

Reevaluating Portfolio Diversification Benefits With New Multinational Indices

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Abstract

This study reviews international diversification using new sets of global and regional indices of multinational companies. Contrary to previous studies, it can be demonstrated that U.S. investors can aspire to strategically balanced portfolios through positioning in these indices. One might think that, because U.S.- and European -based companies frequently dominate these indices this might lead to poor diversification benefits. After all, one could argue that policymakers from the U.S. and the other major economies are increasingly coordinating their macroeconomic decisions resulting in the same monetary and public policies that affect a portfolio of purely domestic firms. Our results, however, show that it is far from being the case.

1.0 Introduction

A relatively new generation of investable stock indices representing multinational companies—the Dow Jones Global Titans Index and the S&P Global 100 Index—has been introduced as important tools for global equity diversification. More recently, Dow Jones launched the Dow Jones Asian Titans, an index of blue chip companies headquartered in the Asia/Pacific region, and the Dow Jones STOXX Europe, representing Europe most important companies as a means of further improving international portfolio diversification through, this time, regional indices. With barriers to trade coming down and global deregulations of various industries such as telecommunications, banking, or utilities in full swing, these indexes are thought to allow investors to pick up “true” multinational companies, no matter where they are headquartered.

The impetus for these new indexes comes from various directions including the multinationals and the index compilers themselves. The multinationals see them as an answer to their request to have their performance measured against their global competitors rather than their domestic peers. As to the index providers, they are hoping to capture more business from fund managers who no longer invest with traditional national criteria, such as fund managers in Europe who are switching to a regional approach in their investment strategies after the arrival of the euro.

The rush of releases also underlines the growing popularity of exchange-traded funds in the US since their birth in 1993 when they were largely seen as obscure products reserved for institutional investors. The new multinational indexes are expected to expand the use of exchange traded funds to retail investors, seen as a bigger target, by moving these products from their birthplace on the American Stock Exchange to larger arenas such as the New York Stock Exchange and Deutsche Borse. The business press is filled with examples of mutual funds already filing registration documents with the Securities and Exchange Commission for a number of exchange-traded funds tied to global indexes.

The true test, however, remains of whether these multinational indexes offer investors true international diversification. After all, this idea has had its skeptics as early as the 1970s. For example, in 1978 Jacquillat and Solnik investigated whether multinational firms could realize the gains from international diversification. They

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tested the assumption that firms doing business in many countries may be viewed as a diversified international portfolio by examining multinational firms from nine countries and found that their stock prices behave very much like those of purely domestic firms.¹ Clearly, their results did not support the hypothesis that positioning in multinational firms provides additional diversification benefits to a portfolio of purely domestic firms.

To have a full understanding of what is at stake here, we will first briefly review the aforementioned two global indexes by comparing them against each other. The Dow Jones Asian Titans Index and the Dow Jones STOXX Europe are not included at this stage of the analysis because of their narrower focus. We will then determine, using standard industry tests, whether this new generation of global and regional indices of multinational companies provide any further explanation to the international diversification puzzle.

2.0 Data And Methodology

To examine the return differential of these multinational indices, their total returns are examined over the period beginning January 1992 and continuing through December 2000. The providers of the indices did not make more recent data available. Performance is calculated on a total return basis in compliance with SEC established standards. A substantial simulated return history exists prior to their introduction in July 1999 for the Dow Jones Global Titans and February 2000 for the S&P Global 100.

As a means to expand our database, these results have been included in the study in spite of the general difficulty in back testing a selection process with substantial qualitative components in an unbiased manner. In this case, however, both indices are composed of stable companies that have facilitated back testing and the development of index histories. Portfolio managers also use these simulated results according to several industry publications. This is what led the index providers to generate them through back testing in the first place. This gives us 2931 high frequency daily data points. Note that the FTSE Global 100 Index, a third global multinational benchmark, was launched in September of 1999. However, unlike the two indices, it does not provide data back to January 1, 1972. Rather than shortening our database to match that of the FTSE Global 100 Index, we chose to exclude the index from our analysis.

