly stronger in the late 1990s and early 2000s with correlations of almost 0.85. More recently, Statman and Scheid (2005) found the correlation coefficient between U.S. and international stocks increased to 0.86 by 2003.

There are several possible explanations for the apparent rise in international equity market correlation. Clearly, the globalization of financial markets is a major factor with world economies becoming more integrated due to the opening of formerly closed economies and the exchange cross-listing of many equity securities. It also is possible that in integrated international equity markets, the actions of arbitrageurs have acted to ensure that stocks with similar risk are priced to offer the same return. Additionally, there is improved policy coordination across countries with better and more rapid investment information flows. Finally, the country in which a firm is headquartered apparently has become less important to investors, suggesting a decline in investors' "home bias" regarding their portfolio holdings; a finding that was reported by Tesar and Werner (1995) and Lewis (1999). Siegel suggests that it is quite likely that the globalization of equity trading will continue to cause world markets to move more synchronously than in the past. Brooks and Del Negro observed a similar increase in international correlation since the mid-1990s; however, they suggest that some of the rise may be due to temporary factors that resulted from unique global and country-specific shocks.

The Asian financial crisis, a strong global shock that started in the summer of 1997 in Thailand, adversely affected the currencies and stock markets of many Asian countries. Besides Thailand, Indonesia and South Korea were deeply affected by the crisis, while Hong Kong, Malaysia, and the Philippines were adversely impacted to a lesser degree. The Pacific Rim countries of Japan, China, Taiwan, Singapore, New Zealand, and Australia were only minimally affected by the Asian financial crisis. Like the other "Asian tiger" countries, Thailand enjoyed massive foreign capital investment inflows in the early 1990s. The Thai economy grew at an average annual rate of almost 10% during the period. Following a large sell-off of the Thai baht in 1996 by George Soros' hedge fund and lower returns on real asset investments, the Thai stock market and currency dropped by over 50% in the summer of 1997 following the move to a floating currency, which had been previously pegged to the U.S. dollar. Thailand's chronic trade and government deficits, along with rising inflationary pressures, led to a loss of investor confidence and resulted in a run on the country's financial markets. Even with substantial International Monetary Fund (IMF) intervention, the currencies and stock markets of the Philippines, Indonesia, and South Korea plunged in value shortly after the Thailand collapse in 1997.

The Asian financial crisis has had a long-term effect on international financial markets. After 1997, creditors and investors in the U.S. and Europe came to the realization that the Asian economies could not grow as fast as they had in the early 1990s. This resulted in an extremely cautious approach to Asian foreign investment. The other important fallout of the Asian crisis was the demise of fixed exchange rates as a system of international monetary exchange. Floating currencies and strict IMF lending restrictions became the norm in most Asian countries after 1997. This trend has brought more integration of the world's economies and is likely responsible for the observed increase in international equity market correlation.

It is the purpose of this study to investigate the recent relationship between U.S. and international stocks market returns before and after the Asian financial crisis. If there has been an increase in the long-term correlation between U.S. and foreign stock market returns after the crisis, this would sharply lower the diversifying properties of international equities and remove most of the benefits of naïve international stock diversification.

METHODOLOGY

In this paper, we investigate the return relationships between U.S. equities and a variety of international equity indices and individual country stock market indices from 1970 through 2004. The international equities examined include both developed and emerging market countries. Although return relationships are examined over more than thirty years, our focus is on the nature of the relationships following July 1997 when the Thai baht was

significantly devalued and the Asian crisis began. This is consistent with the general perception of the crisis and the methodology used in related studies, such as Olienyk, Schweback, and Zumwalt (2000).

It is hypothesized that the return relationships between U.S. and international equity indices increased following the Asian financial crisis in July 1997. To capture this phenomenon, two statistical tests were employed: the t-test for comparing mean return correlations and time series relations, and the F-test for comparing the pre- and post-crisis correlation variances.

