

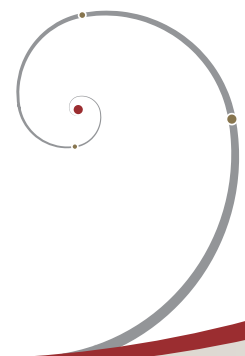
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## **Understanding the S&P 500**

### **This Index Offers a Lot of International Exposure**

*By Indrani De, CFA®, PRM*



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# Understanding the S&P 500

## This Index Offers a Lot of International Exposure

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### Abstract

This paper highlights how the international business exposure of the S&P 500 constituents has evolved over the past decade. It demonstrates that a large and increasing fraction of the revenue of the S&P 500 constituents comes from international markets. In 2010, almost 40 percent of the market-weighted sales of the S&P 500 were international. In the past decade, almost 40 percent of the S&P 500's earnings growth came from international sales, and in some years it was almost 60 percent. The S&P 500 constituents benefit from the fast growth in the emerging markets of Latin America and Asia. The S&P 500 offers ample geographic diversification, and it benefits from emerging markets growth. The U.S. index offers sector diversification close to that of the global index.

S&P 500 provides U.S. investors with a good global diversification opportunity because U.S. firms in the index have large and increasing business exposure in international markets. As a result, the S&P 500 provides global stock market exposure to U.S. investors. These economic factors drive the high degree of co-movement between the returns of the S&P 500 and global indexes. Domestic U.S. investors achieve substantial diversification benefits, by either investing in S&P 500 index funds or actively investing using the S&P 500 as the benchmark. For active managers, understanding the extent of international exposure inherent in the S&P 500 is an important part of knowing the index characteristics.

### Introduction

Research over the past few decades has pointed out the benefits of international diversification. In one of the earliest papers on this topic, Levy and Sarnat (1970) identified international diversification as a source of welfare gains for individual investors. Harvey (1995) showed that U.S. investors can achieve large benefits by investing in emerging markets, where stock returns are driven to a larger extent by local factors. Chen and Lin (2012) concluded that any international exposure will improve a U.S.-only portfolio.

Some researchers have tried to reconcile the benefits of international diversification with the so-called "home bias" in investments by pointing out the limited diversification benefits of investing in multinationals. Errunza et al. (1999) showed that investors can mimic the returns on foreign market indexes by creating diversification portfolios based on industry indexes, shares of multinationals, closed country funds, and American Depositary Receipts. Rowland and Tesar (2004) showed that investment in multinationals could

have provided significant diversification benefits for U.S. investors, with marginal gains from adding international indexes. Brooks and Del Negro (2003) found that a firm raising its international sales by 10 percent raises the exposure of its stock return to global shocks by 2 percent and reduces its exposure to country-specific shocks by 1.5 percent, and this link has grown stronger since the mid-1980s. Cai and Warnock (2006) and Nesvicky (2007) pointed out that domestic institutional investors achieve substantial international diversification through their holdings of U.S. multinationals because exposure to foreign equity markets is greater for domestic firms that are more-diversified internationally.

DeRoos et al. (2001) showed that international diversification benefits for U.S. investors are small once transaction costs and short-sale constraints are incorporated. Driessen and Laeven (2007) found the greatest benefits of investing abroad are in developing countries or in countries with high country risk. Recent studies have found that diversification benefits have decreased over time. Driessen and Laeven (2007) found an increase in correlations of local returns with global indexes and a decrease in the variances of local indexes. These results have been attributed to greater financial integration during 1985–2002. The 2008 subprime crisis affected nearly every country, and led investors to question the benefits of global diversification (Bartram and Bodnar 2009).

Some recent literature has concluded that industry effects now drive global returns as much or even more than country effects. Baca et al. (2000) reported that the importance of global industry factors in explaining international return variation increased toward the late-1990s. Cavaglia et al. (2000) concluded that diversification across industries now may provide greater risk reduction than diversification across countries. Xia and Phylaktis (2006) found a major upward shift in the industry effects since 1999, especially in Europe and North America. Menchero and Morozov (2012) concluded that for the world market the industry effect has dominated in the aftermath of the Internet bubble.

This paper builds on the idea of international diversification through investing in multinationals by quantifying the foreign exposure U.S. investors obtain by investing in the S&P 500. It analyzes the international business exposure of the S&P 500 constituents over the past decade and demonstrates that a large and increasing fraction of their revenue and an economically significant portion of their growth comes from international markets. Diversification across industries now may provide as much risk reduction as diversification across

countries, so I analyzed the sector diversification in the U.S., global, and other indexes.

My main conclusion is that the S&P 500 is internationally diversified due to economic reasons. A large and increasing fraction of the S&P 500 constituents' revenue comes from international markets. Almost 40 percent of the market-weighted sales of the S&P 500 are international. Earnings growth is a close proxy for the unexpected component of earnings and a key driver of stock returns. International operations are a major driver of the S&P 500's earnings growth. In the past decade, almost 40 percent of its revenue growth has come from international markets, and in some years it's been as high as almost 60 percent. This trend is in-line with "World-ex-USA" accounting for most of the world's economic output growth in the past decade. The S&P 500's percentage of foreign sales is economically significant and increasing with the rise of foreign economies. The geographic distribution of S&P 500 constituents' foreign sales is following trends in global gross domestic product (GDP) growth. The bigger the company (greater its index weight), the more its growth is driven by overseas markets. An implication of this result is that the S&P 500 index provides a lot of global stock market exposure to U.S. investors. The U.S. index has sector weights similar to that of the global index, providing ample sector diversification. These economic factors drive the strong co-movement of the S&P 500 with a global index. A U.S. investor gets a lot of international exposure by either investing in S&P 500 index funds or actively investing with the S&P 500 as the benchmark.

### Data and Econometric Methodology

I used the S&P 500 (SPX) as the U.S. index, MSCI World ex USA Investable Market Index (MXWDU) as a proxy for World-ex-USA, and MSCI All World Investable Market Index (MXWD) as a proxy for global market. I collected the prices of the three indexes at monthly intervals for the period December 31, 2000, through June 30, 2011, from Bloomberg, and used the monthly arithmetic price returns on indexes.

$$\text{Monthly Arithmetic Return}_t = [(P_t / P_{t-1}) - 1] \times 100$$

I analyzed the monthly index price returns for central tendencies, standard deviation, skew, kurtosis, normality, and autocorrelation in returns. To analyze the linkages between different markets, I calculated the Pearson correlation between monthly returns, year-wise and for rolling twelve-month periods.

My research focuses on the large and growing international business of S&P 500 constituents as an economic reason for the return co-movement between U.S. and global indexes, and I analyzed the international business exposure using sales data. I used foreign sales as a measure of international exposure and calculated it annually for 2000–2010. Few companies reported this data in prior decades. Foreign net income could be a better indicator, but far fewer companies reported that. I collected data from Compustat for 2004 through 2010 if available,

else from Bloomberg. For 2000 through 2003 I collected the data from 10-Ks. I used the S&P 500 constituents on 12/31/YYYY and their international sales for the fiscal year ending month<sub>*i*</sub> / YYYY, where month<sub>*i*</sub> refers to the month of fiscal year-end. Using the annual data on total and international sales for all S&P 500 constituents, I calculated the World-ex-USA/Total sales of the S&P 500 constituents for each year in 2000–2010, and refer to this as the S&P 500's international sales and measure of international business operations.