To understand if their return differential is explained by significant differences in the methodology underlying the constructions of these benchmarks, we begin this analysis with a comparison of the two multinational global indices in terms of their most important characteristics such as content of the benchmarks, profitability screen, if any, reconstitution schemes, and size statistics. The results of this index comparison will also be called upon when we move to examine risk-adjusted performance. Statistics included in this phase of the analysis include standard deviation and Sharpe ratio. If we limit our comparison to returns alone, we are implicitly assuming that both are equally risky.

Several techniques for the measurement of performance that incorporate both risk and return have been developed. Of these composite performance measures, we will call upon the more frequently used Sharpe ratio simply because the Treynor and Jensen measures will automatically assume that the two indices under consideration are well diversified whereas the Sharpe ratio does not.² Herein, the Sharpe ratio is a measurement of the index's excess annualized return over annualized U.S. 30-day Treasury bills adjusted for the index's volatility as measured by the annualized standard deviation.

When analyzing the sources of the performance gap between the two indices, it is equally important to look at whether return differences are period specific. Certainly, it would be a serious mistake to assume outperformance endures. After all, it depends largely on economic and financial cycles. Thereby, two additional periods are added to

¹ B. Jacquillat and B. Solnik, "Multinationals are Poor Tools for International Diversification," *Journal of Portfolio Management*, Winter 1978.

² When completely diversified portfolios—that is, portfolios with no unsystematic risk—are being evaluated, the Sharpe, Treynor, and Jensen measures will agree on how managers should be ranked, from best risk-adjusted performance to the worst. Rankings will be the same because the total variance of a completely diversified portfolio is its systematic risk.

our analysis to emphasize this concern. The period from January 1, 1992 to March 31, 2000 fits within a market cycle widely defined as bullish, whereas the April 1, 2000 to December 31 2000 period represents a retreating market.

3.0 A Brief Overview Of The New Global Multinational Equity Indices

The two global multinational indexes were launched within a relatively short period of time from one another: the Dow Jones Global Titans Index in July 1999, and the S&P Global 100 Index in February 2000. These indexes are being marketed as a solution to the home bias problem in international investment because they measure the performance of “true” global multinational corporations. Most importantly, they offer all the diversification benefits available from direct investment in foreign securities such as ADR’s, yet they do not expose participants to the difficulties and costs involved in foreign capital markets. Also, for the U.S. fund manager, better information is available on these global multinational companies than on many of the less familiar firms quoted in distant stock markets. Lastly, they can be used for comparative performance and risk measurement.

Table 1, which summarizes both background and construction methodologies of these global indexes, highlights a number of similarities but also shows differences that could be material in the management of equity portfolio and other financial products linked to these indexes. There seems to be significant overlaps among these indexes. The most important overlap is the result of the current bent of equity markets worldwide. Technology firms dominate the composition of these global equity indexes,

Table 1: Index Characteristics

	Dow Jones Global Titans	FTSE Global 100¹	S&P Global 100
Background:			
No of constituents	50	100	100
Launch date	7/1999	9/1999	2/2000
History from	1992	1999	1989
Total market capitalization	US\$ 7.4 trillion ²	US\$ 7.7 trillion ²	US\$ 9.4 trillion ²
Sponsorship	Dow Jones	FTSE Int'l.	Standard & Poor's
Top five companies	General Electric [8.3%, US] Exxon Mobil [5.2%, US] Microsoft [4.7%, US] Citigroup [4.4%, US] Intel [3.4%, US]	General Electric [5.9%, US] Microsoft [4.2%, US] Exxon Mobil [3.7%, US] Pfizer [3.6%, US] Intel [2.6%, US]	General Electric [6.2%, US] Pfizer [3.9%, US] Exxon Mobil [3.8%, US] Microsoft [3.7%, US] Citigroup [3.4%, US]
Main Sectors	Technology [29.1%] Telecom [18.3%] Financials [15.0%]	Technology [25.5%] Healthcare [18.0%] Financials [11.7%]	Info Tech [18.1%] Financials [15.8%] Healthcare [15.7%]
Regional Weightings	USA [67.2%] Europe [28.6%] Asia [4.2%]	USA [58.2%] Europe [35.3%] Asia [5.7%] Others [0.8%]	USA [59.4%] Europe [34.2%] Asia [5.3%] Others [1.1%]
Construction methodology:			
Selection criteria			
• Primary:	Dow Jones Global Index	FTSE World Index	S&P Global 1200 Index
• Secondary:	Top 100 by adj market cap	Global exposure (30% of sales must be foreign)	Global exposure (significant foreign sales and foreign employment)
• Tertiary	Fundamental factors	Top 100 by market cap	≥ US\$ 5 B adj. market cap
Weighting by	Float-adjusted market cap ³	Float-adjusted market cap ³	Float-adjusted market cap ³
Calculation frequency	Daily	Daily	Daily
Review of constituents	Quarterly (March, June, Sep, Dec)	same	same