The data for the study, which covered the period from January 1970 through December 2004, was obtained from Morgan Stanley Capital International (MSCI). The widely utilized MSCI international equity benchmarks are maintained across 23 developed and 27 emerging markets. The value-weighted MSCI benchmarks are based on monthly capital appreciation – dividends are not included in the indices. In addition to various developed and emerging country indices, the following regional indices were included in the study:

- The <u>MSCI World Index ex US</u>, a market capitalization index including Australia, Austria, Belgium, Canada, Denmark, Finland, France, Germany, Greece, Hong Kong, Ireland, Italy, Japan, Netherlands, New Zealand, Norway, Portugal, Singapore, Spain, Sweden, Switzerland and the United Kingdom.
- The <u>MSCI EAFE Index</u> (Europe, Australasia, Far East) consisting of 21 developed market country indices.
- The <u>MSCI Europe Index</u> consisting of the developed market country indices in Europe.
- The <u>MSCI Pacific Index</u> consisting of the following five developed market countries including Australia, Hong Kong, Japan, New Zealand, and Singapore.
- The <u>MSCI US Index</u> represents the universe of companies in the United States equity market, including large, mid, small and micro cap companies.
- The <u>MSCI Emerging Markets Index</u>, a market capitalization index designed to measure equity market performance in the global emerging markets, consisting of Argentina, Brazil, Chile, China, Colombia, Czech Republic, Egypt, Hungary, India, Indonesia, Israel, Jordan, Korea, Malaysia, Mexico, Morocco, Pakistan, Peru, Philippines, Poland, Russia, South Africa, Taiwan, Thailand, Turkey and Venezuela. The data for the EM index began in 1988 and in the 1990s several other emerging countries were added to the index.
- The <u>MSCI Emerging Markets Asia Index</u> includes China, India, Indonesia, Malaysia, Pakistan, Philippines, South Korea, Taiwan, and Thailand.
- The <u>MSCI Emerging Markets Europe Index</u> includes the Czech Republic, Hungary, Poland, and Russia.

Monthly rates of return were calculated and correlation coefficients were computed over 6-month non-overlapping periods for U.S. and other stock market returns. Compound mean returns and standard deviations were calculated for all indices over the various time periods studied. The degree of asynchronous movements of returns between the U.S. and international indices was measured by the correlation coefficient. Based on modern portfolio theory it is well known that as the correlation coefficient between the U.S. and international indices increases, the gains from naïve portfolio diversification are mitigated. As stated previously, it is the purpose of this research to investigate the recent relationship between U.S. and international stocks market returns to determine if there has been increased equity correlation and, if so, whether the Asian financial crisis was the triggering event.

DATA ANALYSIS

Table 1 presents the compound annual returns and standard deviations for the developed regions and major countries for the period 1970-2004 and for the pre- and post-Asian financial crisis time periods. The returns are computed in U.S. dollars. Overall, world mean annual returns of the developed countries declined following the Asian financial crisis, except for Australia. Hong Kong and Japan experienced the most extreme return difference across sub-periods with average annual returns lower by almost 20% and 15%, respectively. The U.S. and European stock markets were also lower in the post-financial crisis period, but not by statistically significant levels. The standard deviations of the returns were not statistically different across the two sub-periods studied.

Table 1: Compound Annual Dollar Returns Of Developed World Stock Markets, 1970-2004 (Std. Deviations)

Region or Country	1970 - 2004	1970 – June 1997	July 1997 - 2004
World ex US	7.75% (16.80%)	9.39% (16.92%)	1.76% ** (16.22%)
EAFE	7.72% (16.70%)	9.39% (16.83%)	1.69% ** (16.10%)
Europe	7.44% (16.75%)	8.34% (16.52%)	4.20% (17.53%)
Pacific	8.50% (20.87%)	11.41% (21.14%)	-2.09% *** (19.53%)
U.S.	6.88% (15.47%)	7.79% (15.05%)	3.56% (16.87%)
United Kingdom	7.03% (22.87%)	8.41% (24.62%)	2.00% * (14.64%)
Germany	7.27% (21.41%)	8.63% (20.16%)	2.36% (25.39%)
France	7.59% (22.62%)	7.89% (23.21%)	6.48% (20.32%)
Hong Kong	12.31% (37.42%)	16.62% (39.07%)	-3.15% *** (30.12%)
Japan	9.10% (22.46%)	12.50% (22.79%)	-3.18% *** (20.80%)
Australia	4.93% (24.13%)	4.69% (25.41%)	5.83% (18.76%)

Significance of mean difference across sub-periods (* $p<.05$ ** $p<.01$ *** $p<.001$).