My hypothesis was that the extent of international sales of the S&P 500 constituents reflected global macro-economic trends. GDP is a common way to measure economic growth, and stock market capitalization (SMC) is a proxy for the weights of different countries in global stock indexes and a more direct measure of a country's importance for an equity investor. Very specifically, my hypothesis was that the international business operations of S&P 500 constituents followed trends in world GDP and SMC, and were a major driver behind the co-movement in the returns of the U.S. and global indexes. To have a fair comparison across countries over time, I collected the SMC and GDP data in current U.S. dollars annually for 2000–2010 from the World Bank and calculated the World-ex-USA/World ratio for GDP and SMC each year. I compared the World-ex-USA/Total sales of the S&P 500 to the World-ex-USA/World ratio for GDP and SMC for each year in 2000–2010. I found strong similarity in the trends for S&P 500 international sales and international GDP and SMC.

I also analyzed the contribution of international operations to the sales growth of the S&P 500, because growth is a closer proxy to the unexpected component of earnings and therefore more important for equity returns than absolute sales. The implicit assumption was constant margins so that sales growth would indicate the earnings growth, and I concentrated only on earnings growth and not the valuation change component of stock return.

The terms "international" or "World-ex-USA" cover a lot of ground, so the follow-up question becomes whether the growth in international sales of S&P 500 was in parts of the world with major GDP and SMC growth. To answer this question, I analyzed the S&P 500 international sales, international GDP, and SMC data at a more granular level using four major geographic blocs—the Americas (excluding USA), Europe, Asia, and Other. I included Australia in Asia and Russia in Europe. International sales without geographic breakdown were included in Other. Due to data availability, I could do the geographic breakdown post-2004 only. I calculated the annualized growth rate of the S&P 500 international sales, GDP, and SMC among these four geographic blocs.

GDP growth rates, exchange-rate movements, and inflation are all important considerations for international equity investments. My hypothesis was that business decisions by the S&P 500 companies were incorporating these considerations and an investor in the S&P 500 was in-effect making rational investment choices incorporating these trends. I analyzed whether the trend in unit international sales by

S&P 500 constituents was what would be expected based on GDP growth rates, exchange-rate movements, and inflation. To do this, I decomposed the U.S. dollar value of the index constituents' domestic and international sales into units of domestic and international sales by excluding the inflation and exchange-rate effect (using the formulas below). I used the consumer price index (CPI) inflation calculator from the Bureau of Labor Statistics to calculate the value of U.S. dollars each year in constant year 2000 value. For the exchange-rate effect, I calculated an annual average exchange rate using the daily (trade basket-weighted) exchange rate for the U.S. dollar reported by the Federal Reserve.

$$\text{Foreign Unit Sales}_i = (\text{U.S. \$ Value of Foreign Sales})_i / (\text{Average Trade Weighted U.S. \$})_i$$

$$\text{U.S. Unit Sales}_i = (\text{U.S. \$ Value of U.S. Sales})_i / (\text{Constant Year 2000 Value of U.S. \$})_i$$

*i* refers to the year in the period 2000–2010

$$\% \text{ Share of Foreign Sales in Units}_i = [\text{Foreign Unit Sales}_i] / [\text{Foreign Unit Sales}_i + \text{U.S. Unit Sales}_i]$$

I compared the domestic and international unit sales growth (of the S&P 500 constituents) with the U.S. and World-ex-USA GDP growth rates using the World Bank real GDP data. I found that the foreign unit sales of the S&P 500

constituents are in-line with what would be rational given GDP and exchange-rate trends, indicating that an investor benchmarked to the S&P 500 benefitted from these economic trends.

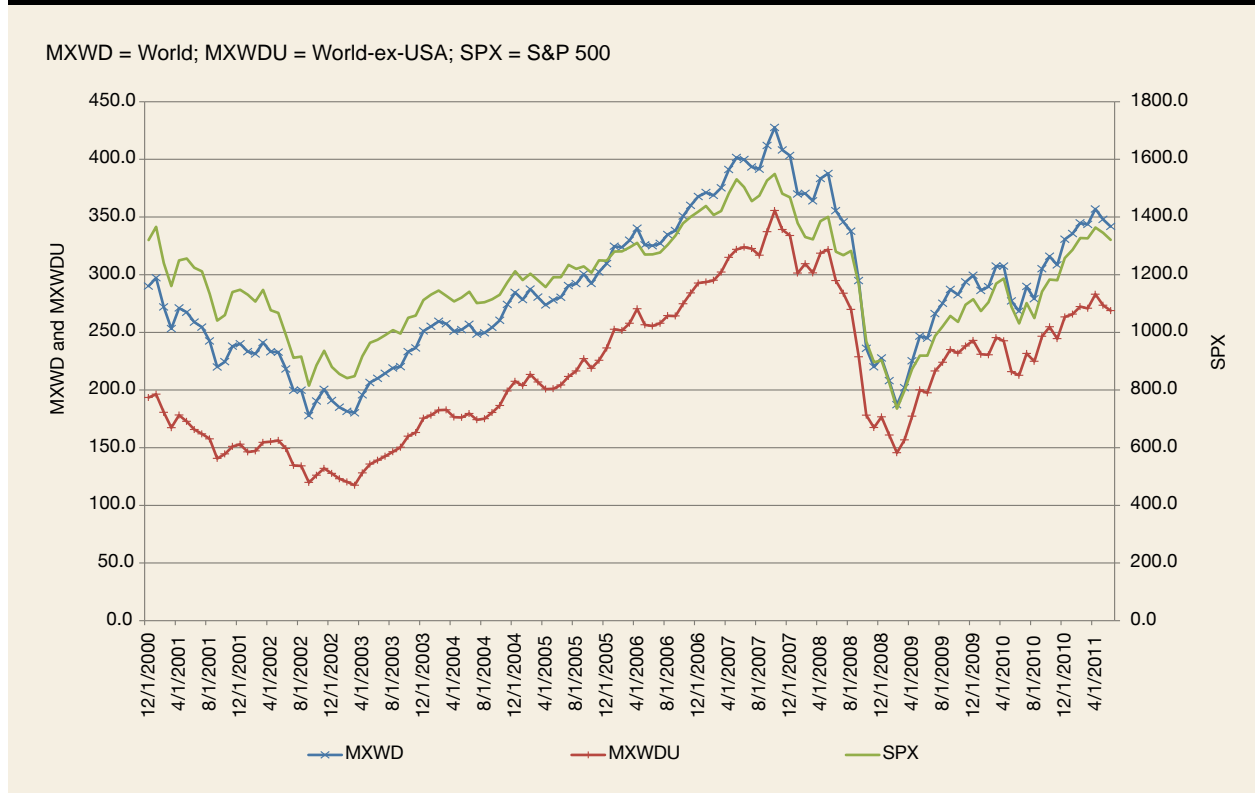
Apart from the country effect, industry effects are another major driver of global returns and diversification benefits. I analyzed whether an investor benchmarked to the U.S. index is exposed to similar industry effects as an investor benchmarked to a global index. Because of data subscription constraints I did not have the historical sector weights for the MSCI indexes and used the FTSE indexes, which report only Industry Classification Benchmark (ICB) sector classification. S&P 500 does not report ICB classification, and I used the FTSE U.S. as the U.S. index. I used the FTSE U.S., FTSE All World Asia Pacific, FTSE All World Europe, FTSE All Cap Latin Americas, and FTSE All World indexes as proxies for U.S., Asia Pacific, Europe, Latin America, and Total World indexes.

**Empirical Results**

Figure 1 shows the three indexes co-moved very closely and the co-movement became more marked after July 2007. Figure 2 indicates the monthly returns of the three indexes tracked each other very closely, and seemed to be a stationary process with a mean around zero. MXWDU (World-ex-USA) was more volatile than SPX (S&P 500 denoting USA).

