

## **RISK-ADJUSTED RETURNS OF AMERICAN DEPOSITARY RECEIPTS FROM LATIN AMERICA**

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### **ABSTRACT**

For many global investors, the instrument of choice for accessing stock markets in Latin America is the American Depositary Receipt (ADR). These ADRs are created when a financial institution holds shares of Latin American corporations in trust and issues receipts which are then listed on stock markets in the U.S. The objective of this study is to provide empirical documentation on the risk-adjusted performance of Latin American ADRs. The first part of the study examines the nature of these ADRs, based on depositary bank, sponsorship status, industry classification, and listing. The second part of the study evaluates the performance of the ADRs using statistical measures grounded in modern portfolio theory. Market returns are adjusted for the degree of total risk and systematic risk inherent in each ADR, and the securities are then ranked on the basis of risk-adjusted performance. In addition to standard Sharpe, Jensen and Treynor performance measures, two newer evaluation metrics, the Modigliani and Sortino measures, are used for ranking the ADRs. The results of this study would be of interest to global investors, managers of international financial institutions, multinational corporate executives, global portfolio managers and academicians in the area of global business and international finance.

*Keywords:* ADRs, Latin America stocks, portfolio performance measurement

### **INTRODUCTION**

Over the past decade, there has been a significant rise in investor comfort with global financial securities, aided by the ease with which corporate financial information can be accessed via the internet. One of the most convenient instruments for accessing corporate securities listed outside an investor's home country is a Global Depositary Receipt. In the United States, these financial instruments are known as American Depositary Receipts (ADRs). They are listed on the New York Stock Exchange (NYSE), NYSE Amex (formerly American Stock Exchange), the NASDAQ system, and on private trading networks.

Although ADRs from Latin America have been studied before (Creamer, 2009; Schaub, 2013), to our knowledge there has been no study focusing on their risk-adjusted performance. The stock market in this region is significant in size and provides many opportunities for risk diversification. Total market capitalization in Latin America in 2013 was US Dollar (USD) 2,524 billion (World Bank, 2014). The largest market in this region, in terms of market capitalization (USD 1,230 billion) was Brazil. The other large markets were Mexico (USD 525 billion), Chile (USD 313 billion), Colombia (USD 262 billion), Peru (USD 97 billion), and Venezuela (USD 25 billion).

An ADR is created when a financial institution, usually a multinational bank, purchases shares of stock listed on a foreign market and holds them in trust in that country. The bank then issues ADRs in the US based on this holding. These ADRs may be created either at the request of investors or at the request of corporations whose stock is held in trust as collateral for the ADR. These securities serve a dual purpose: they enable firms incorporated in developing countries to raise funds from the U.S. without having to meet the stringent listing requirements of U.S. stock exchanges, and, at the same time, they allow investors to earn returns on securities listed on U.S. stock exchanges without the dual inconvenience of having to deal with foreign stock brokers and with currency conversion. A US based investor who is contemplating investing directly in stocks listed on a market in the Latin American region would need to contact a broker in that country, open a local bank account, convert US dollars into local currency and then execute a buy or sell order. Many US based investors find this inconvenient, and, therefore, prefer to invest in ADRs rather than purchase the stock itself.

The primary securities that underlie an ADR may be corporate stocks or bonds. The earliest ADRs were issued at the request of institutional investors. These ADRs were “unsponsored.” Most of the ADRs that are currently listed are “sponsored” programs, issued at the request of the firm whose securities underlie the ADR. When a sponsored ADR is issued, there may or may not be a corresponding creation of new capital. There are four grades of sponsored ADRs. Level I ADRs are traded in the OTC market. Level II ADRs trade on national stock exchanges (such as the NYSE). If new capital is raised during the process of issuing sponsored ADRs, then the ADRs are categorized as Level III and IV. Level III ADRs are listed on national stock exchanges. Level IV ADRs are privately listed, and are usually issued under rule 144A of the US Securities and Exchange Commission.