The term "emerging markets" was coined by the World Bank in the early 1980s. Emerging market countries typically are in the process of industrialization and have lower gross national product per capita than more developed countries. Of the 130 countries generally considered to be emerging market countries, 27 have stock market indices monitored by Morgan Stanley Capital International. Emerging markets often experience periods of highly volatile returns especially surrounding major events. This was especially true following the 1997 Asian financial market contagion and the 1998 Russian ruble devaluation and debt default.

Table 2 presents the compound annual returns and standard deviations for emerging market regions and selected countries for the period beginning in 1988, as well as the pre- and post-Asian financial crisis time periods. While the emerging market index for Europe was significantly higher in the post-crisis period than for Asia, it should be noted that the majority of the European emerging countries were added after 1992 and a pre-crisis comparison to other emerging market returns should be done with caution. The returns are computed in U.S. dollars. As expected, the Asian emerging market region and individual Asian countries had lower returns in the post-financial crisis period, except for South Korea. As previously observed by other researchers, the return volatility of emerging markets was much greater than the standard deviations computed for the returns of developed countries. In addition, all standard deviations for emerging Asian countries were higher in the post-financial crisis period, except Taiwan.

Figure 1 shows the growth of $100 invested in equities in the U.S. and the four international regional indices of developed markets over the entire study period. While the long-term returns are nearly identical at the end of 2004, the individual regional returns fluctuated significantly during the 1980s and early 1990s, especially the returns of the Pacific index which were dominated by the large fluctuations experienced by Japan and Hong Kong.

Figure 2 shows the growth of $100 invested in equities in the U.S. and the three international emerging market indices over the 1988-2004 period. The U.S. and world emerging market indices outperformed the European and Asian emerging markets during this 17 year period.

Table 2: Compound Annual Dollar Returns Of Emerging World Stock Markets, 1988-2004 (Std. Deviations)

Region or Country	1988 - 2004	1988 – June 1997	July 1997 - 2004
World Emerging Markets	9.94% (23.07%)	18.16% (20.45%)	-0.28% *** (25.72%)
Emerging Markets - Asia	5.01% (25.13%)	12.96% (20.98%)	-4.87% *** (29.32%)
Emerging Markets -Europe	7.15% (26.57%)	3.28% (29.92%)	11.69% * (30.49%)
Indonesia	5.35% (55.40%)	20.22% (50.00%)	-13.03% ** (61.28%)
Malaysia	4.72% (32.32%)	14.11% (23.19%)	-6.94% ** (40.84%)
Philippines	2.73% (34.11%)	18.11% (30.01%)	-16.26% *** (38.03%)
South Korea	4.31% (40.72%)	1.70% (27.49%)	7.59% (52.71%)
Taiwan	4.76% (40.35%)	14.70% (44.67%)	-7.58% ** (33.71%)
Thailand	3.34% (41.64%)	7.83% (31.01%)	-2.27% (51.97%)
Turkey	7.10% (43.49%)	3.48% (55.95%)	11.33% (39.62%)
Country	**1993-2004**	**1993 – June 1997**	**July 1997 - 2004**
China	-11.53% (39.55%)	-4.67% (31.85%)	-15.58% (43.47%)
India	5.34% (29.14%)	5.80% (28.42%)	5.06% (29.56%)
Poland	18.24% (216.42%)	54.52% (275.79%)	3.44% (30.52%)
Country	**1995-2004**	**1995 – June 1997**	**July 1997 - 2004**
Czech Republic	11.38% (33.27%)	0.65% (35.21%)	14.24% * (34.59%)
Russia	16.81% (29.12%)	34.45% (55.79%)	12.98% (30.52%)

Significance of mean difference across sub-periods (* p<.05   ** p<.01   *** p<.001).

Table 3 shows the correlation coefficient of the returns for the U.S. and various international and country equity indices over the entire study period and the two sub-periods. All return correlations were found to be higher in the post-Asian financial crisis period and all standard deviations, except for China, were found to be lower. As shown in the table, most return correlations were about double the average pre-crisis levels, including the emerging European markets. The variation of the correlations of the regional indices for the developed and emerging countries were statistically lower in the post-crisis period than in the previous period and all F-tests of difference between variances were found to be significant (p<.05).

