

Portfolio Disaggregation in Emerging Market Investments

Passive indexing strategies are no longer enough.

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Interest in emerging markets has been growing among the financial community over the last two decades. The vast majority of research in this area has highlighted the benefits of international portfolio diversification into emerging markets. Most research suggests that segmentation is a particularly important feature of these markets. Given their segmented returns, the inclusion of emerging markets in a diversified portfolio enlarges the efficient set of assets for investment.

Despite the reported benefits, diversification into emerging markets is much less common than we would expect. Emerging market stocks make up a disproportionately small share of investors' equity holdings when one considers relative stock market capitalizations. Data on U.S. holdings of foreign equities show that the emerging market share in U.S. investors' portfolios is close to 1%.

I explore the asset allocation implications of financial market globalization. Many emerging markets have undergone liberalization that has increased their sensitivity to world risk factors. Emerging markets are today much more integrated with world stock markets, and tend to behave like other developed markets.

I reexamine the role of emerging market equities in an increasingly globalized world capital market in two ways. First, I test whether adding an aggregate investment in emerging markets to a global equity portfolio significantly improves the investment opportunity set. I present several measures of the benefits of aggregate emerging market investment, either value- or equally weighted.

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Then, I perform the analysis in different periods: before and after globalization.

I find that investors who use diversified index funds of emerging market equities do not improve their portfolios' performance. Emerging markets as an aggregate behave much like other asset classes, and in the post-integration period no longer enjoy the segmentation benefits of before. This result would advise against index investment strategies. Aggregate diversification across all emerging markets is no longer enough to create value. Country and stock selection strategies are imperative if a global portfolio manager wants to achieve enhanced performance.

Many of my results are at variance with those in earlier studies that recommend aggregate emerging market investment. This is natural, as the time period is different, and so is the investment set available. The 1988-2001 period that I cover includes not only a booming market, but also long periods of negative returns, and thus may provide a better approximation of the full business cycle.

I also examine a period of increasing integration in international markets. Indeed, returns on emerging markets in the 1990s were very different from those in the past. Until the early 1990s, emerging markets were quite segmented, and seemed to provide substantial benefits. After the advent of country funds, cross-listed securities, and other forms of financial liberalization, these markets became more integrated with world capital markets (see Bekaert and Harvey [2000] and Fernandes [2003]).

Another important difference is the investment set available. I allow investors to choose other developed market assets before investing in emerging markets. The benchmark is not the performance of U.S. equities, but rather the behavior of a diversified portfolio of developed market equities.

DIVERSIFICATION BENEFITS OF AGGREGATE EMERGING MARKET INVESTMENT

The sample includes indexes of emerging equity markets, the U.S., and other developed markets. For the U.S. market, I use monthly dollar-denominated returns on value-weighted indexes for the New York Stock Exchange and the Nasdaq 100 index (NAS100). Included in the investment opportunity set are other developed market equities measured according to the Morgan Stanley Capital International (MSCI) Europe, Australia, and Far East (EAFE) index. This index aggregates the performance of developed markets (other than the U.S.).

Emerging market equities are represented by the

EXHIBIT 1

Summary Statistics

Panel A: Summary statistics				
	EAFE	EMF	NAS100	NYSE
Mean	5%	11%	17%	14%
Std. Dev.	17%	25%	29%	14%
Skewness	-0.23	-1.01	-0.70	-0.57
Kurtosis	3.37	6.28	5.08	3.88
P-value B-J	0.315	0.000	0.000	0.001

Panel B: Unconditional correlation				
	EAFE	EMF	NAS100	NYSE
EAFE	1.00			
EMF	0.54	1.00		
NAS100	0.47	0.54	1.00	
NYSE	0.57	0.57	0.80	1.00

P-value B-J is the p-value for the Bera-Jarque test for normality.

MSCI Emerging Markets Free (EMF) index. This is an aggregate (value-weighted) index of emerging market equities around the world. One of its main advantages is that it reflects actual investable opportunities for global investors by taking into account local market restrictions on share ownership by foreigners.

Returns on the indexes are measured in U.S. dollars, based on the end of the month currency rates from MSCI. The risk-free rate is given by the U.S. Treasury bill with three months to maturity. Monthly data on the indexes are collected from January 1988 (starting date of the EMF index) through December 2001, yielding a total of 168 observations per index. We measure all returns with dividends, and in continuously compounded (log) form.

