Risk, Return and Performance of Latin America's Equity Markets, 1975-1995

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ABSTRACT. This paper examines the investment performance of Latin American equity markets from 1975 through mid-1995. Latin American equity markets have been among the most volatile in the world over the past twenty years. However, their low correlation with other markets has provided diversification benefits. These markets have low liquidity and are concentrated in a few securities. The currencies of Latin American markets have depreciated dramatically against the U.S. dollar. Nevertheless, the investment performance of these markets has been impressive: Their compound returns in U.S. dollar terms have exceeded those of the U.S. and of emerging markets in other regions of the globe.

Este trabajo examina el desempeño de los mercados accionarios latinoamericanos desde diciembre de 1975 hasta junio de 1995.

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Estos mercados han tenido una de las volatilidades mas altas del mundo durante los veinte años examinados, sin emhargo sus bajas correlaciones con otros mercados han resultado en beneficios de diversificación. En cada mercado el valor de la unidad monetaria local ha caido dramáticamente con respecto al dólar de Estados Unidos y también han existido problemas de liquidez. A pesar de ésto, el desempeño de los mercados accionarios en la región ha sido impresionante y sus rendimientos compuestos han superado los de los mercados de Estados Unidos y otras economías emergentes.

Esse trabalho examina o desempenho do investimento no mercado de ações da América Latina entre 1975 até os meados de 1995. Os mercados de ações latino-americanos encontram se entre os mais voláteis do mundo nos últimos 20 anos. Entretanto, a sua baixa correlação com outros mercados apresentou benefícios para a diversificação. Esses mercados apresentam baixa liquidez e são concentrados em umas poucas ações. As moedas dos mercados Latino-americanos depreciaram dramaticamente contra o dólar americano. Entretanto, o desempenho de investimentos nesses mercados tem sido impressionantes: o retorno composto em dólares americanos excederam os dos Estados Unidos e os dos mercados emergentes em outras partes do mundo. *[Article copies available for a fee from The Haworth Document Delivery Service: 1-800-342-9678. E-mail address: getinfo@haworth.com]*

KEYWORDS. Emerging equity markets, Latin America

INTRODUCTION

This paper provides a performance overview of Latin America's emerging equity markets based on data in the Emerging Markets Data Base (EMDB) provided by the International Finance Corporation [1996] for the twenty-year period from December 1975 through June 1995. The goal of the paper is to present in a unified fashion an overview of the risk, return and other characteristics of these important markets and to show how that performance has varied across time. The paper also shows the correlations of the Latin American markets among themselves and with the U.S. to demonstrate the benefits to investors of diversifying outside of their home markets.

Latin America's equity markets have experienced a level of volatility in investment performance among the highest in the world in the past twenty years. Currency values have regularly depreciated against global curren-

cies, notably the U.S. dollar, and economic policies have undergone profound changes ranging from highly restrictive and inward-looking to open and outward-looking. The region has been characterized by frequent changes of direction as one failed economic policy after another has been prescribed, only to be replaced shortly thereafter by yet another.[1]

Latin American markets have experienced episodes of high and low performance as measured by indices of compound values of investing in portfolios of Latin American equities. In spite of their inconsistent performance across shorter periods, overall returns in the region for the twenty-year period from 1975 through mid-1995 were impressive. The Latin American equity index (LAMs) outperformed an index made up of the remaining emerging equity markets[2] and achieved higher compound rates of return in U.S. dollar terms than did major indices of the U.S. equity markets.

Latin America has undergone enormous change in recent years. Massive privatizations of formerly state-owned enterprises have been undertaken, economic stabilization programs have been enacted across the region, and markets have been opened to foreign investment at an unprecedented level. Foreign portfolio capital has poured into the region, and the size of the region's markets has grown sharply. Table 1 shows the growth in the value of listed equities in eight nations in the region from the end of

TABLE 1. Market Capitalizations in Latin American Markets, End of 1990 and 1995, in Billions of US$^

Market in Latin America	1990	1995
Brazil	16.4	147.6
Mexico	32.7	90.7
Chile	13.6	73.9
Argentina	3.3	37.8
Colombia	1.4	17.9
Peru	0.8	11.8
Venezuela	8.4	3.7
Ecuador	0.0	2.6

^Market capitalization is the total market value of all shares listed on organized exchanges in the country and is measured by the sum of closing stock price multiplied by number of shares outstanding at the end of the mentioned period.

1990 through the end of 1995. Only Venezuela lost market value, a result of economic policies that ran counter to the liberalization of markets that took place in other countries in the regions during the same period. The total market value of the eight markets shown grew from US$76.6 billion at the end of 1990 to US$386.0 billion, more than a 400% increase in five years time.[3] During this same period, the U.S. equity markets grew less than 150% in market capitalization.

The EMDB includes data on equities in Argentina, Brazil, Chile and Mexico over the full period of the study (December 1975 through June 1995). Data for Colombia and Venezuela are available beginning in December 1984, and data on Peru begin in December 1992. The EMDB is one of the most widely used and comprehensive sources of data on prices, returns, market values and other statistics on emerging capital markets in the world.

Previous finance research on EMs has tended to consider those markets as a class or to focus on one or a few individual markets. Relatively little work has examined Latin America in particular, as we do in this paper. Most of the work that has examined the Latin American region has been published in practitioner journals [e.g., Donayre 1994] or as special reports by investment banking firms, consulting firms, or other institutions [e.g., Kaplan 1996; Pipich and Muehl 1996]. Relatively little academic research has focused on Latin America as a region. Some exceptions include work by Susmel [1996a; 1996b] that examines time-varying volatility in Latin American markets and special features of the returns distributions of Latin American markets, and Aggarwal, Leal and Hernandez [1993], who examined the market for initial public offerings in Latin America. However, broader work on emerging markets usually contains results on LAMs or has lessons that apply to Latin America [e.g., Goetzmann and Jorion 1996a and 1996b; Bekaert and Harvey 1997; Bekaert, Erb, Harvey and Viskanta 1998].

Emerging equity markets are widely characterized as offering high returns at the cost of high risk, but with low correlations with developed markets [Spiedell and Sappenfield 1992], thus leading to increased expected returns and lower overall portfolio risk for investors in developed markets who add emerging markets to their portfolios. Bekaert and Urias [1996, 1997] point out that the practical existence of such portfolio improvement depends on the investor's ability to implement strategies that achieve the results. They examine open-end funds, closed-end funds, and ADRs as vehicles to achieve that performance, and they find that the value of such instruments is dependent on the time period examined. In particular, they find diversification benefits in Latin America (for the U.S. and

U.K. investors) for 1990-1993 and 1993-1996 periods. A sizable fraction of all emerging market ADRs are Latin American. Barry, Peavy and Rodriguez [1997c] examine investability data from the EMDB and conclude that the performance of emerging markets is obtainable on a practical basis.