As a graphical representation of general trends, Figure 3 shows the 24-month moving average correlation trend between the US and EAFE stock returns over the entire period. The graph shows that the correlation trends for the two sub-periods were significantly different. As hypothesized, the general trend of the correlation coefficient for the post-Asian financial crisis period was rising and approaching 0.90, while the trend for the pre-crisis period was only about 0.40. Correlation trends for all of the other developed market regional and individual country indices displayed a similar pattern of flat, highly volatile return correlation coefficients followed by a period of rising, less volatile co-movements after the 1997 Asian financial crisis.

Figure 1: Returns In International Developed Markets (U.S. Dollars), 1970-2004
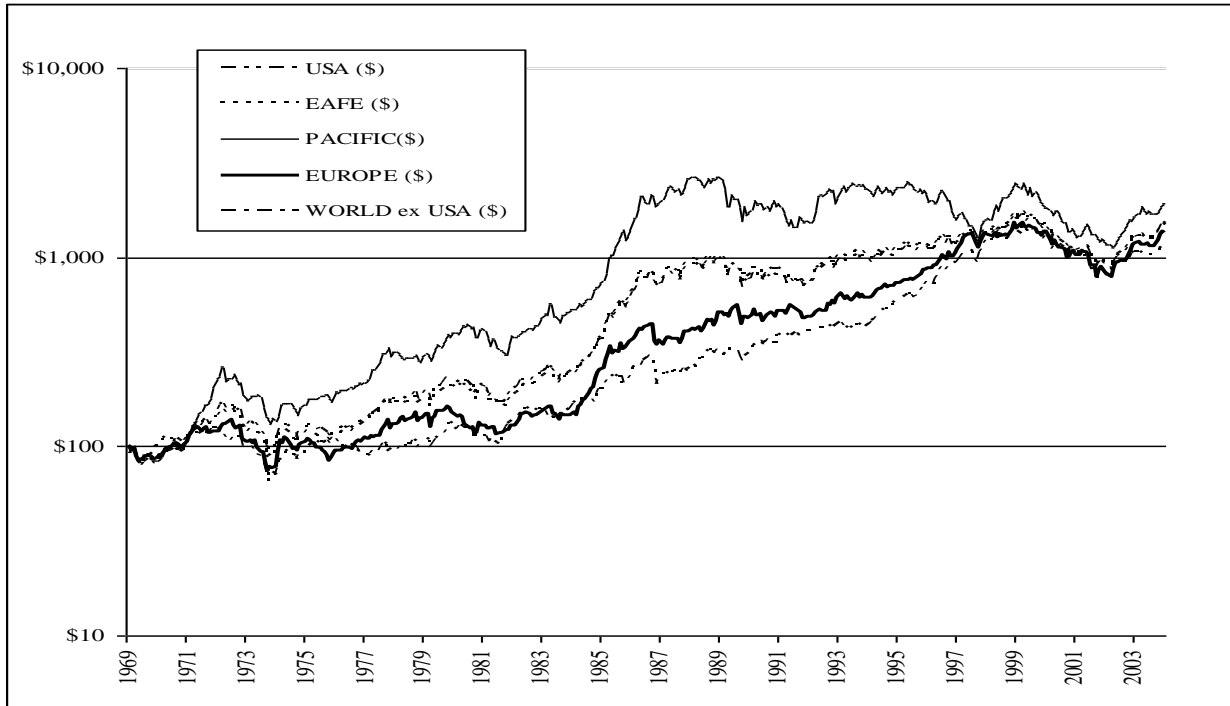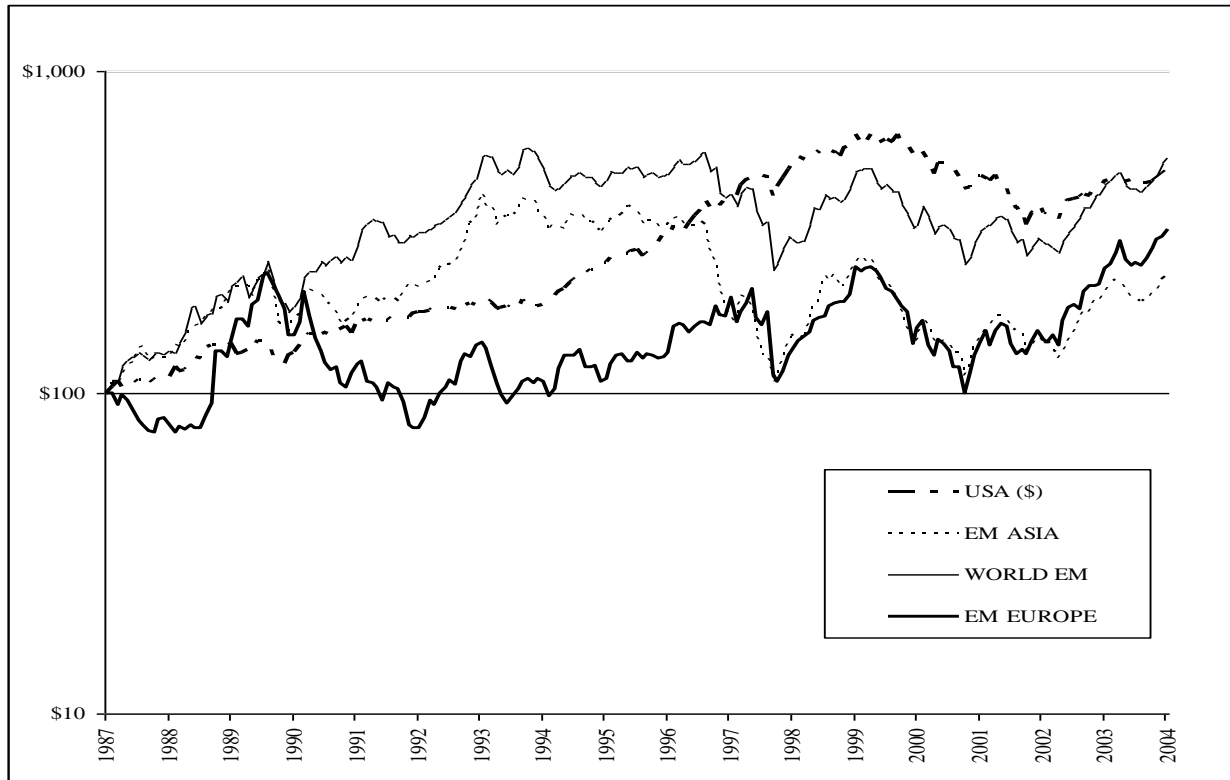