Exhibit 1 describes the data used. Panel A provides summary statistics for the returns on the indexes used. Panel B presents the unconditional correlations for the whole sample period.

Some interesting facts are revealed by these statistics. Emerging market correlations with other assets are higher than those reported elsewhere (Harvey [1995] and Froot, O'Connell, and Seasholes [2001], for example). This reflects the fact that I am using an aggregate diversified index of emerging markets equities.

The benefits of international diversification have been thoroughly documented since the early 1970s. With the development of the International Finance Corporation database, several studies have documented benefits of emerging markets investment. Unlike developed markets, in these countries the estimates of correlations are low, and many are even negative. Given these low correlations, Harvey [1995, p. 774] shows that "adding emerging market assets to the portfolio problem significantly

shifts the investment opportunity set” and that risk-adjusted returns are 50% higher after their inclusion in the portfolio. These low correlations and the associated diversification benefits are often attributed to emerging markets segmentation from world capital markets.

Merton’s [1987] model of capital market equilibrium with incomplete information provides the framework for this hypothesis. Fixed costs of research and a lack of information prevent investors from investing in emerging market assets. As a result, the market portfolio is no longer efficient. Also, the equilibrium expected returns are higher than those given by the CAPM capital market line, since there is an additional visibility premium associated with segmented market assets. These assets are not held widely, so the few investors who hold them must be adequately compensated for their loss in terms of risk-sharing. They have to bear more risk than necessary in an integrated market, so they must earn a higher return.

Despite the apparently strong evidence, there is no consensus in the investment world about the benefits of diversification in emerging markets. Indeed, it appears that investors do not use emerging markets very much despite the apparent good diversification opportunity. Emerging market stocks make up a disproportionately small share of investors’ equity holdings when one considers relative stock market capitalizations (approximately 10% of world market capitalization). Data on U.S. holdings of foreign equities show that emerging market share in U.S. investors’ portfolios is a little higher than 1%.¹

I start with an unconditional mean-variance analysis, both with and without short sale constraints.² The diversification benefits of emerging markets are assessed relative to a benchmark of developed market returns.

When there are no short sales constraints, the vector of weights of the optimal (tangency) international portfolio is:³

$$W_{tang} = \frac{\Sigma_w^{-1} \mu_w}{\mathbf{1}' \Sigma_w^{-1} \mu_w} \quad (1)$$

where W_{tang} is the vector of optimal weights in risky assets, Σ_w^{-1} is the inverse of the covariance matrix, $\mathbf{1}$ is a unit vector, and μ_w is the vector of mean excess returns of all assets.

When there are short sales constraints, the optimization problem is solved by adding an additional constraint:

$$w_i \geq 0, \forall w_i \in W_{tang} \quad (2)$$

Pure estimation of the tangency portfolio ignores important issues such as sampling error. Indeed, this portfolio is highly dependent on expected returns. Thus, we also present results for the minimum-variance portfolio (MVP), since this is more stable over time, but also represents the shifts in the efficient set as a result of using different assets.⁴

Eun and Resnick [1988] show that strategies based on the global minimum-variance portfolio outperform tangency strategies. The MVP for the assets under consideration is:

$$W_{MVP} = \frac{\Sigma_w^{-1} \mathbf{1}}{\mathbf{1}' \Sigma_w^{-1} \mathbf{1}} \quad (3)$$

This portfolio requires only an estimate of the covariance matrix of returns, and the expected return vector is not required.

Besides estimating the weights on efficient portfolios, I summarize the incremental benefit of aggregate emerging market investment using three different statistics:

$$\phi_1 = \text{Max}\{\mu_{tang} - \mu_{US} \mid \sigma_{tang}^2 \leq \sigma_{US}^2\} \quad (4)$$

$$\phi_2 = \sigma_{US} - \sigma_{MVP} \quad (5)$$

$$\phi_3 = 1 - \frac{\sigma_{MVP}}{\sigma_{US}} \quad (6)$$

where μ_{tang} and σ_{tang} are the excess return and standard deviation of the tangency portfolio from Equation (1), and μ_{US} and σ_{US} are the excess return and standard deviation of the NYSE portfolio. σ_{MVP} is the standard deviation of the minimum-variance portfolio [Equation (3)].