This study examines the nature and performance of Latin American ADRs, sorted on basis of depositary bank, sponsorship status, industry classification, and stock exchange on which the security is listed. Data are obtained from the Bank of New York Mellon and Center for Research in Security Prices (CRSP). The intent of the study is to provide documentation to international investors who would like to hold ADRs from Latin America in their global portfolios. The study should be of interest to international investors, managers of mutual funds who are exploring opportunities to diversify their global portfolios, managers of corporations who are planning to sponsor the issue of depositary receipts, and to bank managers who provide international financial services.

The rest of this paper is structured as follows. We summarize pertinent studies in the area of modern portfolio theory and present a review of the literature on ADRs. We then examine the sponsorship status, choice of depositary bank, industrial classification, and market listing. The performance of these ADRs is then evaluated on a risk-adjusted basis, using the Morgan Stanley Capital International (MSCI) Europe, Australasia, and Far East (EAFE) Index as a benchmark for comparison purposes. Finally, we present an analysis of the empirical findings followed by the conclusion of the paper.

## **LITERATURE REVIEW**

Modern Portfolio Theory was pioneered by the research of Treynor (1965), Sharpe (1966), and Jensen (1968). Their performance evaluation metrics are still commonly in use. Treynor (1965)

evaluated an investment portfolio by adjusting the mean excess return (mean return less the risk-free rate of return) for the degree of market risk. Sharpe (1966) calculated mean excess return adjusted for the degree of total risk in the portfolio. Jensen (1968) created a metric (Jensen's Alpha) to determine whether the deviation of portfolio returns from market returns was statistically significant, and, thereby, to determine whether the excess return should be attributed to superior management, or purely to chance.

In 1997, Franco Modigliani and Leah Modigliani did some pioneering work in the area of financial reward and risk. They proposed a new risk-adjusted performance measure (hereafter referred to as M Squared), which is intuitively quite appealing to investors. The idea that underlies their methodology is to adjust the returns of a portfolio to the level of risk in an unmanaged stock market index and then measure the returns on the risk-matched portfolio. Further, academicians and practitioners in finance have shown an interest in downside risk measures for evaluating portfolio performance. The most widely cited performance measure that adjusts for downside risk is the Sortino Ratio (Sortino & Price, 1994). In this paper, we use a modified Sortino Ratio that was introduced by Pedersen and Satchell (2002), who show that this ratio has a sound theoretical foundation.

Academicians have studied the benefits of global diversification of investment portfolios extensively. Solnik and McLeavey (2004) present an excellent summary of these benefits. Officer and Hoffmeister (1987) show that portfolio risk can be reduced significantly by including ADRs in a portfolio of purely domestic (U.S.) securities. Aggarwal, Dahiya, and Klapper (2005) analyse the investment allocation decision of mutual fund managers to invest in emerging market firms that are listed in their domestic markets and have issued ADRs in the U.S. as well. They find that ADRs are the preferred mode of holdings if the local market of the issuer has weak investor protection, low liquidity and high transaction costs, and if the firm is small and has limited analyst following.

The unpredictability of stock returns in emerging markets has been demonstrated widely. Aras and Yilmaz (2008), for example, report evidence on 12 emerging market countries. Obi, Sil, and Choi (2010) study the South African stock market and document that traditional analytical approaches resulted in poor value-at-risk forecasts during the 2008-2009 global financial crisis. They obtain realistic value-at-risk estimates by accounting for the effects of time-varying volatility in portfolio returns. Similarly, Muzindutsi and Niyimbanira (2012) examine the exchange rate risk exposure in the South African stock market and the pricing of this risk. They find the exchange rate exposure to be identifiable and yet different across companies.

The motivation for cross-listing shares on foreign exchanges has also been widely researched (Saudagaran, 1988). Umutlu, Salih, and Akdeniz (2007) investigate the consequences of cross listing in emerging markets and find that ADR listing has no effect on the volatility of the underlying stock. On the other hand, Jaiswal-Dale and Jithendranathan (2001) report that ADRs capture the fluctuations of both the domestic and U.S. markets.