Figure 2: Returns In The U.S. And International Emerging Markets (U.S. Dollars), 1988-2004

Table 3: Return Correlation Between U.S. And International Markets In US Dollars (Std. Deviations)

Region or Country	1970 - 2004	1970 – 6/1997	7/1997 - 2004
World ex US	49.79% (39.83%)	40.34% (39.76%)	84.46% (8.75%) *** ###
EAFE	49.50% (42.28%)	40.67% (43.33%)	81.86% (11.32%) *** ###
Europe	52.76% (39.98%)	45.38% (41.46%)	79.82% (14.95%) ** ##
Pacific	35.48% (44.01%)	28.17% (45.70%)	62.29% (21.63%) ** ##
United Kingdom	47.17% (40.77%)	38.61% (41.14%)	78.55% (17.40%) *** ##
Germany	39.79% (48.27%)	30.81% (48.19%)	72.71% (31.24%) **
France	47.36% (41.69%)	39.68% (42.64%)	75.50% (20.94%) ** #
Hong Kong	39.16% (45.67%)	34.35% (48.29%)	56.78% (28.01%)
Japan	29.18% (43.78%)	24.48% (44.26%)	46.41% (37.18%)
Australia	43.01% (40.51%)	36.87% (41.75%)	65.48% (25.01%)
	1988 - 2004	**1988 – June 1997**	**July 1997 - 2004**
World Emerging Markets	57.43% (33.81%)	41.87% (36.28%)	77.14% (15.11%) *** ##
Emerging Markets - Asia	51.65% (39.65%)	36.67% (45.04%)	70.62% (18.70%) ** ##
Emerging Markets -Europe	23.39% (40.36%)	-1.41% (44.50%)	54.79% (25.72%) *** #
Indonesia	30.86% (38.90%)	28.37% (41.86%)	34.00% (34.54%)
Malaysia	36.00% (37.10%)	36.57% (40.32%)	35.27% (32.56%)
Philippines	32.05% (42.78%)	28.30% (43.96%)	36.79% (40.74%)
South Korea	32.05% (43.03%)	13.40% (42.37%)	55.66% (30.42%) **
Taiwan	29.73% (44.10%)	12.09% (45.97%)	52.08% (28.95%) **
Thailand	57.43% (45.28%)	41.87% (52.99%)	77.14% (26.36%) * #
Turkey	39.04% (56.44%)	32.08% (64.87%)	59.62% (46.21) *
	1993 - 2004	**1993 – June 1997**	**July 1997 - 2004**
China	48.22% (30.51%)	41.73% (24.94%)	52.11% (32.80%)
India	21.30% (42.32%)	12.69% (48.39%)	26.47% (37.27%)
Poland	4.48% (64.19%)	-33.89% (75.33%)	27.41% (57.27%) *