¹Although not included in the analysis, the FTSE Global 100 was included for the sole purpose to show that it has characteristics identical to those of the Dow Jones Global Titans and the S&P Global 100.

²Float adjusted

³Based on shares that are available for trading, but may vary slightly across index providers

followed by telecommunication, healthcare, and financial firms.³ One can also easily notice a bias in favor of U.S. firms in the composition of these indexes as quite a few of them have positioned themselves as technology leaders. Regardless of the methodology used in the compilation of these indexes, they seem to be included more frequently and as a result tend to dominate.

Although the providers of these indices claim that the methodology underlying their compilation is inherently different, one can see that the selection criteria are closely related. To start with, they all use membership in their respective global indices as a starting point in their selection procedures. The rest of the criteria such as importance of foreign sales, proportion of foreign employment, or liquidity of the company as measured by adjusted market capitalization are similar although not applied in the same order. The Dow Jones Titans seems to be the only index that puts some emphasis on specific financial factors such as book value and net profits. This does not seem to affect the end result, however, in view of the striking similarities observed on the list of the top multinationals comprising these indexes. Dow Jones also tracks only the top 50 multinationals as identified by its selection methodology compared to the other two indexes with 100 each.

4.0 Performance Analysis: January 1, 1992-December 31, 2000

We are testing whether increasingly common world factors are equally affecting expected cash flows of the multinational firms comprising the indexes, making them poor diversification tools. Logically, increasingly closer economic and government policies between the countries where most of these multinationals are domiciled could contribute to commonality in the indexes' performance behavior.

4.1 Performance Based On Correlations

Table 2 shows the correlations of the two global indexes with the S&P 500 and selected regional indexes such the Dow Jones Stoxx Europe, the Dow Jones Asian Titans, and the Nikkei 225. As a rule of thumb, two variables are strongly positively correlated if their coefficient of correlation is at least 0.50. (The interested reader can find a source for this informal rule in Farrar and Glauber's discussion of a related topic.⁴)

On average, they tend to move up and down against each other, showing almost complete lack of synchronization. This could indicate that, to some extent, increasingly common world factors are not equally affecting expected cash flows of the multinational firms comprising the indexes.

In the case of the multinational global indices, this result based on correlations is certainly surprising, as we have expected strong co-movements justified by the aforementioned fact that, without exception, U.S.-based multinationals comprise an important fraction of the indices. For example, as of December 31, 2000, the S&P Global 100 included no less than 39 US multinationals that accounted for approximately 59.4% of the index gross market capitalization. In the case of the Dow Jones Global Titans, out of the 50 multinational firms that comprise the index, 27 are headquartered in the U.S. and make up 67% of the index market capitalization as of the same date.

We expected that although a sizable portion of their revenues is generated outside the U.S., their performance would still be largely determined by the same monetary and budgetary policies that guide U.S. economic growth. In view of its high correlation with the S&P 500, widely recognized as a good gauge of the U.S. market portfolio, our expectation was certainly verified for the S&P 100 Global. On the other hand, in spite of its being loaded with U.S.-based multinational corporations, the performance of the DJ Global Titans, our other multinational index, is weakly correlation with that of the S&P 500.

³ With all but a very few technology firms rapidly falling out of favor in today's highly volatile equity markets, this dominance is now highly questionable.