Many researchers worry that the alleged diversification benefits of emerging markets will tend to dissipate as investment restrictions are relaxed and foreigners become more active in the markets. Bekaert and Harvey [1997] find that cost of capital decreases as equity markets are opened to foreign investors, but they do not find that volatility of the markets or correlations with developed markets systematically increase.

Bekaert, Erb, Harvey and Viskanta [1998] examine the distributions of emerging market returns and find that they tend to have high positive skewness and fat tails when compared to the normal distribution. Argentina is the most extreme example among the 19 markets examined: Argentina exhibits the highest positive skewness and most fat-tailed distributions of any of the markets. Of the six Latin American markets in the study, five have high kurtosis (Chile is the exception) and five have positive skewness (Mexico is the exception). So, as a general rule returns do not appear to be normally distributed in LAMs.

The goal of the present paper is to present an overview of the performance of LAMs over the recent twenty years to serve as a backdrop for continued investigations into the characteristics of such markets. The paper presents results on a Latin America index constructed from the EMDB and contrasts results on that index against its complement, the non-Latin America EMs for which data are available in the EMDB.[4] The paper also presents an overview of issues for further research on LAMs.

INVESTMENT PERFORMANCE OF EMERGING CAPITAL MARKETS, 1975-1995

Throughout this paper, we report results based on total returns from equity investments in the U.S. and in a variety of EMs. The emerging market results are derived from data in the EMDB. A recent monograph [Barry, Peavy and Rodriguez 1997a] provides an overview of the EMDB and explains the calculations of rates of return for securities and portfolios based on the EMDB. This paper follows the same methodology as Barry, Peavy and Rodriguez [1997a, 1997b] and borrows extensively from results in the monograph.

Research studies, popular books, and articles in the popular press often report high returns and high risk for investments in EMs. Often those

studies are based on data from the most recent decade as of the time of the study.[5] Panel A in Figure 1 illustrates the type of results often presented. Figure 1 reports the compound value over time of a US$1.00 investment in EMs and in the S&P 500. In the case of the EMs, the US$1.00 initial investment is converted into local currencies and invested at end-of-period prices. Values at the end of each subsequent period are converted back to US$. That procedure ensures that the results are comparable across all the markets studied. The performance of EMs (EM Composite) from June 1985 through June 1995 exceeded that of the S&P 500 by a substantial margin. However, when taking the longer view available through the EMDB, i.e., beginning in December 1975, Panel B of Figure 1 shows that the EM Composite performed well below the S&P 500. The difference between the two panels is partly attributable to the so-called "lost decade" surrounding the debt crisis of the early 1980s. The point is that over the longer period EMs have not provided higher returns than a popular index of U.S. securities in spite of the high volatility associated with EMs. If investors believe that emerging markets will experience crises as they have throughout their history, then the long run performance of these markets provides relevant information. The December 1994 Mexican Peso collapse was a reminder that these markets are not yet immune to crises that lead to dramatic losses in value.[6]

LAMs produced much better performance than did the broader set of EMs. Panel A in Figure 2, for example, shows that a composite portfolio of Latin American equities in the EMDB (Latin America) sharply outperformed the S&P 500 on the basis of compound returns from 1975 through June 1995. Note also that the scale of the graph is substantially wider than in the case of EMs in Figure 1. LAMs also outperformed non-Latin American EMs for the same period, as shown in Panel B in Figure 2.

In addition to high overall performance, Figure 2 shows that Latin American markets had relatively high volatility compared to other markets. However, it is difficult to interpret relative volatility across time in Figures 1 and 2 because in a graph of compound values a movement of a given size has very different implications in terms of percentage gains and losses as the level of the index changes across time. A one-point move when an index is at two is much more important than a one-point move when the index is at 20; the former is a move of 50% and the latter only 5%. Figure 3 presents compound values for the four Latin American markets with data available over the full period of this study in a semi-logarithmic form, i.e., log base 10 of the values of an initial US$1.00 investment over time are used in place of the compound value of the investment. Thus, a change of a particular magnitude in this graph represents the same

FIGURE 1. Composite Portfolio of Emerging Markets versus S&P 500: Compound Value of US$1.00 Across Time