The first measure, ϕ_1 , assesses the expected return benefits of international diversification and can be interpreted as the gains of international diversification after controlling for variance. It measures the gain in returns (percent per year) obtained by international diversification (through the optimal tangency portfolio), for a level of risk equal to the volatility of the U.S. market.

The second and third measures of the gains of international diversification are framed in terms of the reduction in variance allowed by diversification. ϕ_2 is the reduction in standard deviation provided by the minimum-variance portfolio relative to the NYSE benchmark. ϕ_3 is the percentage reduction in volatility relative to the same benchmark.

Exhibit 2 presents the estimates of the weights for dif-

EXHIBIT 2

Optimal Portfolios and Measures of Diversification Benefits

	(1)	(2)	(3)	(4)	(5)	(6)	(7)
Panel A: Gains from diversification							
Sharpe	0.184	0.184	0.187	0.218	0.218	0.222	0.222
GRS	0.975	0.976	0.951	0.602	0.602	0.568	0.568
ϕ_1	0.1%	0.6%	0.6%	0.2%	0.2%	0.7%	0.7%
ϕ_2	0.0%	1.5%	1.5%	0.7%	0.7%	2.0%	2.0%
ϕ_3	0.0%	10.5%	10.7%	4.8%	5.2%	14.2%	14.2%
Panel B: Weights of the tangency portfolio							
w1	1.156	1.164	1.265	1.908	1.909	1.988	1.979
w2	-0.156	-0.164	-0.123	-0.908	-0.906	-0.795	-0.808
w3			-0.142		-0.002	-0.192	0.027
w4							-0.198
Panel C: Weights of the MVP portfolio							
w1	0.998	1.327	1.286	0.705	0.745	1.057	1.061
w2	0.002	-0.327	0.049	0.295	0.324	0.248	0.253
w3			-0.335		-0.069	-0.305	-0.011
w4							-0.303
Panel D: Weights of the Tangency Portfolio without Short Sales							
w1	1.000	0.777	0.777	1.000	1.000	0.777	0.777
w2	0.000	0.223	0.000	0.000	0.000	0.000	0.000
w3			0.223		0.000	0.223	0.000
w4							0.223
Available Assets	NYSE EMF	NYSE NASDAQ	NYSE EMF NASDAQ	NYSE EAFE	NYSE EAFE EMF	NYSE EAFE NASDAQ	NYSE EAFE EMF NASDAQ

GRS is the p-value of the Gibbons, Ross, and Shanken [1989] test for the statistical improvement of the Sharpe ratio. ϕ_1 is the yearly gain in returns obtained by the tangency portfolio, controlling for variance. ϕ_2 is the reduction in yearly standard deviation provided by the minimum-variance portfolio relative to the NYSE benchmark. ϕ_3 is the percentage reduction in volatility. The sample runs from January 1988 through December 2001, and observations are sampled monthly.

ferent combinations of available assets. I estimate the marginal benefit of emerging markets investment for different initial global portfolios. The base assets are the NYSE, the NAS100, and the EAFE. Different global portfolios include increasingly expansive combinations of these base assets. Then I add emerging markets into each portfolio and measure the incremental benefit they create.

Panel A provides the results for the different measures that assess the gains from including other assets in a portfolio: the Sharpe ratio, the Gibbons, Ross, and Shanken (GRS) [1989] test for statistically significant improvement in the Sharpe ratio relative to the NYSE benchmark, and the measures of gains from diversification introduced above (ϕ). Panel B shows the tangency portfolio weights in each asset class under consideration. Panel C shows the weights of the MVP in each asset class, and Panel D the weights of the tangency portfolio when short sales are not allowed.

In the first column, the investment set is the NYSE and the EMF. The optimal tangency portfolio has weights of 1.156 and -0.156, and the Sharpe ratio is 0.184.⁵ The improvement in the Sharpe ratio is not significant, as implied by the p-value of the GRS [1989] statistic. Also, this tangency portfolio leads to a gain in expected return per year of less than 1%. Interestingly, even the MVP, where difference in mean returns is not considered, has a zero weight in the aggregate emerging market index. Although the correlation of NYSE/EMF is 0.57, the higher volatility of the emerging market index (0.25 versus 0.14 for the NYSE) makes it less desirable for variance reduction purposes. In Panel D, the results suggest that if short sales are not allowed, the optimal investment in the EMF is zero.