⁴ D.E. Farrar and R.R. Glauber, "Multicollinearity in Regression Analysis: The Problem Revisited," *Review of Economics and Statistics*, vol. 49, 1967, pp.92-107.

Table 2: Correlations of Selected Global and Regional Multinational Indices

With the S&P 500 Index						
	S&P 500	DJ GLOBAL TITANS	S&P 100 GLOBAL	DJ STOXX	ASIAN TITANS	NIKKEI 225
S&P 500	1.00					
DJ Global Titans	-0.04	1.00				
S&P 100 Global	0.87	0.03	1.00			
DJ STOXX	0.00	0.65	0.03	1.00		
ASIAN TITANS	-0.05	0.57	-0.05	0.48	1.00	
NIKKEI 225	0.22	0.11	0.44	0.09	0.03	1.00

The fact that this index is not moving in step with the S&P 500 (-0.04) according to Table 2) could indicate that, to some extent, the so much heralded common world factors increasingly bringing economies closer together are not after all equally affecting expected cash flows of the multinational firms. Indeed, both multinational indices are loaded with large companies headquartered in countries such as the U.K. and other European countries supposed to pursue economic policies similar to those applied in the U.S.

This point is further emphasized by the correlation coefficient of the DJ STOXX Europe with the S&P 500 (0.00). As a European index including only multinationals headquartered in Europe, the performance of this benchmark in relation to the S&P 500 is less likely to be blurred by the inclusion of multinationals located in the U.S. and Asia. It shows that there is a strong argument to be made in favor of diversifying in Europe for an investor who holds the S&P 500.

Furthermore, in view of the negative correlation of the S&P 500 with the Asian Titans index, a benchmark for Asian multinational companies, one might suspect that the Asian constituents of the DJ Global Titans might have caused the negative sign of the correlation between the latter and the S&P 500. On the other hand, the slightly higher correlation of the NIKKEI 225, an index of Japanese companies, with the S&P 500 indicate that the latter were to some extent less affected by the Asian crisis than their counterparts in the rest of Asia. After all, from a market performance, who could deny that Sony, Honda, Toyota, and the like are much more visible in the U.S. markets than Hunday or Daewoo?

In the same vein, in view of the recent Asian crisis, one can only speculate that the correlation coefficient of the S&P 500 with the DJ Asian Titans could have been even more substantial had Japanese companies not dominated the latter. Japan's dominance of the DJAT is explained by the main selection criteria underlying the index, which are significantly different from those underlying the other multinational indexes. For example, rather than emphasize the importance of foreign sales, which usually favors U.S. corporations, the DJAT first includes only those companies from the Asia/Pacific region. Of the 50 companies included in the index, 25 are automatically selected from Japan with the rest going to the region's other major countries, such as Australia, Hong Kong, South Korea, and Taiwan. Due to this substantial allocation and the relatively larger size of its companies, Japan alone accounted for a whopping 75.8% of the index's market capitalization as of October 31, 2000.

All in all, this analysis based on correlations indicate that the U.S. based globally minded investor does not need to become alarmed. They indicate that for now most of the multinational indices offer the benefits of diversification for investors afraid to venture in foreign equity markets.

4.2 Performance Based On Risk-Adjusted Returns

Now that we have established that international diversification can be achieved through most of these multinational indices, the next step is to assess their risk-adjusted performance.