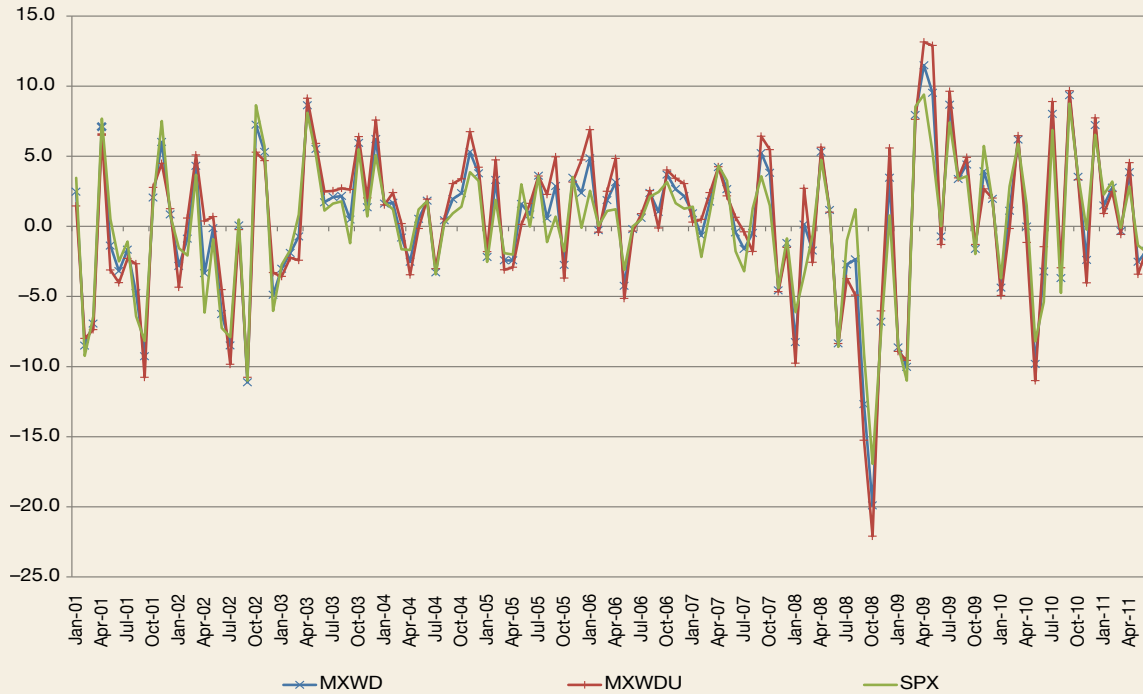
As tables 1, 2, and 3 show, over the past decade, the mean returns of MXWDU and SPX statistically were not different

**FIGURE 1: INDEX LEVELS—MXWD, MXWDU, AND SPX**



**FIGURE 2: MONTHLY RETURNS—MXWD, MXWDU, AND SPX**

MXWD = World; MXWDU = World-ex-USA; SPX = S&P 500



from zero, and the difference in their average returns is statistically insignificant. Both were non-normal distributions with a negative skew. SPX had a higher minimum and 25th-percentile return, and less negative skew, kurtosis, and autocorrelation.

**Regression Analysis**

I regressed the monthly returns of MXWDU on SPX, and the model fit is:

$$\text{MXWDU Monthly Returns} = 0.30 + [(1.05)^{***} \times (\text{SPX Monthly Returns})] + \epsilon$$

\*\*\* denotes significance at 1-percent level

With the SPX average monthly return of 11 basis points (bps), the average MXWDU monthly return can be expected to be higher by only  $[(1.05 - 1.00) \times 0.11] = 0.6$  bps per month.

**Correlation in Monthly Returns**

To analyze the linkages between different markets, I calculated the Pearson correlation between monthly returns, year-wise and for rolling twelve-month periods (see table 4 and figure 3). Figure 1

**TABLE 1: DISTRIBUTION OF MONTHLY ARITHMETIC RETURNS**

	<b>MXWDU (World-ex-USA)</b>	<b>SPX (S&amp;P 500)</b>	<b>MXWD (World)</b>
Mean	0.41	0.11	0.26
Pr >[t] for Mean = 0	0.40	0.79	0.56
Standard Deviation	5.45	4.64	4.96
Median	0.90	0.81	0.85
Maximum	13.14	9.39	11.48
Quantile 3 (75%)	4.01	3.15	3.46
Quantile 1 (25%)	-2.92	-1.98	-2.43
Minimum	-22.10	-16.94	-19.91
Skewness	-0.80	-0.67	-0.78
Kurtosis	1.96	0.95	1.69
Shapiro-Wilk	0.96 ***	0.97 ***	0.96 ***

\*\*\* indicates statistical significance at 1-percent significance level.

**TABLE 2: T TEST FOR DIFFERENCE IN MEANS**

$H_0: \mu_1 = \mu_2$	<b>MXWDU (World-ex-USA) and SPX (S&amp;P 500)</b>	<b>MXWD (World) and SPX (S&amp;P 500)</b>
P-Value for $H_0$	0.1676	0.2113

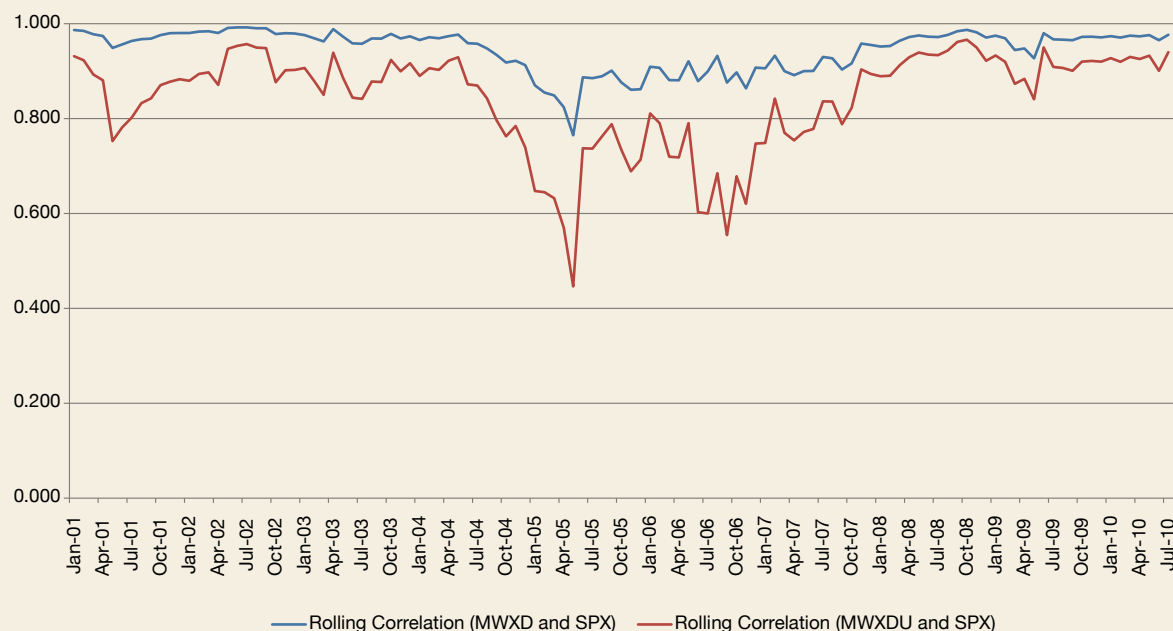
**TABLE 3: AUTOCORRELATION OF MONTHLY RETURNS**

	<b>MXWDU (World-ex-USA)</b>	<b>SPX (S&amp;P 500)</b>	<b>MXWD (World)</b>
$\rho_1$	0.260	0.197	0.241
$\rho_2$	0.042	-0.059	0.003
$\rho_3$	0.143	0.120	0.145
Pr > ChiSq at lag 6	0.0158	0.1034	0.0319