The second column shows the results when the base portfolio includes the NYSE and the NAS100. I then introduce the EMF to this investment set [in column (3)]. The improvement in the Sharpe ratio is not significant, and the weights of the EMF on the tangency and MVP are negative. When short sales are prohibited, the weight of

the EMF is zero.

The fourth and fifth columns are based on the US/EAFE benchmark. Much as in the previous investment set, the introduction of emerging markets to a diversified portfolio of developed market securities does not significantly improve performance. Columns (6) and (7) display the optimization results when all benchmark assets (NYSE, EAFE, NAS100) are simultaneously considered. Again, in this broad specification, introduction of the EMF [column (7)] does not significantly improve performance. Similarly, when short sales are not allowed, the weight of the EMF is zero.

These results suggest that diversification using an aggregate fund of emerging market equities has not substantially improved the performance of an international investor (measured by ϕ_1). Even when we look at the risk reduction aspect of international diversification, the MVP shows that emerging markets have zero or negative weights. Across different specifications of the benchmark

EXHIBIT 3

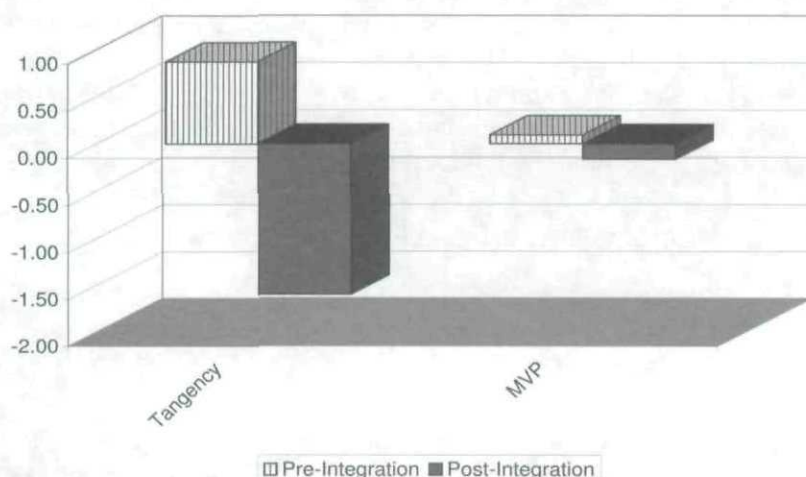
Diversification Benefits in Different Subperiods

	Whole Sample	Pre-Integration	Post-Integration
Tangency Portfolio	0.03	0.87	-1.60
Minimum Variance Portfolio	-0.01	0.09	-0.16
Sharpe	0.21	0.30	0.38
ϕ_1	0.00	0.04	0.08
ϕ_2	0.02	0.01	0.04
ϕ_3	0.14	0.08	0.24

The first half of the sample (1988-1994) is defined as the pre-integration period. The second half (1995-2001) is defined as the post-integration period. The first two rows show the weight of emerging markets in the different optimal portfolios. Sharpe is the Sharpe ratio of the tangency portfolio. ϕ_1 is the yearly gain in returns obtained by the tangency portfolio, controlling for variance. ϕ_2 is the reduction in yearly standard deviation provided by the minimum-variance portfolio relative to the NYSE benchmark. ϕ_3 is the percentage reduction in volatility.

EXHIBIT 4

Optimal Aggregate Investment in Emerging Markets in Different Periods



Tangency represents weights of emerging markets in optimal portfolio. MVP represents weights in minimum-variance portfolio.

portfolio (NYSE alone, NYSE + NAS100, NYSE + EAFE, NYSE + EAFE + NAS100), introduction of the EMF does not substantially change the performance of the optimal portfolios and resulting diversification measures (ϕ_2 and ϕ_3). This result can be explained by the high level of volatility of emerging market equities (0.25) and their level of correlation with the U.S. (0.57).

A portfolio that is diversified into emerging markets does not reduce volatility risk for the U.S. investor. Indeed, the ratio of volatilities (EMF/US) is about 1.8, but almost 60% of it cannot be diversified away (high correlation). An alternative way to see this is to compute the beta of the EMF relative to the U.S. This beta is slightly lower than one, suggesting low levels of variance reduction by investing in the aggregate emerging markets index.