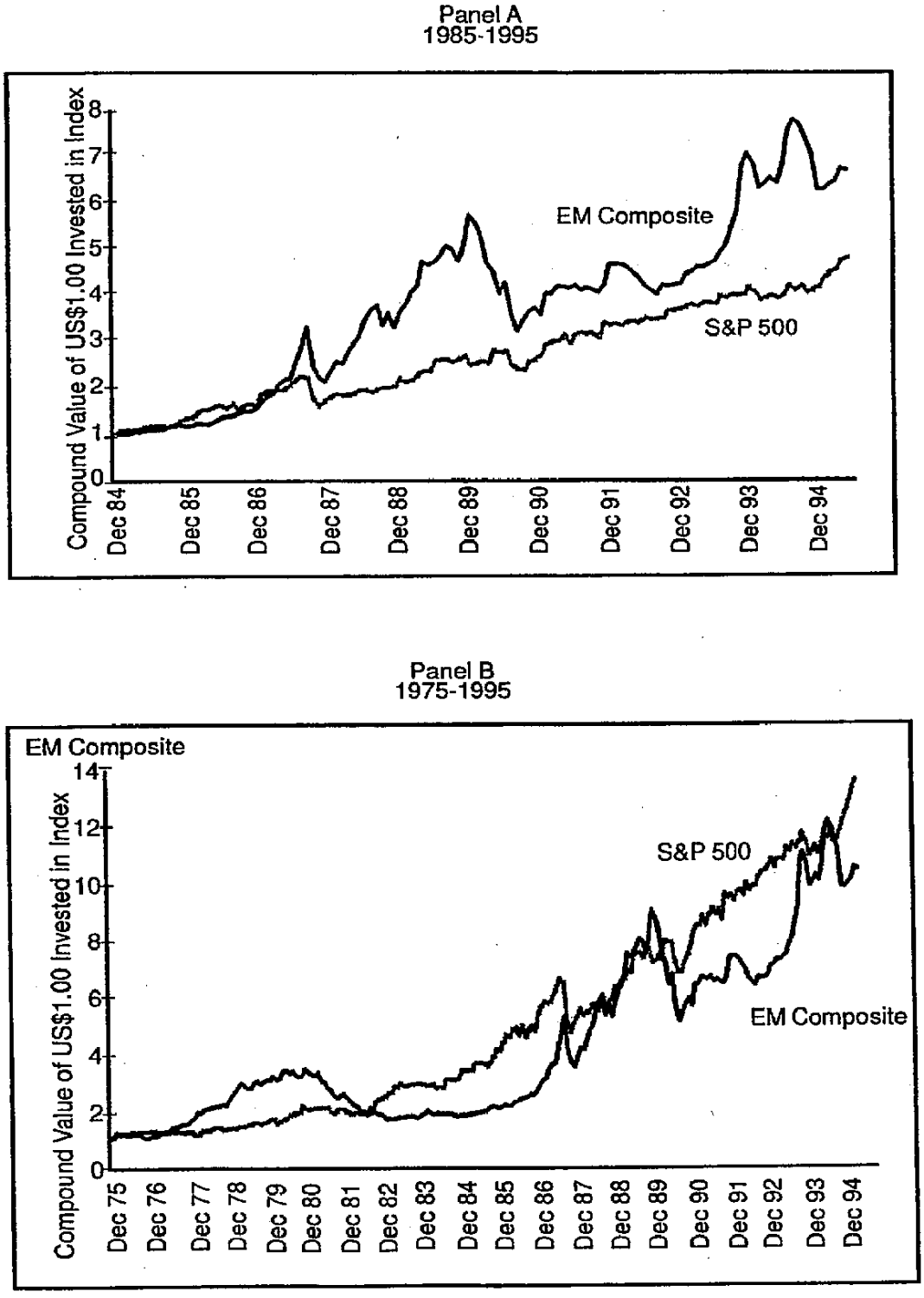
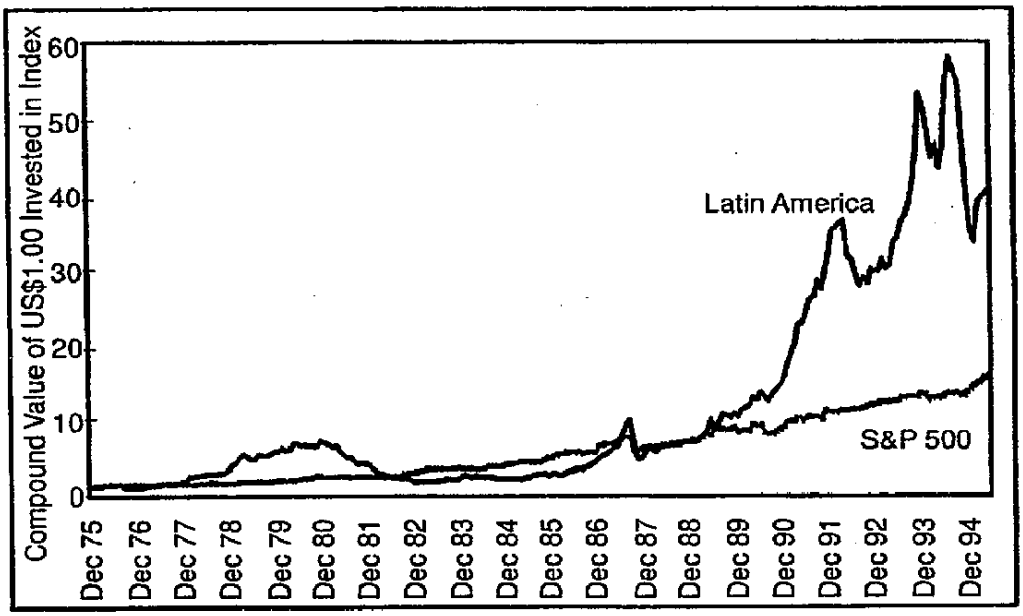
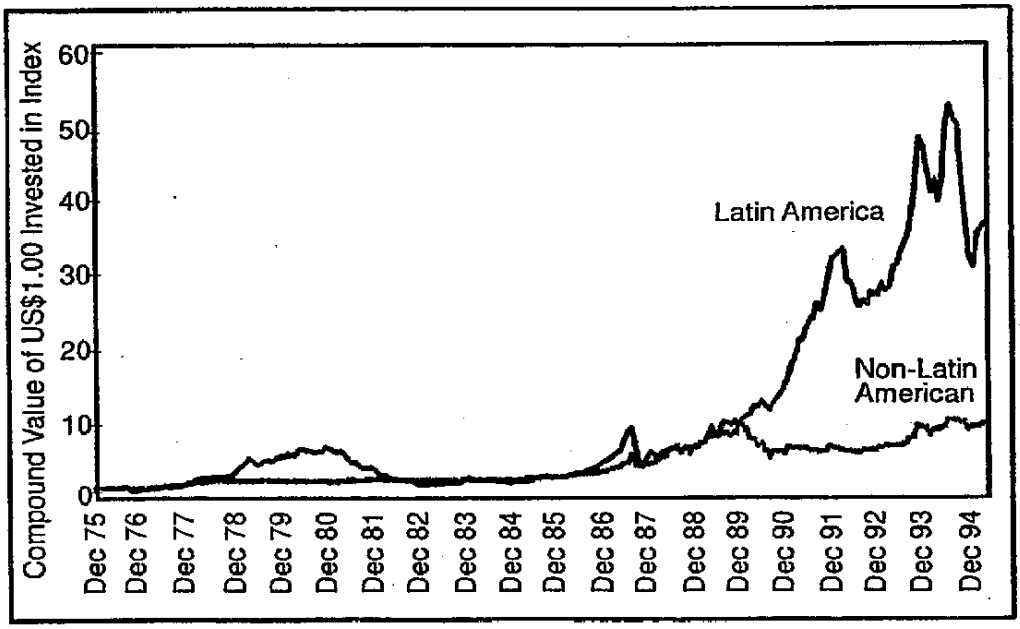


FIGURE 2. Latin American Markets versus S&P 500 and Non-Latin American Emerging Markets: Compound Value of US$1.00 Across Time, 1975-1995