$\rho_i$  denotes autocorrelation of lag  $i$

**FIGURE 3: SUBSEQUENT TWELVE-MONTH ROLLING CORRELATION IN MONTHLY RETURNS**

MXWD = WORLD; MXWDU = WORLD-EX-USA; SPX = S&P 500



**TABLE 4: YEAR-WISE CORRELATION IN MONTHLY RETURNS**

	MXWD & SPX	MXWDU & SPX
2001	0.987	0.931
2002	0.980	0.880
2003	0.976	0.907
2004	0.965	0.890
2005	0.870	0.647
2006	0.909	0.811
2007	0.906	0.748
2008	0.952	0.889
2009	0.975	0.933
2010	0.974	0.927

MXWD = World; MXWDU = World-ex-USA; SPX = S&P 500

**TABLE 5: CORRELATION IN RETURNS—SUBPERIODS**

	SPX	MXWDU	MXWD
<b>December 31, 2000–June 30, 2011</b>			
SPX	1.000		
MXWDU	0.894	1.000	
MXWD	0.965	0.979	1.000
<b>December 31, 2000–July 31, 2007</b>			
SPX	1.000		
MXWDU	0.863	1.000	
MXWD	0.965	0.964	1.000
<b>July 31, 2007–June 30, 2011</b>			
SPX	1.000		
MXWDU	0.921	1.000	
MXWD	0.968	0.989	1.000

**TABLE 6: TWELVE-MONTH ROLLING CORRELATION IN MONTHLY RETURNS**

Time period: January 2001–July 2010	(MWXD & SPX)	(MWXDU & SPX)
Minimum	0.765	0.446
Maximum	0.992	0.966
Average	0.945	0.842

showed July 2007 to be a break-point with the indexes tracking each other much more closely thereafter, so I also looked at subperiods (see table 5).

World is composed of World-ex-USA and USA, and it follows that

the S&P 500 will correlate more with World than with World-ex-USA. The correlation between returns of the U.S. and World-ex-USA indexes increased from 86 percent to 92 percent in the later part of the decade. The rolling

twelve-month correlation between the S&P 500 and the World-ex-USA index in the past decade has ranged from 45 percent to 97 percent with the average 84 percent (see figure 3 and table 6).

**Economic Reasons behind the High Correlation between S&P 500 and World Indexes**

I analyzed how the international exposure of U.S. companies has changed over the past decade. In the past, companies traditionally derived most of their income from their home countries, but in an age of increasing globalization domicile may no longer capture the true international exposure of a portfolio. Revenue sources may provide a better proxy as to where a company operates in the world. Foreign net income could be a better indicator of foreign exposure, but coverage of this variable is very poor, and due to data availability, I analyzed the foreign sales of the S&P 500 constituents. For a U.S. investor a cap-weighted basis is the most relevant. As a cross-check I also analyzed on an equally weighted and portfolio basis.

Table 7 and figure 4 show the rising and considerable international exposure of the S&P 500, which on a market-weighted (MW) basis was almost 40 percent at the end of 2010. The MW foreign sales of the S&P 500 consistently have been higher than on an equally weighted basis, indicating larger companies have more international exposure.

**Relating the International Exposure of the S&P 500 to World Economic Trends**

My hypothesis was that the international exposure of the S&P 500 followed macro-economic trends in gross domestic product and stock market capitalization. I analyzed the (World-ex-USA/World) GDP and SMC, and the foreign sales (World-ex-USA/Total Sales) of the S&P 500 (see figures 5, 6, and 7).

Figures 5, 6, and 7 indicate the rising share of World-ex-USA in world gross domestic product and stock market capitalization, and that the S&P 500 foreign sales follow this trend.

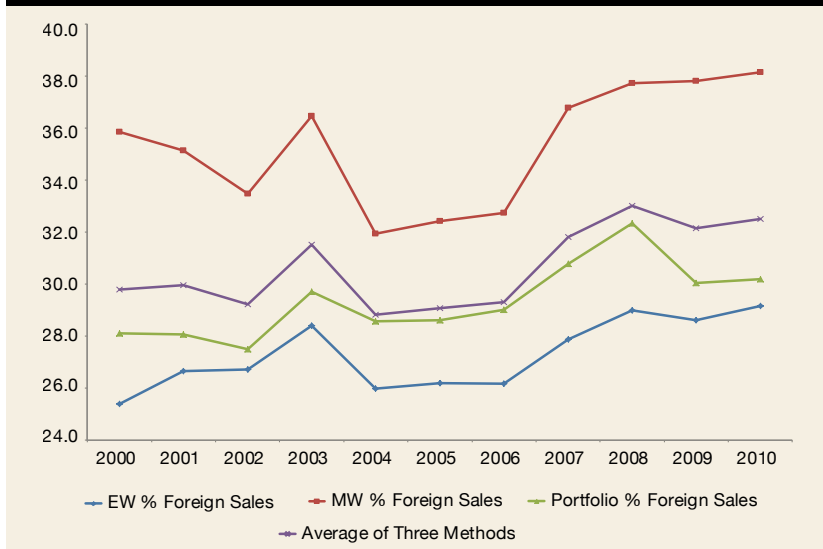
**International Geographic Exposure of the S&P 500 follows Growth in Different Parts of World**

I further analyzed the international revenue of the S&P 500 among the broad regions of the Americas (excluding

**TABLE 7: INTERNATIONAL SALES OF THE S&P 500, 2000–2010**

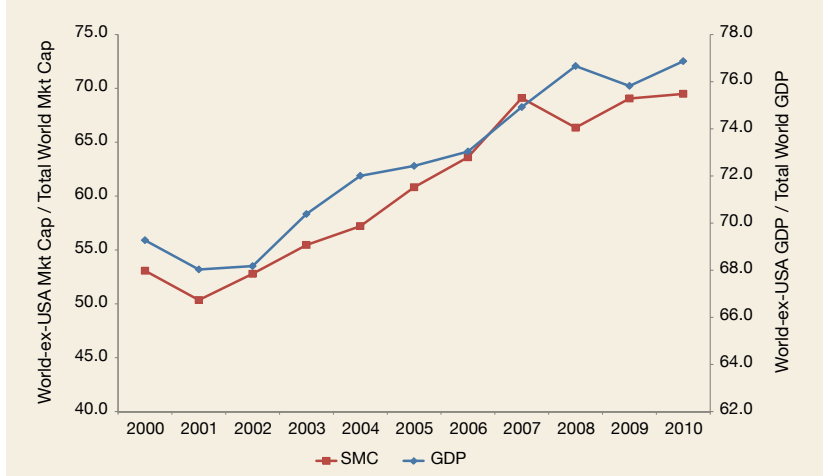
	Equally Weighted	Market Weighted	$\Sigma$ Foreign Sales / $\Sigma$ Sales	Average of 3 Methods
	EW % Foreign sales	MW % Foreign sales	Portfolio % Foreign sales	
12/31/2000	25.4	35.9	28.1	29.8
12/31/2001	26.6	35.1	28.1	29.9
12/31/2002	26.7	33.5	27.5	29.2
12/31/2003	28.4	36.5	29.7	31.5
12/31/2004	26.0	31.9	28.6	28.8
12/31/2005	26.2	32.4	28.6	29.1
12/31/2006	26.2	32.7	29.0	29.3
12/31/2007	27.9	36.8	30.8	31.8
12/31/2008	29.0	37.7	32.3	33.0
12/31/2009	28.6	37.8	30.0	32.2
12/31/2010	29.1	38.2	30.2	32.5