Table 3: Risk-Adjusted Performance of the Multinational Indices

	S&P 500			S&P 100 Global			DJ Global Titans		
	<i>Return</i>	<i>Std Dev</i>	<i>Sharpe Ratio</i>	<i>Return</i>	<i>Std Dev</i>	<i>Sharpe Ratio</i>	<i>Return</i>	<i>Std Dev</i>	<i>Sharpe Ratio</i>
1992	4.42	11.50	-0.12	-1.38	10.81	-0.66	-7.84	15.83	-0.86
1993	6.82	10.20	0.10	12.86	9.36	0.75	16.44	13.55	0.79
1994	-1.33	11.10	-0.64	3.69	9.07	-0.23	5.52	10.28	-0.03
1995	34.11	8.49	3.35	30.68	7.44	3.36	19.11	12.01	1.12
1996	19.33	12.12	1.17	23.44	9.56	1.91	11.95	9.00	0.76
1997	31.67	18.20	1.46	31.91	15.84	1.69	22.79	15.58	1.13
1998	26.07	20.32	1.04	31.68	18.01	1.49	28.39	17.93	1.31
1999	19.53	18.14	0.81	24.20	15.56	1.25	22.98	16.01	1.14
2000	-10.14	28.08	-0.57	-15.27	29.59	-0.72	-20.76	35.15	-0.76
1/92-12/00	15.26	17.05	0.60	16.42	15.97	0.71	10.93	18.20	0.33
1/92-03/00	19.23	15.22	0.92	21.30	13.07	1.23	15.63	14.44	0.73
3/00-12/00	-15.22	29.17	-0.68	-19.91	32.48	-0.75	-24.37	38.75	-0.75

Starting with the performance of the multinational indices, Table 3 indicates that the average (arithmetic) annualized total return for the DJ Global Titans for the nine-year period is 10.93 percent compared to a much higher 16.46 percent for the S&P 100 Global, and 15.26 percent for the S&P 500. In addition, the exhibit includes the annualized standard deviation of each index return, which indicates the associated risk. For the same period, the S&P 500 and the DJ Global Titans exhibit almost equivalent risks, 17.05 versus 18.20, respectively, whereas that of the S&P 100 Global is lower at 15.97. This means that in 68 percent of the sample years the annual return ranged from 32.31 % to -1.79 % for the S&P 500, 32.39 % and 0.45 % for the S&P 100 Global, and 29.13% and -7.27% for DJ Global Titans. Obviously, on one hand, an investor forced to sell stocks during a declining market could sustain larger losses with the latter. On the other hand, the same investor must also choose his or her battles: the ability to effectively diversify a portfolio by investing in the DJ Global Titans rather than in the S&P 100 Global or higher returns and poor diversification opportunity if the latter is chosen.

Next, we calculate the Sharpe performance ratio to further evaluate the two multinational indices. Of the two indices, the S&P 100 Global offered by far the better performance on a risk-adjusted basis. The 1992-2000 sample period shows a significant difference in their Sharpe ratios: 0.71 for the S&P 100 Global compared to 0.33 for the DJ Global Titans. Obviously the choice between one and the other boils down to diversification.

Because the results may have been affected by fluctuations in the equity markets, we break our nine-year sample period into two subperiods: January 1, 1992 to March 31, 2000 and April 1, 2000 to December 31, 2000. Starting with the January 1, 1992 to March 31, it is clear that the rising market has had a dramatic effect on the performance of both indices. Their returns have noticeably exceeded those of the longer sample period, by 4.70 percent for the DJ Global Titans and 4.88 percent for the S&P 100 Global. On the other hand, the two periods show that the difference between the variability of their returns as measured by the standard deviation is much narrower.

As would be expected, their return range for the period indicates much less risk. One has to use more than one standard deviation to reach the level of risk associated with the overall period. The results for this time horizon

clearly show that both indices performed relatively well. Their statistics have improved but the S&P 100 Global has still a clear edge from a pure risk-adjusted return point of view (1.23 versus 0.73.) One has to look at the correlation coefficients of the two indices with the S&P 500 to determine which of the two offer higher diversification benefits.

The next step is to determine the advantage of investing in the regional multinational indices included in our analysis. The aftermath of the Asian is quite visible in the performance statistics associated with the DJ Asian Titans and the NIKKEI 225. Table 4 show that both significantly lagged the DJ STOXX and the S&P 500. Starting with the overall sample period, their paltry returns and high volatility are reflected in:

Table 4: Risk-Adjusted Performance of the Regional Indices

	S&P 500			DJ STOXX			DJ Asian Titans			NIKKEI 225		
	Return	Std Dev	SP*	Return	Std Dev	SR*	Return	Std Dev	SR*	Return	Std Dev	SP*
1992	4.42	11.50	-0.12	-4.48	18.21	-0.56	-15.45	31.97	-0.66	-26.16	37.80	-0.85
1993	6.82	10.20	0.10	24.32	14.89	1.24	43.51	24.89	1.52	14.36	27.79	0.31
1994	-1.33	11.10	-0.64	0.12	14.64	-0.39	7.63	17.80	0.10	27.71	20.81	1.05
1995	34.11	8.49	3.35	23.21	12.92	1.36	6.17	22.94	0.02	-2.78	26.60	-0.32
1996	19.33	12.12	1.17	18.45	9.29	1.43	-5.97	12.27	-0.91	-12.74	15.44	-1.16
1997	31.67	18.20	1.46	24.67	17.39	1.12	-17.57	24.73	-0.92	-29.88	31.06	-1.13
1998	26.07	20.32	1.04	34.23	24.56	1.19	-2.74	28.41	-0.27	6.42	35.45	0.04
1999	19.53	18.14	0.81	22.33	18.22	0.96	80.44	21.42	3.53	50.74	24.55	1.87
2000	-10.14	28.08	-0.57	-10.03	30.56	-0.52	-31.75	64.39	-0.59	-34.74	52.88	-0.77
1/92-12/00	15.26	17.05	0.60	15.40	19.21	0.54	3.27	31.73	-0.05	-5.04	32.33	-0.31
1/92-03/00	19.23	15.22	0.92	19.36	17.22	0.82	9.12	23.61	0.17	1.06	27.92	-0.15
3/00-12/00	-15.22	29.17	-0.68	-14.96	32.50	-0.60	-38.53	72.73	-0.59	-47.64	59.79	-0.87

*Stands for the Sharpe Ratio


their low Sharpe ratios -0.31 and -0.05 for the NIKKEI 225 and the DJ Asian Titans as compared to 0.54 and 0.60 for the DJ STOXX Europe and the S&P 500. Their performance statistics were slightly better during the period corresponding with the bull market but so was the performance of the other regional index, the DJ STOXX Europe. It's only during the general market decline that the risk-adjusted performance of the DJ Asian Titans caught up with that of the DJ STOXX Europe (-0.59 versus -0.60 , respectively.)

Obviously both the DJ STOXX Europe and to a lesser extent the DJ Asian Titans have dominated the NIKKEI 225. Their risk-adjusted returns were sizably better (especially the DJ STOXX Europe) whereas Table 2 indicate that both represent a better diversification tool than the NIKKEI 225 for the U.S. investor. By looking at these numbers, one might be inclined to say that an investor seeking international diversification is better off investing the international portion of his or her portfolio in the DJ STOXX Europe. However, this is assuming that investors are only looking at the risk-adjusted returns of the two other regional indices. Table 2 shows that the Asia/Pacific region does offer sizable benefit from diversification. Based on our sample period, a case can be made that after all, global U.S. investors are better off without the NIKKEI 225. This does not mean, however that Japanese multinational companies are being overlooked. After all, as aforementioned, they represent 50 percent of the DJ Asian Titans, a benchmark that proved to be a much more safer bet than the NIKKEI 225.

5.0 Concluding Remarks

Two major conclusions can be drawn from this study. First, and most important, our results show that U.S. investors can diversify their portfolios using these new multinational indexes because they offer all the diversification benefits available from direct investment in foreign securities such as ADRs without exposing

participants to the difficulties and costs involved in foreign capital markets. Also, for these investors, better information is available on these global multinational companies than on many of the less familiar firms quoted in distant stock markets.

Second, their risk-adjusted returns show that in addition to their diversification benefits they also provide investors with noticeable performance, especially the DJ GLOBAL TITANS and the DJ STOXX Europe. Their performance was at par with that of the S&P 500. But assuming that the investor is not interested in the DJ GLOBAL TITANS because of its high share of U.S. multinational companies and is not convinced that the U.S. and European economies have yet to move in tandem as suggested by our correlation matrix, he or she can still allocate part of the portfolio to the DJ ASIAN TITANS. Regardless of how the problem is looked at, one cannot deny the diversification benefits of these new multinational indices. 

Bibliography

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Notes