Panel A
Latin American Markets versus S&P 500



Panel B
Latin American Markets versus Non-Latin American Emerging Markets



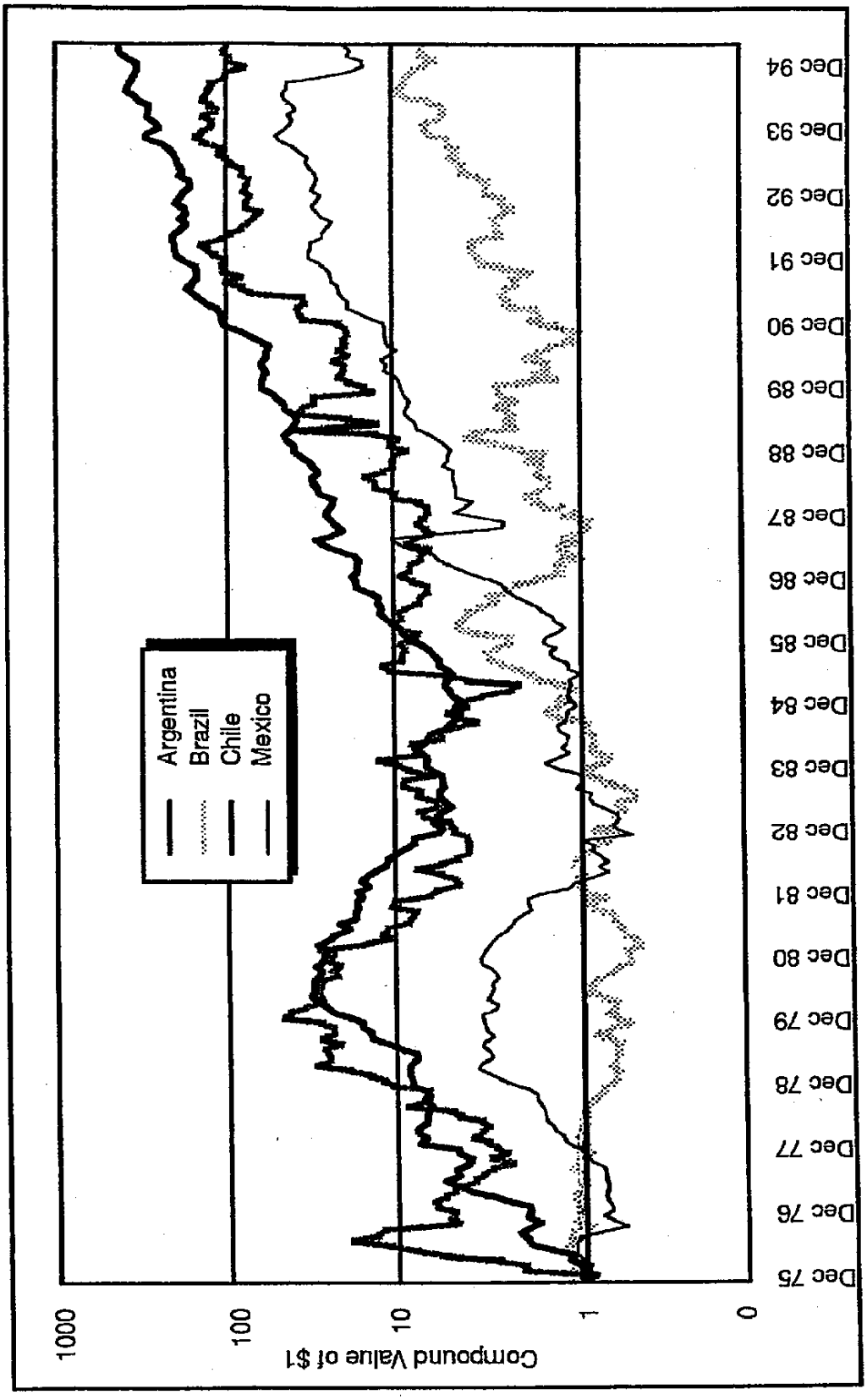


FIGURE 3. Four Countries with 20 Years Data; Compound Value of US$1.00 Invested in Each, 1975-1995

percentage movement regardless of the level of the index at the time of the change.

Figure 3 shows the performance of those four markets separately. The Figure demonstrates that Chile's equity market outperformed the other three by a wide margin on the basis of compound returns. Chile and Argentina began the sample period with high returns, and Chile, Argentina and Mexico were all hard-hit by the debt crisis of the early 1980s. Brazil, on the other hand, was relatively unaffected in comparison to the others.

Figure 3 also illustrates the relatively consistent performance of the Chilean market since coming out of the debt crisis at the end of 1984. Chile's market has been marked by a relatively steady progression since that time. Argentina, in sharp contrast, continued to experience episodes of wide swings in the market throughout the sample period. For example, Argentina implemented its Convertibility Plan[7] in early 1991 and had the highest rate of return of any market in the world that year, achieving approximately a 400% rate of return. The Argentine market then lost more than 50% of its value in the six months from May through November of 1992, among the worst performances in the world. Mexico, in contrast to Argentina, experienced a relatively smooth increase in market values from the end of 1987, when the Solidarity Pact[8] was implemented, until political events began unraveling in 1994, beginning with an uprising in the State of Chiapas, continuing with the murder of the leading presidential candidate, and, finally, concluding in the devaluation of the peso following the inauguration of the new administration in the fall. The case of Mexico illustrates the continued sensitivity of LAMs to political circumstances and economic policy changes. Expectations based on the long run must consider the possibility of negative economic policy changes and crises as well as lucrative time periods in these markets.

RISK AND RETURN OF LATIN AMERICAN MARKETS

In light of the comparatively high compound returns of LAMs compared to other EMs, Latin American stock markets have attracted the interest of foreign investors from time to time (and, unfortunately, often run those same investors away). The presence of risk is an unmistakable component of any evaluation of LAMs. This Section quantifies the risk and return characteristics of LAMs, and the subsequent Section considers the prospects for diversification among LAMs and between LAMs and developed markets.

Table 2 provides summary statistics of monthly returns for the S&P 500, the Composite Index of EMs, a portfolio of EMs excluding Latin

TABLE 2. Performance Characteristics for Latin American Emerging Markets Listed in the EMDB. The Performance Measures Are Based on All Available Data in Each Market or Region from December, 1975, through June, 1995.^

Market	Values in US$ Terms				Values in Local Currency Terms			
	Arithmetic Average	Compound Average	Standard Deviation	Coefficient of Variation	Arithmetic Average	Compound Average	Standard Deviation	Coefficient of Variation
S&P 500	1.20%	1.11%	4.25%	3.55	1.20%	1.11%	4.25%	3.55
Composite	1.15%	0.99%	5.61%	4.89	2.17%	2.02%	5.56%	2.56
Not Latin America*	1.06%	0.91%	5.46%	5.17	1.34%	1.20%	5.37%	4.00
Latin America	1.95%	1.53%	9.01%	4.62	5.32%	4.93%	9.00%	1.69
Argentina	5.61%	2.11%	30.25%	5.39	15.55%	10.45%	41.20%	2.65
Brazil	2.31%	0.70%	18.49%	8.01	15.37%	12.70%	28.47%	1.85
Chile	3.08%	2.51%	11.03%	3.59	4.71%	4.18%	10.78%	2.29
Colombia	3.31%	2.95%	9.03%	2.72	5.12%	4.75%	9.13%	1.78
Mexico	2.20%	1.27%	12.91%	5.88	4.69%	4.00%	11.92%	2.54
Peru	3.57%	2.67%	13.74%	3.84	4.64%	3.73%	13.92%	3.00
Venezuela	1.75%	0.88%	13.14%	7.51	4.03%	3.40%	11.60%	2.88

^ Data for Colombia and Venezuela begin in December, 1984. Data for Peru begin in December, 1992.
* The category "Not Latin America." refers to all emerging markets in the EMDB excluding those in Latin America.