**FIGURE 4: FOREIGN EXPOSURE OF S&P 500—PERCENTAGE FOREIGN SALES**

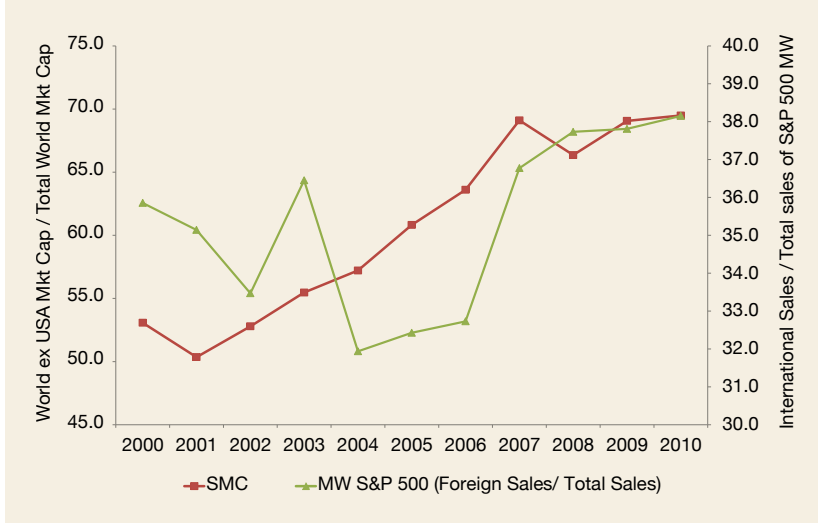


**FIGURE 5: GROSS DOMESTIC PRODUCT AND STOCK MARKET CAPITALIZATION, WORLD-EX-USA/TOTAL WORLD**

REST OF THE WORLD GAINING IMPORTANCE IN TERMS OF SHARE OF WORLD GROSS DOMESTIC PRODUCT AND MARKET CAPITALIZATION

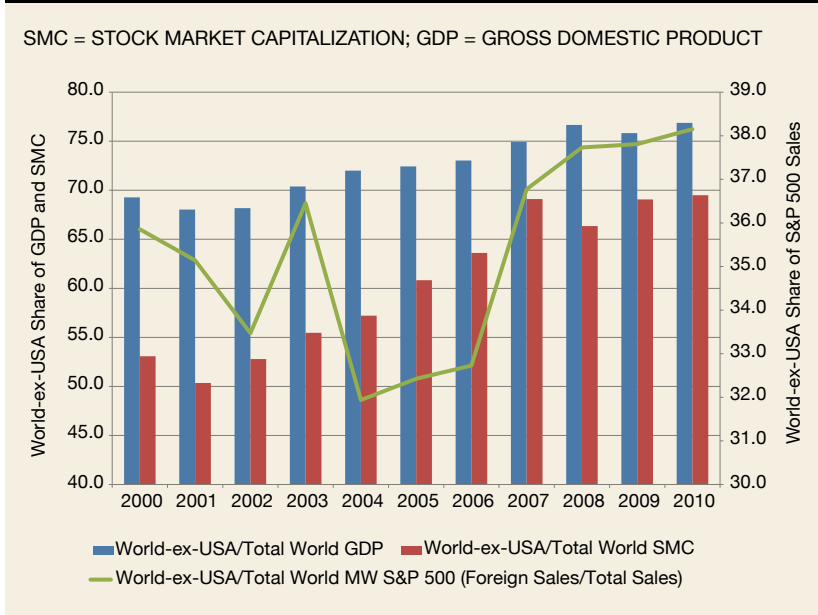


**FIGURE 6: STOCK MARKET CAPITALIZATION (WORLD-EX-USA/TOTAL WORLD) AND SALES OF S&P 500 (% FOREIGN SALES)**



The main conclusion is that, on average the S&P 500 constituents are overweight in the Americas-ex-USA, but this region is showing the least growth. The overweight in Americas-ex-USA reflects heavy exposure to Canada (and therefore the commodities boom) and fast-growing Latin America. The S&P 500 is underweight in Europe. The annualized growth to Asia is almost 10 percent per annum. The S&P 500 is economically overweight in Canada and Latin America and underweight in Europe, and its fastest-growing market is Asia. An investor benchmarked to the S&P 500 derives the benefits of high growth in Latin America, Asia, and emerging markets.

**FIGURE 7: GDP, SMC, SHARE OF S&P 500 SALES, WORLD-EX-USA/TOTAL WORLD**



**Exploring the Year-to-Year Variation in Foreign Sales**

The results so far have shown the rising trend in the international sales of the S&P 500. But temporary dips in a few years led me to analyze the reasons behind the aberration. Logically a U.S. company would sell more units in the domestic market in years when the U.S. GDP grows faster than the rest of the world (World-ex-USA) or when the U.S. dollar strengthens. And it would sell more units internationally when World-ex-USA GDP grows faster or the U.S. dollar weakens. To analyze whether the trend in unit international sales of S&P 500 constituents was what would be expected based on GDP growth rates, exchange-rate movements, and inflation, I decomposed the U.S. dollar value of the index constituents' domestic and international sales into units of domestic and international sales by taking out the inflation and exchange-rate effect (using the formulas below). I used the consumer price index (CPI) inflation calculator from the Bureau of Labor Statistics to get the value of the U.S. dollar in constant year-2000 value. I calculated the annual average exchange rate using the daily (trade basket-weighted) exchange rate for the U.S. dollar, reported by the Federal Reserve. I used the inflation and exchange-rate data, in a simplistic analysis, to estimate the share of

USA), Europe, Asia, and Others (primarily Africa). I collected the geographic distribution of international sales from Bloomberg, and tabulated it into these four categories. I included Australia in Asia, and Russia in Europe. "Other" includes sales to Africa and also international sales where a clear breakdown into these categories is not available. (Companies break their international sales into self-defined categories that may differ from these groupings. For example, Company A may report for Europe and the Middle

East while Company B may do so for Europe and Asia.) Data availability in Bloomberg allows me to do this analysis only from 2004.

The World Bank reports the SMC and GDP data for each country, and I grouped the countries into these same categories—the Americas (excluding USA), Europe, Asia, and Other. I calculated the total SMC and GDP of each group each year and the annualized growth rate of the S&P 500's international sales, SMC, and GDP in these four geographic areas (see tables 8 and 9).

foreign sales in unit terms (see table 10). The last column in table 10 shows the share of World-ex-USA in World GDP each year (World Bank data).

Share of foreign sales in units dipped in 2001, 2002, and 2009, years when the U.S. dollar strengthened. In 2001 and 2009, the share of ex-USA in world GDP declined, implying stronger domestic GDP growth. The slight decrease in the S&P 500 unit foreign sales in 2001, 2002, and 2009 mirrored a strengthening U.S. dollar and faster domestic GDP growth.

GDP growth rates, exchange rate, and inflation are all important considerations for international equity investments. These results show that foreign unit sales followed currency and GDP trends, that business decisions by the S&P 500 companies were incorporating these considerations, and implying an investor in the S&P 500 was in-effect making investment choices incorporating these trends. By being benchmarked to the S&P 500, an investor followed exchange-rate and GDP trends.