Merton [1987] suggests that lack of investor access leads to higher expected returns as a result of a segmentation premium. Most financial market liberalization took place in the early 1990s (see Bekaert and Harvey [2000] and Fernandes [2003]).

To assess the relevance of liberalization and higher integration, I divide the sample into two equal subperiods. The first half of the sample (1988-1994) is defined as the pre-integration period and the second half (1995-2001) as the post-integration period. Optimal portfolios and diversification metrics are reestimated in these two subsamples. Exhibits 3 and 4 show the results.

Integration of emerging markets with world stock markets leads to a reduced segmentation premium. In the pre-integration period, aggregate investment in emerging markets was a good strategy. The segmentation premium these markets enjoyed provided substantial diversification benefits just by indexing at the asset class level. The second column in Exhibit 3 suggests that both the tangency portfolio and the MVP include substantial exposure to this asset class.

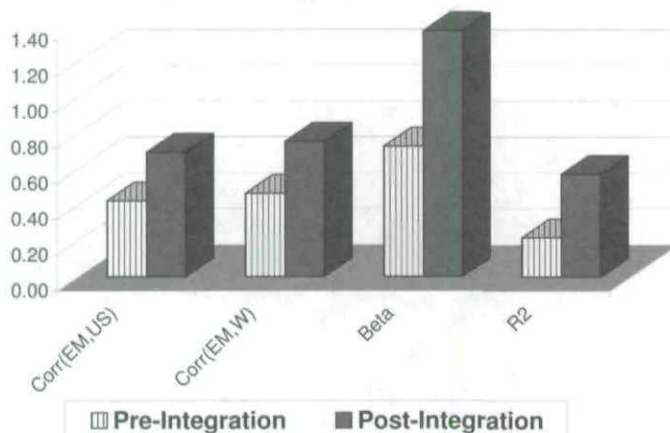
In the post-integration period, the results are reversed. The last column of Exhibit 3 shows that the weight of an aggregate investment in emerging markets in the post-integration period is negative or zero. Even the MVP, which does not consider the expected returns, no longer

includes the EMF. This can be interpreted as a result of the increased correlation with the U.S. (and the world market). The correlation in the pre-liberalization period was 0.3/0.4; post-liberalization, the value doubled.

The volatility of the aggregate emerging market index, however, has not been substantially reduced. Volatility of the EMF actually increased in the post-integration period (26% versus the previous 23%).⁶ In the pre-integration period, the lower correlation more than compensated for the high variance risk of the EMF, suggesting a 9% weight in emerging markets. In the post-integration period, volatility remained high, but the correlation doubled, thus eroding the variance-reduction benefits of the EMF investment.

EXHIBIT 5

Effects of Increased Integration



Cor(EM, US) is correlation of the EMF with the U.S. index. *Cor(EM, W)* is the correlation of the EMF with the world market. Beta is the estimated risk coefficient of the World CAPM regression, and R^2 is the explanatory power of this regression.

What is the quantitative evidence underlying the view that integration has increased since the early 1990s? For each subperiod, I estimate the correlation of emerging markets with the U.S. and the MSCI World Market indexes. Exhibit 5 shows the correlations in different periods. Whether we look at correlation with the U.S. or

the world market, the correlations of emerging markets have increased substantially. These increased correlations are partially responsible for the diversification results we see in Exhibits 3 and 4. In the post-integration period, emerging markets now behave more like developed market benchmarks. Excluding the Asian and Russian crises has no material impact on the results.

An alternative way to assess increasing integration is provided by asset pricing theory. Indeed, higher integration should give world factors more of an impact in explaining returns. Thus, we estimate a world CAPM, where the risk factor is the return on the world market index. The third and fourth bars in Exhibit 5 indicate similar conclusions. Global factors are significantly more important today than in the past. We find substantial increases in the explanatory power of world factors in the second half of the sample. In the second subperiod (post-integration), the world factor explains almost 60% of the variance in returns, while it explained something like 20% in the first period.

Exhibit 6 presents 36-month rolling correlations of emerging market returns with the world. Even in the post-crisis period, we can see that correlations are substantially higher than in the beginning of the sample.