America, and LAMs, including the full Latin American region (as represented in the EMDB). The first four columns of results are expressed in US$ terms and the remaining columns in local currency terms. Latin America achieved much higher arithmetic average and geometric average returns than did any of the other indices (aside from individual Latin American countries) both in local currency terms and in US$ terms. On the other hand, the large differences between local currency and US$ returns for Latin America compared to EMs in the "Not Latin America" emerging market index demonstrates that the region has been uniquely unable to maintain currency values. That point is especially prominent in evaluating the local currency versus US$ returns for Brazil and Argentina. For the period of our sample, a US$1.00 investment made at the outset into the Brazilian and Argentine currencies (but not in their equity markets) and held for the entire sample period before being converted back again to US$ would have left the investor with $0.000000003 and $0.000001176, respectively. Among Argentina, Brazil, Chile, Colombia, Mexico and Venezuela, the currency that retained the greatest fraction of its value against the US$ was the Chilean peso, which lost 94% of its value over the twenty years of our sample. Colombia was a close second at 95%, but the drop-off is sharp after Colombia. On the other hand, the Chilean peso has been strong against the US$ for the past decade; most of its loss was in the early part of the data period. Similarly, Argentina has kept its peso pegged at 1-to-1 with the dollar for the past six years.

Arithmetic average returns are heavily affected by volatility. The compound average, also known as the geometric mean, is the constant rate of return that would have produced the same ending value as the underlying series of actual returns.[9] In measuring performance over time in volatile return series, compound average is often a more realistic measure of performance. Again, on a compound average basis, Latin America showed consistently higher returns than did the US market as shown in Table 2.

Measures of risk provided in Table 2 include the standard deviation of monthly returns and the coefficient of variation. On the basis of standard deviation of returns, LAMs have been consistently among the riskiest markets on Earth. On the other hand, relative to mean returns the LAMs have compensated investors for higher risk: coefficients of variation are, for some LAMs, on the order of magnitude of the S&P 500 and lower than the sample of non-Latin American emerging markets. Colombia, Chile and Peru stand out on the basis of coefficient of variation, but the results for Peru must be viewed in light of the very short sample period for Peru in the EMDB (beginning December 1992).

Table 3 reports the compound performance of LAMs and other emerg-

TABLE 3. Compound Value of a US$1.00 Investment in Markets Listed in the EMDB from December, 1975

	Five-Year Segment^				20 Years
Market	1975-1980	1980-1985	1985-1990	1990-1995	1975-1995
Argentina	29.42	0.19	6.21	3.93	133.18
Brazil	0.83	1.81	1.11	3.04	5.07
Chile	33.40	0.16	10.04	6.25	335.34
Mexico	3.45	0.33	9.98	1.69	19.20
Greece	1.00	0.25	12.33	0.55	1.70
India	2.59	2.68	1.45	1.85	18.62
Korea	2.91	0.99	5.96	1.24	21.29
Thailand	2.07	1.48	6.61	2.26	45.77
Zimbabwe	1.59	0.63	5.48	0.89	4.89

^The values shown are compound values of a US$1.00 investment at the start of the interval listed at the top of the column and held until the end of the interval, including dividends and their reinvestment. The only markets listed are those for which data were available for the entire time period of the EMDB beginning in December, 1975. The first five-year segment is 4.5 years in length; it begins with December, 1975, and ends in June, 1980. The remaining periods start in July of the first year indicated and end in June of the second year indicated.

ing markets for the full sample period (technically 19.5 years) along with successive five-year compound values (i.e., starting each five-year period anew at US$1.00). Nine EMs have data in the EMDB since the start of the data period. Among those nine, four are LAMs, and two of them, Chile and Argentina, have shown by far the greatest compound value of investment. However, results vary dramatically across time; success in one five-year period is no assurance of success in a subsequent period. Again, Chile and Argentina are prime examples: From compound values of 33.4 and 29.42, respectively, in the first five years of data, the two markets lost 84% and 81%, respectively, of their values in the subsequent five years (i.e., their $1.00 investments fell to $0.16 and $0.19, respectively). Those losses make Chile's and Argentina's performance over the full sample period even more impressive: They had much to overcome. It is also worth noting that Brazil had relatively stable performance across successive five-year periods in spite of Brazil's high standard deviation of monthly returns and coefficient of variation of monthly returns reported in Table 2.

PORTFOLIO CHARACTERISTICS OF LAMS

Given the high risk associated with LAMs, their inclusion in a portfolio of non-LAM portfolios will depend on the degree of correlation between the LAMs and other markets. Also, the Latin American investor, confronted with very high risk compared to other investment opportunities, would be well advised to consider diversification opportunities outside of the domestic market.[10] This section of the paper examines correlations among LAMs and between LAMs and various non-LAM portfolios.

Table 4 presents correlations among LAMs and between LAMs and other indices, including the S&P 500, the EAFE (Europe, Australia and the Far East), an EM Composite Index, and an index of EMs excluding LAMs (the so-called "Not Latin America" Index). EAFE is an index that is commonly used by pension fund managers in the U.S. to provide a benchmark of foreign, developed-market investment alternatives. Thus, for example, a U.S. pension fund consultant will often suggest including LAMs or EMs as a piece of the pension portfolio labeled "foreign," and in so doing they will discuss the combination of EAFE and the suggested LAMs or EMs. In addition, correlations between various EMs and EAFE suggest the value to U.S. investors of including EMs in their subportfolio of foreign assets.

The first row of results in Table 4 takes the perspective of a U.S. investor interested in diversifying into Latin America or of a Latin American investor interested in U.S. investments (and concerned about risk

TABLE 4. Correlations Among Latin American Markets and Other Markets. Values Calculated over Period for Which U.S. Dollar Denominated Returns Are Available for Both Markets in a Pair.^

	S&P 500	EAFE	Composite	Not Latin America	Latin America	Argentina	Brazil	Chile	Colombia	Mexico	Peru	Venezuela
S&P 500	1.00	0.42	0.27	0.21	0.24	0.03	0.05	0.04	0.08	0.28	0.12	−0.04
EAFE		1.00	0.33	0.31	0.19	−0.01	0.08	0.08	0.01	0.17	0.20	−0.08
Composite			1.00	0.86	0.68	0.06	0.06	0.43	0.06	0.60	0.30	−0.10
Not Latin America				1.00	0.29	−0.06	0.05	0.22	0.05	0.30	0.12	−0.14
Latin America					1.00	0.32	0.07	0.51	0.09	0.83	0.52	0.14
Argentina						1.00	0.01	0.10	−0.07	0.16	0.52	0.05
Brazil							1.00	0.05	0.08	0.00	0.14	−0.03
Chile								1.00	0.02	0.16	0.57	−0.13
Colombia									1.00	0.02	0.06	0.14
Mexico										1.00	0.48	−0.01
Peru											1.00	0.14
Venezuela												1.00

^ Data for Colombia and Venezuela begin in December, 1984. Data for Peru begin in December, 1992.

measured in U.S. dollar terms). All of the LAMs have low correlations with the S&P 500 in the sense that the correlations are low enough that combinations of the S&P 500 with each of the LAMs, taken one at a time, would have had lower risk than the S&P 500 alone. In view of the comparatively low standard deviation of the S&P 500 as shown in Table 2 (less than one-half the standard deviation of any LAM), it is remarkable that risky LAMs could reduce the risk for the holder of an S&P 500-based portfolio.