### International Operations as a Driver of Growth and Stock Returns

Valuation and earnings drive stock returns. The net impact of changes in valuation, while negligible in the very long run, can be quite meaningful over shorter periods. While acknowledging the importance of valuation changes, my analysis concentrates on the earnings component. Stock returns respond to earnings news or the unexpected component of earnings. Earnings growth is a good proxy for the unexpected component of earnings, and generally earnings growth is more strongly correlated with stock returns than absolute earnings. International operations are a major driver of the earnings growth of the S&P 500 constituents (assuming that margins remain constant and earnings growth is in-line with sales growth). I analyzed the contribution of World-ex-USA to World GDP growth and S&P 500 sales growth (see figures 8 and 9). I used the World Bank real GDP data for each year reported for all countries to get the share of World-ex-USA in World GDP growth each year. Using the dollar value of S&P 500's foreign and total sales during 2000–2010, I calculated

**TABLE 8: AVERAGE SHARE IN WORLD-EX-USA, 2004–2010**

	S&P 500 International Sales	Stock Market Capitalization	Gross Domestic Product
Americas ex USA	28.6	10.6	12.6
Europe	22.7	42.2	45.2
Asia	11.8	44.5	38.9
Other	37.0	2.8	3.3

**TABLE 9: ANNUALIZED GROWTH RATE BY REGION, 2004–2010**

	S&P 500 International Sales	Stock Market Capitalization	Gross Domestic Product
Americas ex USA	2.2	16.8	12.4
Europe	3.4	3.3	4.5
Asia	9.8	15.1	8.6
Other	11.0	14.8	11.5

**TABLE 10: ANALYSIS OF UNIT SALES: DOMESTIC AND INTERNATIONAL SALES OF S&P 500**

Year	Value of Foreign Sales (\$ million)	Value of U.S. Sales (\$ million)	Trade Weighted \$ Value*	Year 2000 value of \$100**	Foreign Unit Sales (million)	U.S. Unit Sales (million)	% Share of Foreign Sales in units***	[World-Ex-USA GDP / Total World GDP]
2000	1,278,926	3,273,215	119.5	100.0	10,706	32,732	24.6%	69.3%
2001	1,290,658	3,309,462	126.1	102.9	10,239	32,178	24.1%	68.0%
2002	1,334,378	3,519,744	126.9	104.5	10,518	33,691	23.8%	68.2%
2003	1,559,570	3,693,138	119.3	106.9	13,068	34,564	27.4%	70.4%
2004	1,824,872	4,563,182	113.8	109.7	16,037	41,597	27.8%	72.0%
2005	2,135,472	5,331,206	110.8	113.4	19,273	47,008	29.1%	72.4%
2006	2,348,839	5,748,323	108.8	117.1	21,595	49,102	30.5%	73.0%
2007	2,679,030	6,028,171	103.6	120.4	25,852	50,064	34.1%	74.9%
2008	2,992,030	6,259,417	99.8	125.0	29,983	50,063	37.5%	76.7%
2009	2,458,044	5,727,440	105.7	124.6	23,245	45,970	33.6%	75.8%
2010	2,599,707	6,013,836	101.8	126.6	25,526	47,491	35.0%	76.9%

\* Trade basket-weighted annual average value of the U.S. dollar. The trade basket-weighted average is a weighted average of the foreign-exchange value of the U.S. dollar against the currencies of major U.S. trading partners, with a base of 100 in January 1997. I calculated an annual average exchange rate using the daily exchange rates.

\*\* Base of 100 in Year 2000. It measures the impact of domestic inflation.

\*\*\* % Share of foreign sales in units is calculated as below:

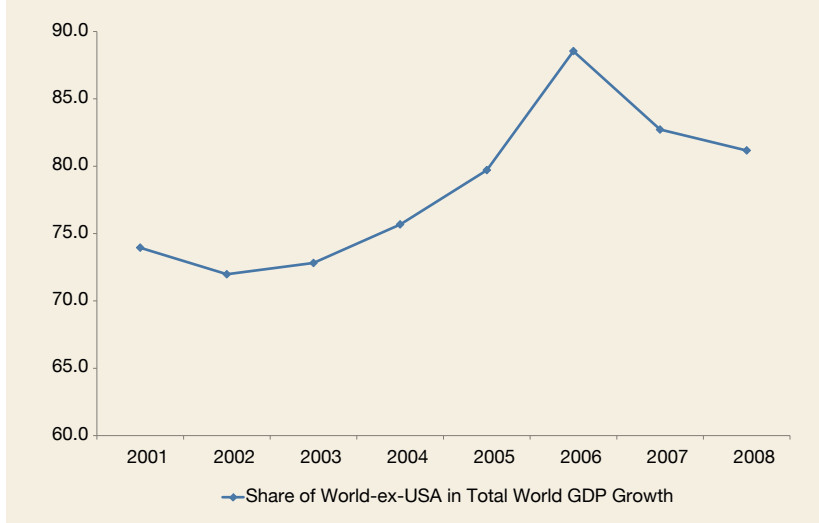
Foreign Unit Sales, = (\$ Value of Foreign Sales) / (Average Trade Weighted \$ Value), \$ = U.S. \$

U.S. Unit Sales, = (\$ Value of U.S. sales) / (Constant Year 2000 Value of U.S. \$),

Subscript (i) refers to the year in the period 2000–2010

% Share of Foreign Sales in Units, = (Foreign Unit Sales) / [(Foreign Unit Sales) + (U.S. Unit Sales)]

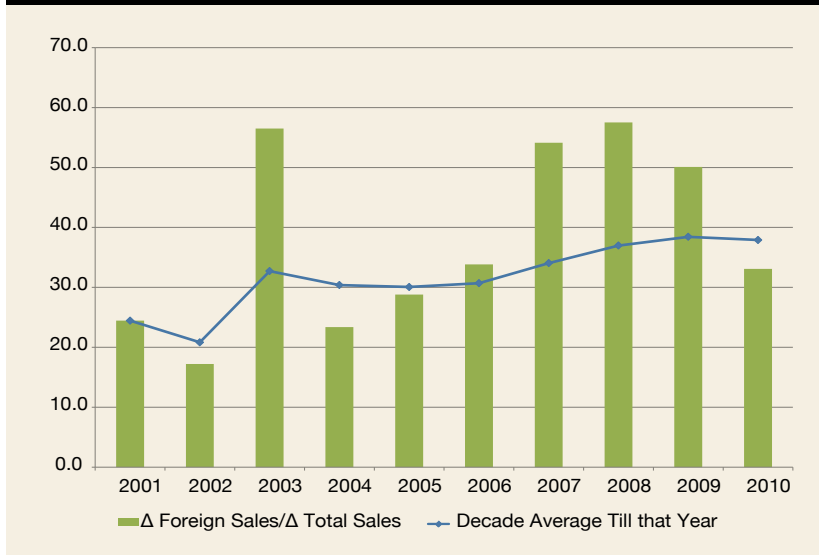
**FIGURE 8: SHARE OF WORLD-EX-USA IN TOTAL WORLD GDP GROWTH, SUBSEQUENT THREE-YEAR MOVING AVERAGE**



**TABLE 11: FOREIGN SALES IS A KEY DRIVER OF EARNINGS GROWTH FOR THE S&P 500**

Year	[(Annual Growth in \$ Foreign Sales) / (Annual Growth in \$ Total Sales)] (%)	Decade Average Till that Year End (%)
2001	24.5	24.5
2002	17.2	20.8
2003	56.5	32.7
2004	23.4	30.4
2005	28.8	30.1
2006	33.8	30.7
2007	54.1	34.0
2008	57.5	37.0
2009	50.1	38.4
2010	33.1	37.9

**FIGURE 9: FOREIGN SALES—A BIG DRIVER OF EARNINGS GROWTH**



the percentage of the sales growth each year driven by international operations (year-over-year growth in foreign sales/year-over-year growth in total sales).

World-ex-USA now accounts for almost 80 percent of the total world GDP growth. Table 11 and figure 9 show the rising importance of foreign sales as a driver of the S&P 500's earnings growth.

In the past decade World-ex-USA accounted for almost 80 percent of the world GDP growth. Over the same time period World-ex-USA accounted for almost 40 percent of the S&P 500 earnings growth. In some years the contribution of World-ex-USA sales to S&P 500 earnings growth was almost 60 percent. Growth of large-capitalization corporate America and the returns of the S&P 500 are driven to a large extent by global factors and not solely by domestic factors such as U.S. GDP.