Significance of mean difference across sub-periods (* p<.05　　** p<.01　*** p<.001). Significance of differences between variances across sub-periods (# p<.05　## p<.01　### p<.001)


DISCUSSION

Beginning in the 1990s, globalization linked together many of the economies of the developed and emerging countries of the world. This has occurred in a number of different ways. More and more multi-national firms not only began to buy products in many different countries, but also set up manufacturing operations in various emerging countries. New world organizations have appeared, such as the World Trade Organization (WTO), and old ones have become more active such as the World Bank and International Monetary Fund (IMF). Further, new treaties have been passed, such as the North American Free Trade Agreement (NAFTA) and the General Agreement on Tariffs and Trade (GATT), which have effectively opened individual country markets. Finally, new technologies, such as the Internet, have also contributed to the rapid integration of the world's economies.

What has not been clear from the outset is how the capital markets would perceive the economic integration. There are still political and cultural differences to be sure. However, the world appears to consist of many economic players and the question is who will win and who will lose. Would developed countries using their political power achieve an improved economic foothold from the integration or would emerging market countries with some economic advantages, such as lower labor costs and regulation, fare better in this new economic environment?

The premise in this paper is that the Asian financial crisis of 1997 and the events which followed were a defining moment with respect to how the equity markets viewed individual developed and emerging market countries.

Before 1997 the world may have been viewed as a "panacea" as evidenced by the higher equity market performance shown in Tables 1 and 2. Both for developed and emerging market countries as a whole as well as many individual countries, return performance was higher prior to 1997 than after the crisis.