Table 5 shows the combination of each LAM with the S&P 500 that would minimize the risk of the combination. Thus, Table 5 explicitly illustrates the claim made in the previous paragraph. In each row of Table 5, pairwise portfolio combinations are considered. Each pair shows the mini-

TABLE 5. Minimum Variance Portfolio Weights of Alternative Markets in Combination with the S&P 500 Index^

Market	Market Weight	S&P 500 Weight
EAFE	37.79%	62.21%
Composite	31.83%	68.17%
Not-Latin America	34.42%	65.58%
Latin America	10.87%	89.13%
Argentina	1.48%	98.52%
Brazil	3.92%	96.08%
Chile	11.81%	88.19%
Colombia	16.66%	83.34%
Mexico	1.87%	98.13%
Peru	1.05%	98.95%
Venezuela	10.86%	89.14%

^The values reported are portfolio weights for the minimum variance combination of the designated market and the S&P 500 Index. All input values (standard deviations and covariances or correlations) are calculated from US$-denominated returns over the full period for which data are available to us on the identified market.

In the cases of Argentina, Brazil, Chile and Mexico, input values are based on data since December, 1975. Data for Colombia and Venezuela begin in December, 1984. Data for Peru begin in December, 1992.

mum-risk portfolio weights from combining the S&P 500 Index with the market shown in the left-hand column of the Table. The minimum variance weights for any pair depend on the correlation between rates of return of the two assets and the standard deviations of returns for each of the assets. The higher an asset's standard deviation of returns (e.g., the higher the standard deviation of EMs), the lower will be that asset's weight in forming a minimum variance combination with any other asset. On the other hand, the lower the correlation between any two assets, the more of the higher risk asset one would hold in forming a minimum variance portfolio: The low correlation serves to ameliorate the effects of high risk.

Each market shown in Table 5 has a positive weight in forming the minimum variance combination with the S&P 500. In the cases of Argentina, Mexico and Peru, the combination of standard deviation of the market and correlation with the U.S. market means that the minimum variance combination contains little of the LAM, but all of the LAMs had at least marginal diversification benefits for the U.S. investor for the periods examined.

Table 5 also shows that the minimum variance combination of a diversified portfolio of LAMs with the S&P 500 Index over the full, twenty-year period of the EMDB would have entailed approximately an 11% commitment to LAMs. Because the LAMs had higher mean returns than did the S&P 500, mean-variance efficient combinations of Latin American investments with the S&P 500 would have started at that minimum variance combination and moved up toward heavier investment in Latin America.[11] Figure 4 depicts portfolio combinations of two portfolios: The S&P 500 Index and a value-weighted portfolio of all Latin American securities in the EMDB. While the S&P 500 Index had considerably lower risk than did the Latin America Index over the twenty years of available data, there were combinations of the Latin America Index with the S&P 500 that had lower risk than that of holding the S&P 500 alone.

Given that an investor might seek to diversify across all the Latin American markets (not just one market or just the Latin American Index), we calculate minimum variance combinations for portfolios when the investor can invest in several LAMs and the U.S. market. Based on the four markets (Argentina, Brazil, Chile, and Mexico) with data available for the entire period under study, a U.S. investor wishing to minimize risk should have made a 15% investment in these LAMs. In December 1984, Colombia and Venezuela were added to the EMDB. Analysis of the next 10 years (ending June 1995) reveals that the minimum variance portfolio combination required a 32% allocation to the six Latin American markets. Data for Peru became available in December 1992. Analysis of the mini-

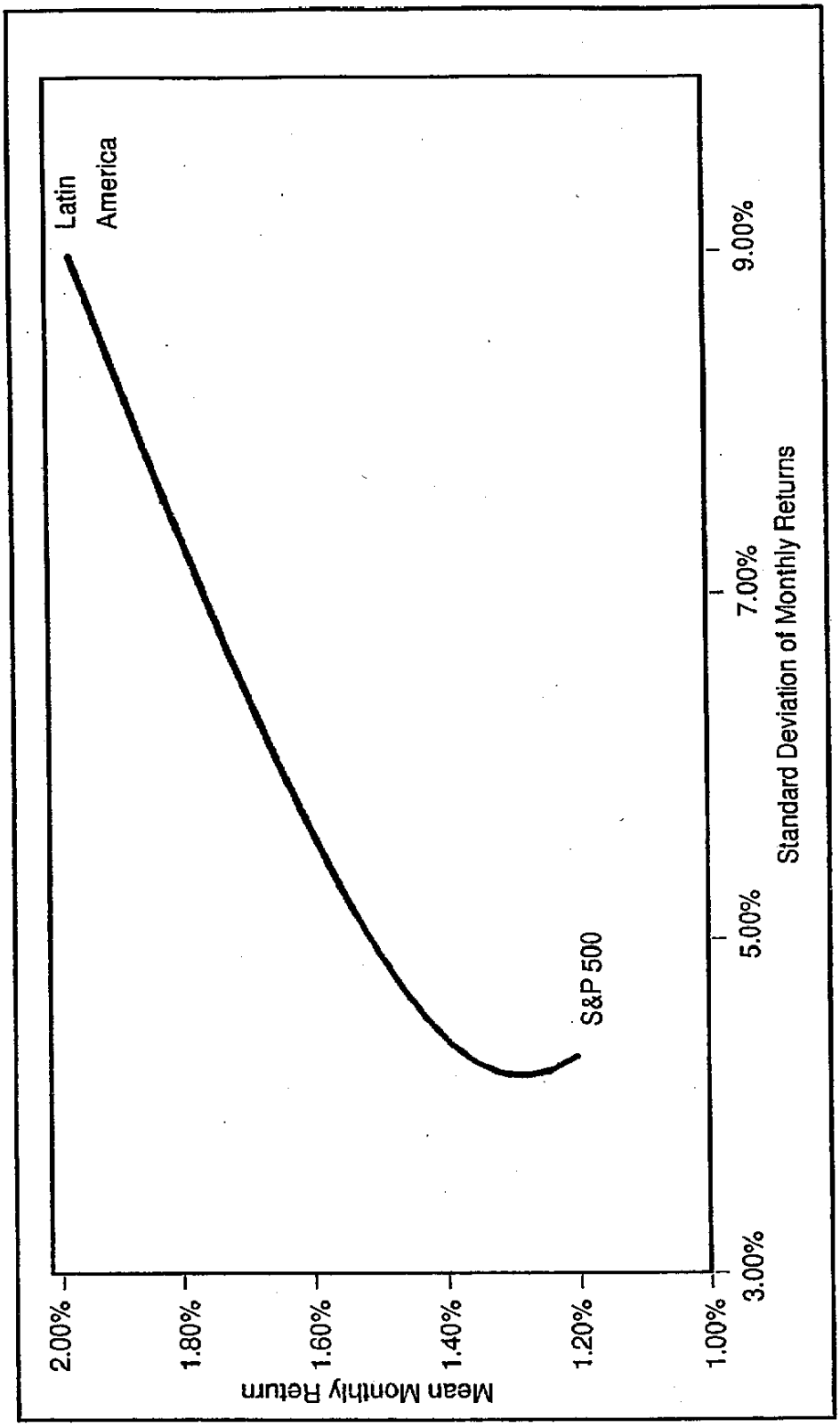


FIGURE 4. Portfolio Combinations of the S&P 500 Index and the Latin American Composite in Mean-Standard Deviation Space. Based on US$ Returns over the Period December, 1975, through June, 1995.

mum variance portfolio combination over the period that includes all seven LAMs results in only a 3% overall allocation to these seven markets. However, the time period used to calculate the correlations and standard deviations used in this analysis was relatively short (monthly data was used from December 1992 through June 1995).