**Sector Diversification**

Recent research has shown that since the late-1990s diversification across industries may provide as much or greater risk reduction than diversification across countries, so I explored the sector weights of the U.S and other indexes. If the sector distribution of the U.S. index is similar to that of the global index, then the U.S. index would be a good proxy for the global benchmark and benchmarking to a global index will not provide much additional risk reduction.

Due to data subscription and availability issues I did not have access to the historic sector weights of the MSCI indexes, so I used the FTSE indexes that use Industry Classification Benchmark (ICB) sector classification. Because the S&P index weights are not available with the ICB sector classification, I used FTSE U.S. as the U.S. index. The indexes used in this analysis were FTSE U.S., FTSE All-World Asia Pacific, FTSE All-World Europe, FTSE All Cap Latin Americas, and FTSE All-World.

I used the concept of relative sector weights (RSW) to identify how different the sector distribution of a

**TABLE 12: SUMMARY OF RELATIVE SECTOR WEIGHTS**

	Minimum	Maximum	Average
USA	0.3	1.7	1.0
Asia Pacific	0.3	3.4	1.1
Europe	0.2	1.7	1.0
Latin America	0.0	3.8	1.2

regional index was from that of the world index. For each regional index  $c$ , I calculated the RSW for every sector  $i$  every year  $t$ .

For regional index  $c$ ,  $RSW_{it} =$  [Weight in Sector  $i$  in regional index  $c$  / Weight in Sector  $i$  in World index], in year  $t$ . The values of  $i$  are the ten sectors under ICB classification. The values of  $c$  are USA, Asia Pacific, Europe, and Latin America. The values of  $t$  are 12/31/YYYY, with YYYY from 2000 through 2010, with the exception of Latin America where the data start from 2003.

For each region  $c$ , I created a table of RSW with the sectors as rows and the years as columns, and then calculated the minimum, maximum, and average RSW year-wise and sector-wise.

Range of  $RSW_c =$   
[Minimum  $RSW_{it}$ , Maximum  $RSW_{it}$ ]  
in regional index  $c$ .

Average  $RSW_c =$   
Average [ $RSW_{it}$ ] in regional index  $c$ .

Detailed tables are in the appendix.

Table 12 shows that the average RSW of USA and Europe are both close to that of the global benchmark, while Asia Pacific and Latin America have greater differences. But USA has the smallest range of RSW. This indicates that among the different major geographic indexes, the USA index has sector weights closest to the global index. The USA index most closely replicates the sector diversification benefits of the global benchmark.

### Conclusions

My research builds on the idea that domestic investors can achieve substantial international exposure through their holdings of U.S.

multinationals, by either investing in S&P 500 index funds or by benchmarking to it. It analyzes how the international business exposure of the S&P 500 constituents has evolved over the past decade, and it highlights that a large and increasing fraction of the S&P 500 constituents' revenue comes from international markets. In 2010, almost 40 percent of the market-weighted sales of the S&P 500 were international. In the past decade, almost 40 percent of S&P 500 earnings growth has come from international markets, and in some years it's been as high as almost 60 percent. The S&P 500 benefits from fast growth in the emerging markets of Latin America and Asia. Through the S&P 500, a U.S. investor can follow global economic growth and exchange-rate trends. As a follow-up to recent research indicating diversification across industries becoming equally or more important than diversification across countries, I found the sector distribution of the U.S. market replicates that of the world more closely than any other major geographic bloc. These economic reasons explain the high degree of co-movement of the S&P 500 with the global indexes. With the S&P 500 as the benchmark, a U.S. investor gets returns similar to those of the global benchmark, ample geographic and sector diversification, benefits from international growth particularly from the emerging markets of Latin America and Asia, and follows global GDP and exchange-rate trends. These economic and business reasons make the S&P 500 an effective benchmark for a U.S. investor to easily get a lot of international diversification. 

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Appendix: Relative Sector Weights = [Sector Weights of Region / Sector Weights of All-World], as of 12/31/YYYY

TABLE A1: FTSE U.S./FTSE ALL-WORLD														
	2010	2009	2008	2007	2006	2005	2004	2003	2002	2001	2000	Min	Max	Avg
Oil and Gas	1.0	1.0	1.1	1.1	1.0	0.9	0.8	0.7	0.7	0.7	0.8	0.7	1.1	0.9
Basic Materials	0.4	0.3	0.4	0.4	0.5	0.6	0.7	0.6	0.6	0.6	0.6	0.3	0.7	0.5
Industrials	1.0	1.0	1.0	1.0	1.0	1.1	1.1	1.0	1.0	1.0	1.0	1.0	1.1	1.0
Consumer Goods	0.9	0.9	0.9	0.9	0.8	0.4	0.5	0.5	0.5	0.6	0.4	0.4	0.9	0.7
Health Care	1.4	1.4	1.4	1.5	1.4	1.3	1.2	1.2	1.2	1.2	1.2	1.2	1.5	1.3
Consumer Services	1.4	1.4	1.3	1.3	1.3	1.3	1.3	1.2	1.2	1.1	1.0	1.0	1.4	1.2
Telecommunications	0.7	0.6	0.6	0.6	0.7	0.6	0.6	0.6	0.7	0.8	0.8	0.6	0.8	0.7
Utilities	0.8	0.8	0.7	0.8	0.8	0.8	0.8	0.8	0.8	0.9	1.1	0.7	1.1	0.8
Financials	0.8	0.7	0.8	0.8	0.9	0.8	0.9	0.9	0.9	0.9	0.8	0.7	0.9	0.8
Technology	1.7	1.7	1.6	1.7	1.5	1.5	1.4	1.5	1.5	1.4	1.4	1.4	1.7	1.5
Minimum	0.4	0.3	0.4	0.4	0.5	0.4	0.5	0.5	0.5	0.6	0.4	0.3	0.7	0.5
Maximum	1.7	1.7	1.6	1.7	1.5	1.5	1.4	1.5	1.5	1.4	1.4	1.4	1.7	1.5
Average	1.0	1.0	1.0	1.0	1.0	0.9	0.9	0.9	0.9	0.9	0.9	0.8	1.1	1.0

TABLE A2: FTSE ALL-WORLD ASIA PACIFIC/FTSE ALL-WORLD														
	2010	2009	2008	2007	2006	2005	2004	2003	2002	2001	2000	Min	Max	Avg
Oil and Gas	0.4	0.4	0.3	0.3	0.3	0.4	0.5	0.5	0.4	0.4	0.3	0.3	0.5	0.4
Basic Materials	1.3	1.4	1.5	1.5	1.6	1.8	1.8	1.9	1.8	1.8	1.9	1.3	1.9	1.7
Industrials	1.3	1.4	1.3	1.4	1.3	1.7	1.7	1.9	2.1	1.8	1.6	1.3	2.1	1.6
Consumer Goods	1.1	1.2	1.2	1.3	1.5	2.8	2.9	3.0	3.1	3.0	3.4	1.1	3.4	2.2
Health Care	0.4	0.4	0.4	0.4	0.4	0.4	0.5	0.4	0.4	0.4	0.5	0.4	0.5	0.4
Consumer Services	0.7	0.8	0.9	0.8	0.8	0.8	0.8	0.9	1.0	1.2	1.2	0.7	1.2	0.9
Telecommunications	1.0	0.9	1.1	1.0	1.0	0.9	0.9	1.0	1.0	0.9	0.9	0.9	1.1	1.0
Utilities	0.9	0.9	1.0	0.7	0.9	0.9	1.1	1.2	1.6	1.7	1.2	0.7	1.7	1.1
Financials	1.3	1.3	1.3	1.2	1.0	1.1	1.0	1.0	0.9	1.0	1.0	0.9	1.3	1.1
Technology	0.9	0.9	0.9	0.9	1.1	1.0	1.0	0.8	0.8	0.7	0.6	0.6	1.1	0.9
Minimum	0.4	0.4	0.3	0.3	0.3	0.4	0.5	0.4	0.4	0.4	0.3	0.3	0.5	0.4
Maximum	1.3	1.4	1.5	1.5	1.6	2.8	2.9	3.0	3.1	3.0	3.4	1.3	3.4	2.2
Average	0.9	1.0	1.0	1.0	1.0	1.2	1.2	1.2	1.3	1.3	1.3	0.8	1.5	1.1