The relation between the price of ADRs and the underlying shares has also been studied thoroughly (Alexander, Cheol & Janakiramanan, 1987; Alexander, Cheol & Janakiramanan, 1988). Jayaraman, Shastri & Tandon (1993) study the impact of international cross-listings using ADRs. Because ADRs can be exchanged for the underlying shares, financial arbitrage usually ensures that

the price of an ADR is within transactions costs of the price of the underlying share. Interestingly, Eichler and Maltritz (2008) model the probability of a currency crisis as a function of the deviation of the ADR price from the price of the underlying stock.

To the knowledge of the authors, this is the first study of the nature and performance of individual ADRs focusing on Latin American firms, particularly their sponsorship status, industrial classification, names of banks that are active in this business, and exchanges on which these ADRs are listed. This is also the first study of the individual returns that have accrued to these ADRs, from the point of view of U.S. based investors. Creamer (2009) and Schaub (2013) also study Latin American ADRs, but Creamer (2009) focuses on the prediction of their returns and Schaub (2013) focuses on the relationship between issue characteristics and long term excess returns.

### **NATURE OF ADRS FROM LATIN AMERICA**

As of November 2013, there were 197 ADR issues on firms in the Latin America region (Bank of New York Mellon, 2014). 94 ADRs are from Brazil, 41 from Mexico, 25 from Argentina, 14 from Chile, 9 from Colombia, 8 from Venezuela, 5 from Peru and 1 from Ecuador. Of these 197 ADRs, 193 are sponsored and 4 are unsponsored. Regarding the financial institutions that have issued these ADRs, the Bank of New York Mellon accounts for 127 of the issues, followed by J.P. Morgan Chase with 36 issues, Citibank with 19 issues, and Deutsche Bank with 15 issues. Regarding the exchanges on which the ADRs are listed, 77 are listed on the NYSE, 6 on NASDAQ, and 1 on NYSE Amex. Further, 103 are listed OTC (other than NASDAQ), 8 are listed on OTCQX, and 2 on PORTAL.

With respect to industrial classification, 26 of the ADRs are in the electricity industry; 22 in the banking industry; 16 in real estate investment and services; 12 each in construction and materials, food producers, and industrial metals and mining; 10 each in beverages and oil and gas producers; 9 in financial services; 8 in household goods and home construction; 7 in industrial transportation; 6 in mobile telecommunications; 5 each in gas, water, and multiutility and support services; 4 each in chemicals, fixed line telecommunications, forestry and paper, media, and travel and leisure; 3 in general retailers; 2 each in electronics and electric equipment, food and drug retailers, general industrials, industrial engineering, and mining; and 1 each in aerospace and defense, automobiles and parts, health care equipment and services, and personal goods. All data are retrieved from the Bank of New York Mellon, 2014.

### **PERFORMANCE OF ADRS FROM LATIN AMERICA**

#### **Data and Methodology**

Monthly returns data for the three-year period January 2010 - December 2012 are obtained from CRSP, 2014. CRSP has full returns data for 15 Brazilian ADRs, 14 ADRs each from Argentina and Mexico, 12 Chilean ADRs, and 1 ADR each from Columbia and Peru. Therefore, these 57 ADRs form the final sample in this study for the performance analysis. The return on U.S. 4-week Treasury Bills is utilized as the proxy for the risk-free interest rate. The MSCI EAFE Index is used as the market benchmark.

Monthly returns are averaged over the three-year period to obtain the Mean return. Risk-free rate of return is subtracted from the mean return to compute the Mean excess return, which is divided by its standard deviation to compute the Sharpe (1966) measure:

$$S_i = \frac{R_i - R_f}{\sigma_i} \quad [1]$$

where  $R_i$  = mean return on ADR  $i$ ,  
 $R_f$  = mean risk-free rate of return,  
 $\sigma_i$  = standard deviation of returns for ADR  $i$ .

Mean excess return of each ADR is divided by its beta to obtain the Treynor (1965) measure:

$$T_i = \frac{R_i - R_f}{\beta_i} \quad [2]$$

where  $\beta_i$  is estimated from the market model:

$$R_{it} = \alpha_i + \beta_i R_{mt} + e_{it} \quad [3]$$

where  $R_{mt}$  = market return during month  $t$ ,  
 $e_{it}$  = error term.