It is clear from the results above that correlation structures are not stable through time. This instability leads to different portfolio combinations that minimize risk. (See also Susmel [1996a].) Nevertheless, over the long run LAMs have provided diversification benefits to international investors.

Returning to Table 4, correlations among LAMs are particularly low. A singular exception is the case of Peru, which had correlations of 0.52, 0.57, and 0.48 with the markets of Argentina, Chile, and Mexico, respectively. Aside from the case of Peru (recall data for Peru begins in December 1992), all other pairs of LAMs had low correlations. Hence, investors in each market would have been able to reduce their portfolio risks by investing in other LAMs outside of their domestic market.

A problem with diversification benefits is that correlation is generally measured across relatively long periods of time. It can change as countries integrate their markets more closely together and reduce impediments to the free flow of goods, services, and capital. Thus, estimates of correlations made in one period may prove to be too low when applied in a subsequent period so that diversification benefits that were expected may not be realized [Bekaert and Harvey, 1997]. Further, contagion effects of crises suggest that at times when the diversification benefits are most needed, they may not be present. Frankel and Schmulker [1996] and Sachs, Tornell and Velasco [1996] investigate contagion effects associated with the Mexican peso devaluation of December 1994. They find substantial contagion effects in the sense that the fall during December 1994 of the Mexican stock market was accompanied by sharp declines in other EMs globally, most notably Argentina and Brazil. In contrast, using intraday data Bailey, Chan and Chung [1997] find that contagion effects were much less pronounced on a very short term basis.

LIQUIDITY AND CONCENTRATION OF LATIN AMERICAN MARKETS

The usefulness of a security market depends to a degree on the extent to which the market is liquid and diverse. A liquid market is one in which large amounts of securities can be bought or sold without greatly affecting the prices of the securities. In general, it will be one in which a substantial fraction of the market's total equity value will regularly "turn over" or trade. Thus trading volume in a period divided by the market's total equity

value is a measure of market liquidity. In a liquid market investors may alter their portfolios without making large price concessions. Price concessions are a cost of transacting in a market.

We measure liquidity by the value of transactions undertaken in 1995 (in US$ terms) divided by the value of all securities listed on the market as of the end of 1995.[12] In 1995 the U.S. had a total volume over ending market value of 86%, and the Composite Index of all EMs in the EMDB had total volume divided by ending market value of 57%. No LAM achieved the average liquidity of EMs. Brazil had the highest liquidity among LAMs at 53.6%, and no other LAM achieved more than 40%. The sum of transaction volumes across the seven markets divided by the sum of market capitalizations results in a liquidity for the seven combined markets of 35.2%. Chile, Venezuela, Argentina and Colombia had especially low liquidity in their local markets, all having turnover of 15% and below.

A necessary condition for a diversified market is that the largest companies in the market do not make up a large fraction of the value of the entire market. If only a few securities in a market are sizable and the remaining companies are very small, investors with large amounts of funds will be limited to holding a few securities in their portfolios; the investors will not be able to achieve substantial diversification within the market.

The market values of LAMs are concentrated in relatively small numbers of stocks. Even the four largest LAMs (Argentina, Brazil, Chile and Mexico) are highly concentrated. Although each of these markets lists well over one hundred companies, the largest ten companies in each market make up over 40% of the total market capitalization. Among them, Argentina stands out as especially concentrated. The top ten companies in Argentina represent about 80% of the total market capitalization. That degree of concentration is made worse by the fact that two of the four largest companies listed on the Argentine Bolsa de Valores are in the same industry, telecommunications. YPF, the privatized former national petroleum company of Argentina, is the largest company listed, and at one point Perez Companc, the third largest firm at the time, was the largest investor in YPF. One of the authors of this article taught a class for portfolio managers at the Argentine Financial Executives Institute in which portfolio managers with $100 million to $250 million in assets were in attendance. All of them reported that their holdings were limited to five or six equities because there were no other equities large enough to invest in without making large price concessions on buying and selling. Thus, heavy concentration in a market imposes a practical limitation on the ability of participants in the market to diversify their risk. All four large

LAMs reflect a high degree of concentration compared to the US stock market. These market concentration statistics further demonstrate the importance to domestic investors in LAMs of being free to invest outside of their own markets.

RESEARCH ISSUES IN LATIN AMERICAN MARKETS

A great deal of research has been directed in recent years toward learning more about Latin American economies and capital markets. Much remains to be done. A few suggestions are made in this Section to encourage further research about Latin American capital markets. Further discussion in the broader context of EMs is contained in Barry and Lockwood [1995].

One of the least understood phenomena in Latin America is the role, structure and activities of family holding groups. Family holding groups are groups of companies in which the great majority of ownership is concentrated in a single family. Because diversification opportunities within the equity markets of Latin American countries have often been very limited, diverse family holding groups may be seen as a response to poorly developed security markets. Family holding groups are prevalent in parts of Latin America and in some other developing markets as well. They are the predominant form of economic organization in Italy. Yet, very little is known about them. For example, how are they structured? How do incentives work in the groups? Are agency problems overcome by particular structures and incentives within the groups? How is the investment and decision making behavior of family groups different than for other types of companies? How do they influence public equity markets?

A second research direction is to look at issues from the perspective of a Latin American investor. Often, studies of Latin American capital markets and markets in other developing nations take the point of view of the U.S. or other global, developed-market investors. Latin American investors have their own particular concerns that need to be addressed. Among those issues is the need to understand how governments can trade off the goal on the one hand of achieving increased domestic capital accumulation through policies that increase savings (such as Chile's often-copied system of pension funds) against the goal of permitting citizens to achieve retirement and income security via diversification beyond the domestic market. Restricting citizens from investing abroad increases the risk that those citizens face and forces them to bear risks that are correlated with the value of their human capital. Not imposing such restrictions may lead to a loss of available capital for domestic investment. Will the capital lost in

that process be offset by an increasing willingness to bear risk *within* the market given that it can be offset by more investment *outside* the market? Finally, economists know that one way to drive capital out of a market is to impose laws that prohibit that capital from leaving. Is this another example where allowing capital to move freely can result in an increase of domestically-available capital?