EXHIBIT 6

Rolling 36-Month Correlation of Emerging Markets with World

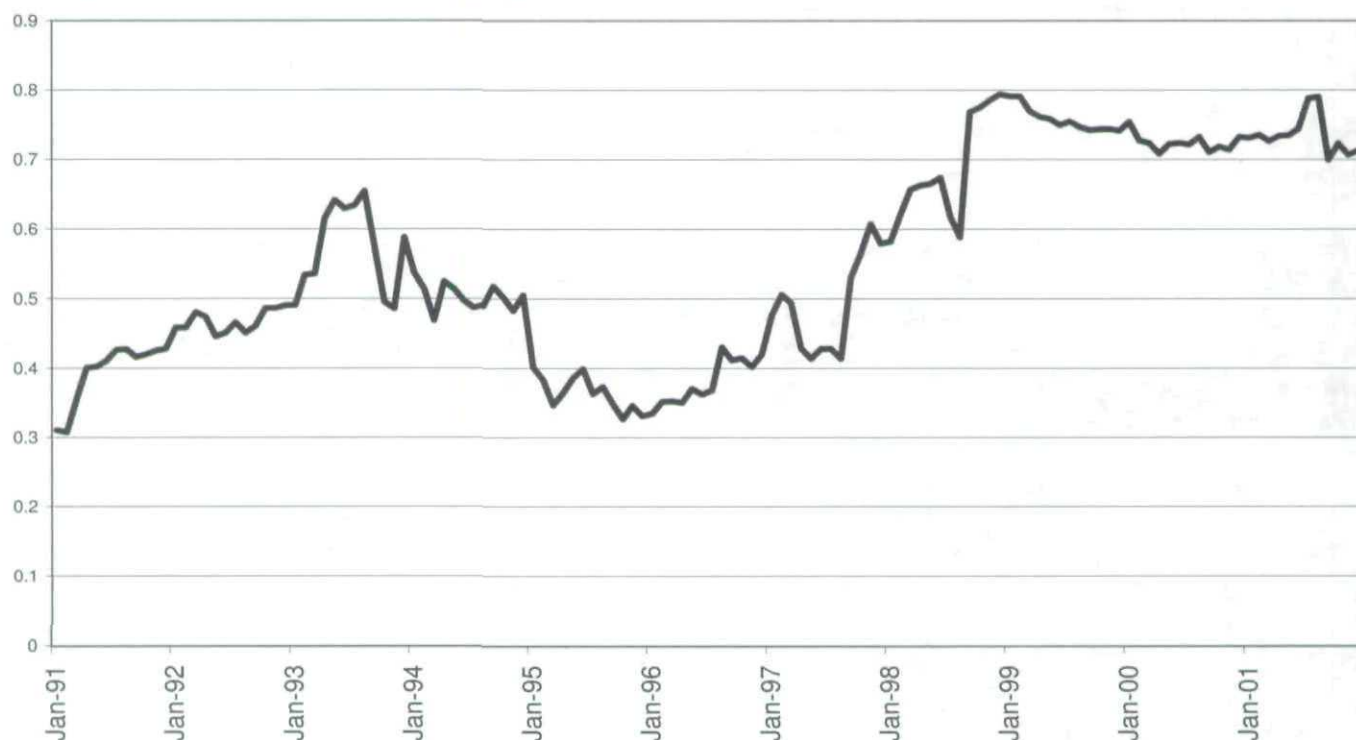
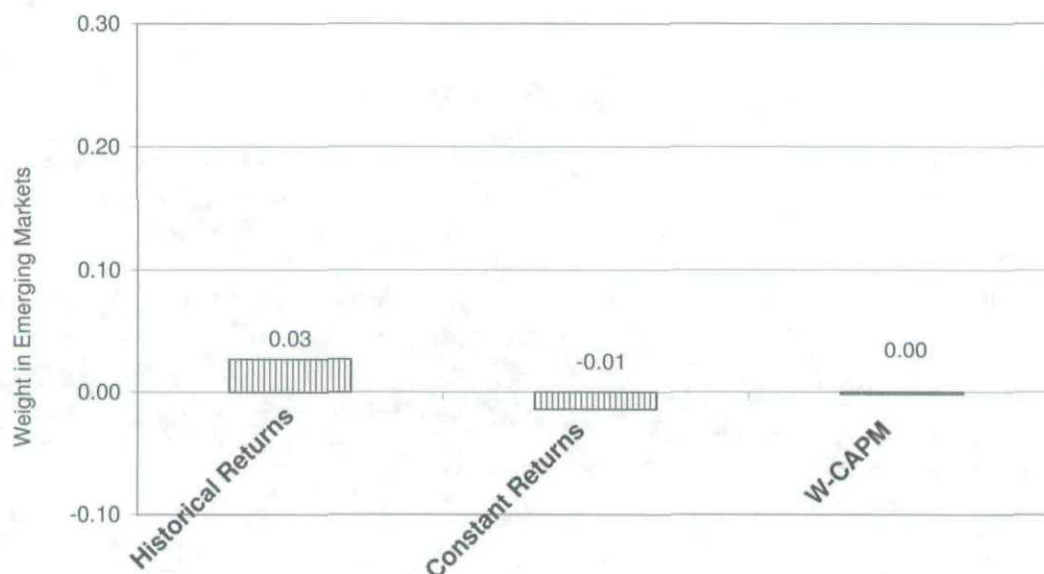