**TABLE A3: FTSE ALL-WORLD EUROPE/FTSE ALL-WORLD**

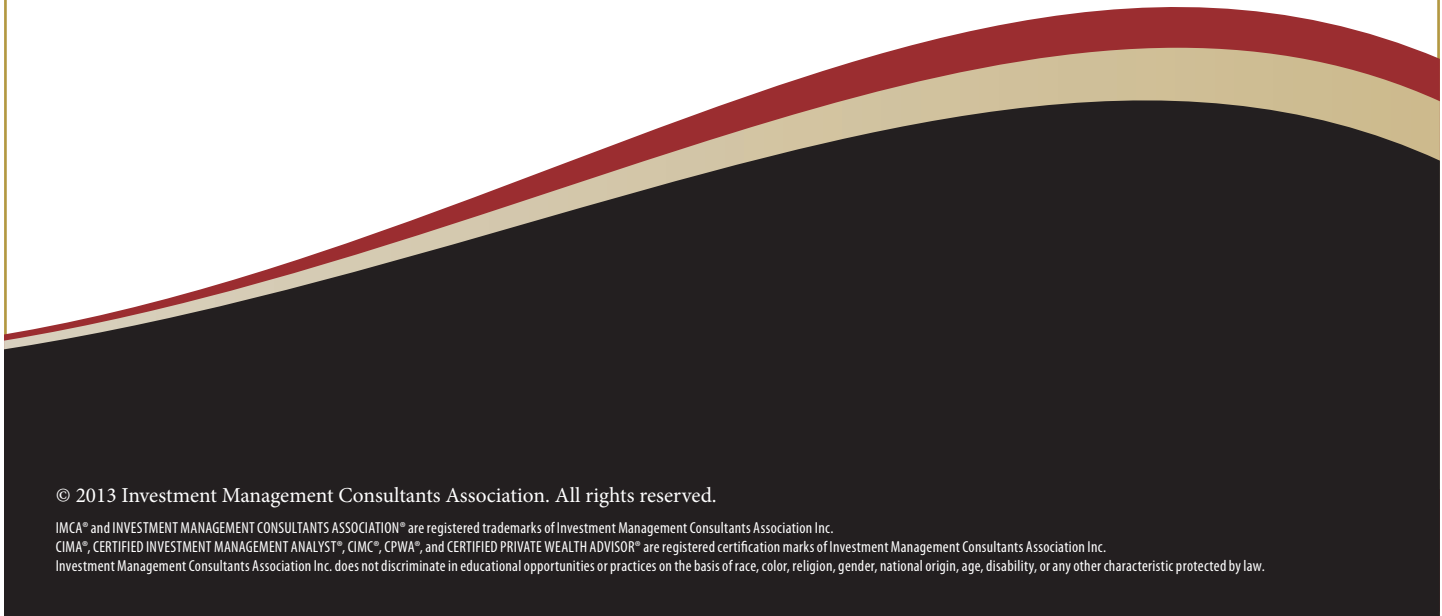
	2010	2009	2008	2007	2006	2005	2004	2003	2002	2001	2000	Min	Max	Avg
Oil and Gas	1.2	1.2	1.2	1.1	1.2	1.3	1.4	1.5	1.6	1.6	1.5	1.1	1.6	1.3
Basic Materials	1.2	1.2	1.1	1.1	1.1	1.0	1.0	1.1	1.2	1.2	1.2	1.0	1.2	1.1
Industrials	0.9	0.9	0.8	0.8	0.8	0.6	0.5	0.5	0.6	0.7	0.7	0.5	0.9	0.7
Consumer Goods	1.3	1.2	1.2	1.2	1.1	1.0	0.9	1.0	1.0	1.1	1.0	0.9	1.3	1.1
Health Care	1.1	1.0	1.0	0.9	0.9	1.0	1.0	1.0	1.0	1.0	0.9	0.9	1.1	1.0
Consumer Services	0.7	0.7	0.7	0.8	0.7	0.7	0.7	0.7	0.7	0.7	0.9	0.7	0.9	0.7
Telecommunications	1.4	1.4	1.4	1.3	1.3	1.5	1.7	1.6	1.5	1.4	1.4	1.3	1.7	1.4
Utilities	1.5	1.5	1.5	1.5	1.5	1.4	1.4	1.3	1.0	0.9	0.7	0.7	1.5	1.3
Financials	1.0	1.1	1.1	1.1	1.2	1.2	1.2	1.2	1.2	1.2	1.3	1.0	1.3	1.2
Technology	0.3	0.2	0.3	0.3	0.3	0.3	0.3	0.4	0.4	0.4	0.5	0.2	0.5	0.3
Minimum	0.3	0.2	0.3	0.3	0.3	0.3	0.3	0.4	0.4	0.4	0.5	0.2	0.5	0.3
Maximum	1.5	1.5	1.5	1.5	1.5	1.5	1.7	1.6	1.6	1.6	1.5	1.3	1.7	1.4
Average	1.0	1.0	1.0	1.0	1.0	1.0	1.0	1.0	1.0	1.0	1.0	0.8	1.2	1.0

**TABLE A4: FTSE ALL CAP LATIN AMERICAS/FTSE ALL-WORLD**

	2010	2009	2008	2007	2006	2005	2004	2003	2002	2001	2000	Min	Max	Avg
Oil and Gas	1.5	1.6	1.5	1.8	1.4	2.1	2.4	2.7	.	.	.	1.4	2.7	1.9
Basic Materials	2.4	2.7	3.2	3.0	3.3	3.0	3.0	2.7	.	.	.	2.4	3.3	2.9
Industrials	0.5	0.5	0.6	0.6	1.0	0.6	0.7	0.8	.	.	.	0.5	1.0	0.7
Consumer Goods	0.9	0.8	0.8	0.7	0.8	0.1	0.1	0.1	.	.	.	0.1	0.9	0.5
Health Care	0.1	0.0	0.0	0.0	0.0	0.5	0.5	0.5	.	.	.	0.0	0.5	0.2
Consumer Services	0.9	0.8	0.8	0.7	0.9	0.7	0.7	0.6	.	.	.	0.6	0.9	0.8
Telecommunications	1.7	2.2	2.6	2.9	3.8	3.7	3.5	3.7	.	.	.	1.7	3.8	3.0
Utilities	1.5	1.4	1.2	1.0	1.2	1.2	1.1	1.3	.	.	.	1.0	1.5	1.2
Financials	1.1	1.0	0.9	0.7	0.5	0.5	0.5	0.4	.	.	.	0.4	1.1	0.7
Technology	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	.	.	.	0.0	0.0	0.0
Minimum	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	.	.	.	0.0	0.0	0.0
Maximum	2.4	2.7	3.2	3.0	3.8	3.7	3.5	3.7	.	.	.	2.4	3.8	3.0
Average	1.1	1.1	1.2	1.1	1.3	1.2	1.2	1.3	.	.	.	0.8	1.6	1.2

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