A third research direction is to examine the value of domestic debt ratings. Latin American debt securities are generally rated below investment grade. A notable exception is Chilean debt, which was the first to achieve investment grade after the debt crisis of the early 1980s, and some other Latin American debt is rated at the lowest ends of the investment grade levels. Such ratings are generally provided by non-Latin American rating agencies, such as Standard and Poor's, Moody's Investor Services, and Duff and Phelps. Such agencies often (but not always) follow the rule of thumb that the rating of private debt in an emerging market is restricted to be no higher than the rating of the market's sovereign debt. That means that the information content of bond ratings provided outside a market is highly limited. On the other hand, domestic rating agencies also exist in some of these markets, and they assign ratings that run the gamut from top-level investment grade to below investment grade. For a foreign investor, do those ratings provide a way of discriminating among issues that are rated identically by foreign rating agencies? An example is Argentina. On the Worldwide Web page of the Ministry of the Economy and Public Works, there are data on domestic bonds, and those data include ratings by domestic agencies of a wide variety of debt securities.[13] Little is known outside of Argentina about the value of such ratings.

The liquidity measures discussed in Section 5 of the paper indicate the very low liquidity associated with some LAMs. However, those statistics do not include the trading of domestic securities through the vehicle of listings in foreign markets, most notably in the form of ADRs (American Depository Receipts) or, more generally, GDRs (Global Depository Receipts). For example, it is estimated that in 1995 twice the volume of Argentine securities traded in New York as in Buenos Aires. Liquidity statistics previously discussed did not include overseas trading of each market's securities. What is the effect of listing securities abroad on the viability of the domestic markets? There are informational advantages that domestic investors have in comparison to foreign investors. In a market dominated by foreign trading in exchanges outside the domestic market, such as the New York Stock Exchange, do prices fully reflect available domestic information? Arbitrage opportunities tend to force prices on the domestic exchange and foreign exchanges into agreement, but which valu-

ations dominate, and do they reflect all available information? Is there a loss of information gathering and, hence, information production when a local market is dominated by foreign trading? In a world of electronic access to information on a timely basis, is the role of the domestic security market essential, or is it better to forego the cost of such a market? What is gained, and what is lost?

Finally, the contagion literature referred to above must go farther. Relatively little is known about how correlations change in response to crisis events or to very favorable events. Are such changes in correlation transitory, and hence can be ignored by the long-term investor, or do they represent a fundamental change? To what extent might such contagion effects be a product of irrationality in global markets, as some have suggested, versus rational revision of probabilities of events? Until more is known, investors cannot be criticized for concluding that "emerging markets offer excellent diversification benefits, except when you really need them." Bailey, Chan and Chung [1997] offer recent evidence on this issue using intraday data from the 1994 devaluation of the Mexican Peso.

CONCLUSIONS

This paper uses the Emerging Markets Data Base provided by the International Finance Corporation to examine the risk, return, diversification and other characteristics of Latin American equity markets from December 1975 through June 1995. While the class of all emerging markets in the EMDB achieved compound growth below that of the U.S. market (as measured by the S&P 500 Index) during the period examined, Latin American markets outperformed the S&P 500. However, Latin American markets are accurately characterized as being among the riskiest capital markets in the world. They have experienced extreme highs and lows in response to frequent changes of direction in economic policies in the region. Among the markets, Chile has been the outstanding performer, reflecting Chile's relatively early adoption of market-oriented economic policies.

Low correlations among Latin American markets and between those markets and other markets suggest that Latin American markets provide important diversification benefits to global investors. Furthermore, because Latin American markets generally experience thin trading (or, low liquidity) and are heavily concentrated in a few large securities, the opportunity to diversify out of those markets can be even more important to domestic investors than the opportunity to diversify into them is to investors from developed markets.

Finally, much remains to be done in the study of Latin American equity markets. The dominant organizational form in some of the markets, namely, the family holding group, is not well understood. A number of issues remain that have to do with the risk, return and diversification of the markets and their role in the accumulation of capital and in the preservation of wealth for Latin American citizens.

NOTES

1. Knight (1996) and Thorp and Lowden (1996) provide overviews of political developments in Latin America and their interaction with economic models since 1945. Edwards (1995) provides rich details of economic reforms in Latin America over the period 1982-1994.

2. We use the term "emerging markets" as it is used by the International Finance Corporation (IFC): An emerging market is an equity market in a developing country. The IFC uses the World Bank's definition of a developing country: One whose per capita gross domestic product places the nation in the lower or middle income categories globally. As of the end of 1994, the cutoff level of per capita national income was US $8,955. See the *Emerging Stock Markets Factbook 1996* for details.

3. Part of the growth in Latin American market capitalization is due to privatizations and other new stock issues in these markets.

4. To our knowledge, this is the first time results for a non-Latin American emerging market index have been presented to reveal how Latin American markets performed relative to the remaining emerging markets.

5. See, for example, Divecha, Drach and Stefek (1992), Price (1994), and Stanley (1995).

6. Goetzmann and Jorion (1996a, 1996b) provide strong warnings that recent high return periods may not be indicative of reasonable long term expectations of performance. Emerging markets are typified by periods of expansion and periods of sharp contraction even to the extent of virtually "submerging."

7. See Edwards (1995) for details of Argentina's Convertibility Plan. The Plan provided for a fixed exchange rate against the U.S. dollar and limited Argentina's money supply to foreign reserves on hand, most notably the dollar.

8. The Solidarity Pact was an agreement among government, business and labor to work "in solidarity" to accomplish objectives in inflation control and other economic areas.

9. The compound average (R_g) for n months can be computed as follows:

$$R_g = \left[\prod_{t=1}^{n} (1 + r_t)\right]^{1/n} - 1$$

where r_t is the rate of return in month t.

10. Many EMs prohibit their citizens from investing in portfolio assets outside the domestic market. For example, a major source of new capital in LAMs is the newly-enacted pension funds of the market. Domestic holders of pension assets are often prohibited from investing those assets outside of domestic securities. Chile has recently enacted a law to permit foreign portfolio investment of Chilean pension assets, pending approval of specific assets that can be used in such a program. Thus, in many cases the practical ability of domestic LAM investors to diversify outside of the domestic market does not exist. Ultimately, politicians must balance the goal of domestic capital accumulation against the goal of allowing their citizens to protect themselves from the wide swings of the domestic market.

11. Efficient portfolios are portfolios that have lower risk than any other portfolio with the same or greater mean return, or greater mean return than any other portfolio with the same or lower risk. Elton and Gruber (1995) explain the theory and practice of combining securities into mean-variance efficient portfolio combinations.

12. These results are based on data in the *Emerging Market Factbook 1996.*

13. The Internet address of the Ministry of the Economy and Public Works for Argentina is: http://www.mecon.ar

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