EXHIBIT 7

Emerging Markets Weight Using Different Measures of Expected Returns



Historical returns are mean returns over the sample. Constant returns represent a 10% return for all asset classes involved. W-CAPM represents the estimation of expected returns according to a world CAPM regression.

Although mean-variance analysis is theoretically grounded, and well accepted by the financial community, there are potential limitations to its use. It requires for each asset estimates of the expected mean return, the expected volatility, and the expected correlation between assets. Estimating expected returns internationally is a difficult task. For emerging markets, the task is even more difficult.

Short samples of data make estimation errors more likely. We use 14 years of data, which although short in comparison to U.S. datasets, is the longest time span available for investable indexes of emerging markets.

Given these shortcomings, I have been using realized returns as a proxy for expected future returns. Changes in this measure, of course, could potentially impact the optimal weight of emerging market equities. Indeed, there is a danger that long-term asset allocations are biased toward assets that have performed well recently. I address this issue directly by creating alternative measures of expected returns.

Exhibit 7 presents the weight of emerging markets in optimal portfolios for different estimates of expected returns. I repeat the optimization procedure and plot the weight assigned to the aggregate emerging market index in the optimal portfolio. The first bar presents the historical results, where the weight of the aggregate emerging market index is less than 3%. The second bar represents the weight of emerging markets in the optimal portfolios,

assuming constant expected returns for all the assets (10% per year). The third bar presents the results based on the estimate of expected returns suggested by the world CAPM. These estimates relate expected return differentials to differences in beta coefficients with respect to the world market.

The resulting efficient portfolios using different proxies for expected returns do not materially affect the conclusions. The aggregate investment in emerging markets recommended by the optimizer is very small. Applying these alternative proxies for expected returns in the two sub-periods provides results similar to those reported in Exhibits 3 and 4. It is only in the pre-integration period that aggregate investment in emerging markets is recommended.

After allowing investment in other asset classes, there are no significant benefits of an aggregate emerging market investment. The mean-variance frontier that an investor achieves by investing in the aggregate EMF index is not statistically different from the one based only on developed market equities. The EMF is a value-weighted index. I repeat all the estimations using an equally weighted index of emerging markets—EM-EW.

Exhibit 8 describes the equally weighted index used, and compares it to the MSCI EMF index. Exhibit 9 reports the optimal portfolios obtained using the equally weighted index instead of the value-weighted EMF. The results are similar to those already presented.

EXHIBIT 8

Summary Statistics: Equally Weighted Index

	EMF	EM-EW
Mean	11%	8%
Std. Dev.	25%	18%
Skewness	-0.98	-1.06
Kurtosis	5.91	7.30
P-value B-J	0.0000	0.0000

EM-EW is the equally weighted return on IFC country indexes for emerging markets.

Although the equally weighted index of emerging markets (EM-EW) seems to provide some additional variance-reduction power (ϕ_2 , ϕ_3), the difference from the value-weighted EMF index is small. The weights on the tangency portfolio are always negative (even more negative than in the results using the EMF).

The main conclusions therefore remain unchanged. Whether looked at in value-weighted or equally weighted terms, indexing strategies of emerging market equities no longer add value to global portfolios. The integration process has eroded the unconditional gains of emerging market investment.