Figure 3: 24-Month Average Correlation Between U.S. And EAFE Returns (U.S. Dollars), 1970 – 2004
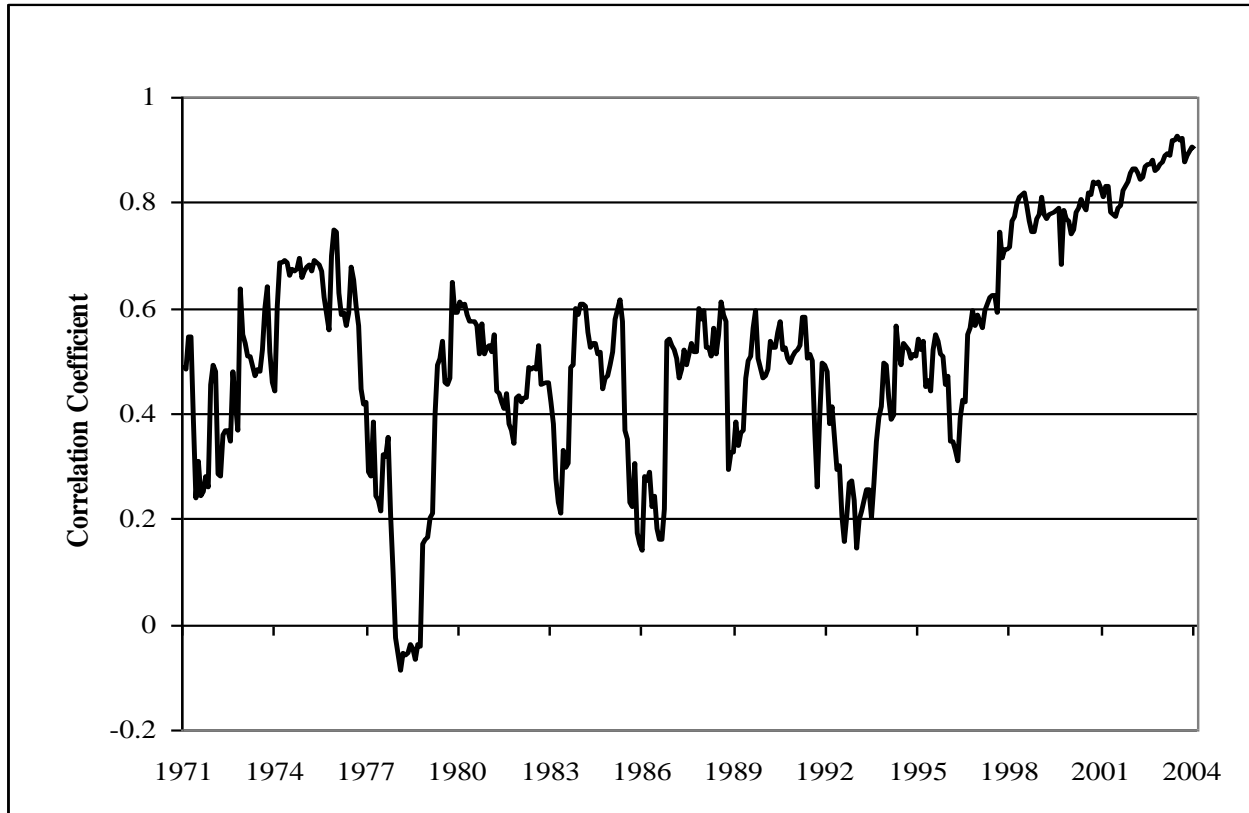
On the other hand, as reported in this paper, the return correlation of the individual country equity markets has changed significantly following the Asian crisis. As shown in Table 3, return correlations between countries was significantly smaller before 1997. This effect was not only true for developed countries but also for emerging market countries. It appears that the equity markets have grown more cautious regarding differences in performance across countries. In some sense, the individual country markets are being perceived more and more as one global market. We believe that the 1997 Asian crisis was a major contributing factor to this changed perception. In a very real sense it awoke investors to the fact that in a globalized economy, it may be more difficult for one player to outperform another. Thus, everyone does the same or at least moves in the same direction and the benefits of naïve diversification are diminished. This is the significant finding of this paper and this effect has been found for a broad range of international stock market indices as well as many individual country stock market indices.

CONCLUSION

This paper examines the question related to the perception that developed and emerging markets have been moving more in parallel with the U.S. stock market since the Asian financial crisis began in July 1997 and that the benefits of global diversification have diminished. This study observes that the low and volatile return correlations of about 0.40 in the pre-Asian crisis period have been replaced by higher and less volatile return co-movements of over 0.85. Looking at various return indices of developed international regions and individual countries, this study found

significantly increased return correlation between the U.S. and international equity markets of developed countries since the Asian financial crisis in 1997.

The MSCI data on emerging countries was also examined, however, the earliest data began in 1988 and many of the emerging countries returns were not available until the early-1990s. The analysis did show; however, that the correlations of the returns of the emerging markets with the US were, on average, higher during the post-crisis period approaching almost 0.80. These results were similar to those observed for developed countries.

We believe that these findings have implications for U.S. and international portfolio managers who previously found considerable benefit from naïvely diversifying with foreign equity securities. Both emerging market and developed country equity indices have tracked more closely with the U.S. since July 1997. The implication is both obvious and alarming. Investments in international equities prior to the Asian crisis were an inexpensive and attractive means of reducing the variability of portfolio returns; however, this study suggests that the benefits have been significantly mitigated since the 1997 Asian financial crisis.

The results reported in this paper suggest that investors and portfolio managers should not expect to naïvely receive the same benefits from international diversification that was obtained prior to the Asian financial crisis. Additionally, the potential to obtain large benefits from international diversification with the equities of emerging countries, in particular, have diminished. Additional research on the return correlations of individual countries and industry sectors might produce more encouraging results for portfolio managers. Finally, study into the possibility of a "China effect" influencing Pacific Rim regional returns should be conducted to determine the recent impact, if any, of this emerging economic giant on international return correlations.

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