This does not mean an investor cannot gain enhanced performance by choosing individual stocks or markets. Indeed, it is possible that emerging markets as an aggregate do not bring substantial diversification benefits, and yet individual country investment would still be advisable. This disaggregation result is not sample-specific. It

is a common fact in portfolio theory that higher levels of disaggregation improve results. It should always be possible to find combinations of disaggregated foreign assets that dominate passive index alternatives. Indeed, even in the U.S., outperforming benchmarks requires some skill in selecting portfolios that diverge from value-weighted indexes (either sectoral or style investment).

The interesting feature is that under segmentation aggregate emerging market investment was enough to add value. The segmentation premium these markets enjoyed provided substantial diversification benefits just by indexing at the asset class level. With increasing integration, portfolio managers must resort to more sophisticated strategies.

CONCLUSION

My reexamination of the role of emerging market equities in an increasingly globalized world capital market focuses on the level of disaggregation advisable in emerging market investment.

The evidence shows that in this post-liberalization period there are few benefits of including an aggregate fund of emerging markets in a portfolio. Across different specifications of the initial global portfolio, the results suggest that aggregate emerging market investment does not provide significant incremental diversification benefits. The aggregate index of emerging market equities (EMF) no longer offers investors performance beyond that achievable using only developed market securities. The

EXHIBIT 9

Diversification Benefits—Equally Weighted

Panel A: Gains from diversification							
Sharpe	0.1846	0.1837	0.1876	0.2184	0.2216	0.2190	0.2218
ϕ_1	0.0%	0.6%	0.3%	0.2%	0.7%	0.1%	0.6%
ϕ_2	0.8%	1.5%	2.3%	0.7%	2.0%	1.1%	2.5%
ϕ_3	5.4%	10.5%	16.5%	4.8%	14.2%	7.9%	18.1%
Panel B: Weights of the tangency portfolio							
w1	1.2403	1.1635	1.3391	1.9076	1.9876	2.0187	2.0478
w2	-0.2403	-0.1635	-0.1891	-0.9076	-0.7953	-0.9095	-0.7988
w3			-0.1501		-0.1923	-0.1092	-0.0609
w4							-0.1881
Panel C: Weights of the MVP portfolio							
w1	0.7225	1.3271	1.0505	0.7050	1.0573	0.5614	0.9128
w2	0.2775	-0.3271	0.2750	0.2950	0.2477	0.2199	0.1677
w3			-0.3255		-0.3050	0.2187	0.2302
w4							-0.3108
Available Assets	NYSE EM-EW	NYSE NASDAQ	NYSE NASDAQ EM-EW	NYSE EAFE	NYSE EAFE EM-EW	NYSE EAFE NASDAQ	NYSE EAFE NASDAQ EM-EW

EMF index used is a value-weighted index, but I reach similar conclusions using an equally weighted index of emerging markets.

Quantitative evidence on the increased integration of these markets shows how this has affected portfolios in different time periods. Emerging markets are nowadays very much integrated with world capital markets. The segmentation premium they enjoyed in the 1980s has been eroded, and in the post-integration period, passive indexing strategies are no longer enough to add value.

These results suggest that after liberalization and higher integration occurred in emerging markets, their role in global portfolios has changed. While investment in emerging market equities can still be very valuable to global investors, merely buying an index of all emerging market countries is not enough. Emerging markets may still provide substantial returns, but investors will have to be more selective going forward.

ENDNOTES

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¹Data are from the U.S. Treasury Department.

²Bekaert et al. [1998] develop a four-moment asset allocation procedure that considers not only mean and variance, but also skewness and kurtosis. Even using this methodology, the emerging markets portfolio weights vary by less than 1.5%.

³Extending the standard assumptions of Markowitz [1952] static optimization to the international arena, namely, perfect capital markets, homogeneous expectations, and a real risk-free asset worldwide (which would not exist without purchasing power parity).

⁴Merton [1972] shows how the entire efficient set can be constructed by combining the tangency and the global minimum-variance portfolios.

⁵According to Exhibit 1, the Sharpe ratio for the NYSE portfolio alone is 0.169.

⁶Excluding the recent crises has no significant impact on the results. The post-crisis volatility of the EMF is 25%.

⁷Equally weighted return on IFC country indexes for emerging markets.

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