Expected return of each ADR is subtracted from its actual mean return to compute Jensen's (1968) Alpha:

$$\alpha_i = R_i - E[R_i] \quad [4]$$

where the expected return for each ADR is obtained using the Capital Asset Pricing Model:

$$E[R_i] = R_f + \beta_i (R_m - R_f) \quad [5]$$

Jensen's Alphas are then tested for statistical significance.

Mean excess return for each ADR is divided by the downside deviation of that ADR's return from the risk-free rate of return to compute the Sortino Ratio (Pedersen & Satchell, 2002; Sortino & Price, 1994),

$$SO_i = \frac{R_i - R_f}{DD_i} \quad [6]$$

where the downside deviation is estimated as follows:

$$DD_i = \left[ \frac{1}{n-1} \sum_{j=1}^n (\max\{0, R_f - R_{ij}\})^2 \right]^{1/2} \quad [7]$$

Here,  $j$  is the month index.

The Sharpe measure is multiplied by the market standard deviation ( $\sigma_m$ ) and then the risk-free rate added to calculate the M Squared measure (Modigliani & Modigliani, 1997):

$$M^2_i = \frac{R_i - R_f}{\sigma_i} \sigma_m + R_f \quad [8]$$

Finally, the market standard deviation is divided by the ADR standard deviation to obtain the Leverage Factor for each ADR:

$$L_i = \frac{\sigma_m}{\sigma_i} \quad [9]$$

The Leverage Factor compares the total risk in the ADR with the total risk in the market portfolio. For example, a Leverage Factor less than one implies that the risk of the ADR is greater than the risk of the market index, and that an investor who is not comfortable bearing risk in excess of market risk should consider un-levering the ADR by selling off part of the holding in the ADR and investing the proceeds in a risk-free security, such as a Treasury Bill. On the other hand, a Leverage Factor greater than one implies that the standard deviation of the ADR is less than the standard deviation of the market index, and that the investor should consider leveraging the ADR by borrowing money (if possible, at the risk-free rate of return) and investing in that ADR.

The significance of the Leverage Factor is that it can be used to form a portfolio containing the ADR and the risk-free asset that has the same total risk (standard deviation) as the market portfolio. By forming this portfolio, risk exposure is limited to market risk and possible gain could be more than the market return. These Leverage Factors are used to compute the adjusted returns in Table 4. First, the Mean Monthly Adjusted Return (MAR) is computed using the Leverage Factor:

$$MAR_i = L_i R_i + (1 - L_i) R_f \quad [10]$$

Then, Mean Annual Adjusted Return (AAR) is calculated by compounding over 12 months:

$$AAR_i = (1 + MAR_i)^{12} - 1 \quad [11]$$

The ADRs are then ranked by order of magnitude of the mean annual adjusted return.

## Results

The 57 ADRs with full monthly return data are identified in Table 1 along with their risk, return, and performance statistics. All returns are reported in US dollars. The ADRs are listed in alphabetical order. The ADR with the highest mean return is Admin Fondos Pensiones Provida of Chile with an average monthly return of 3.46 percent. In comparison, the monthly mean return of the benchmark MSCI EAFE Index is 0.50 percent. The ADR with the highest total risk (measured by the standard deviation of returns) is Gafisa of Brazil with a monthly standard deviation of 19.48 percent. In comparison, the standard deviation of the benchmark MSCI EAFE Index is 5.82 percent. Further, Table 1 reports the numerical values of the Sharpe and Sortino measures, which are used later to rank the ADRs in Table 2. The highest Sharpe and Sortino measures (0.44 and 0.88) are also obtained by Admin Fondos Pensiones Provida. In comparison, the Sharpe measure and the Sortino measure of the benchmark MSCI EAFE Index are 0.08 and 0.12, respectively.

Table 1. 3-Year Returns and Performance on Monthly Basis (2010-2012)

ADRs	Country	Avg (%)	Std (%)	Sharpe	Sortino	Beta	M Squared	Alpha	Alpha t-stat	Treynor
1 Admin Fondos Pensiones Provida	Chile	3.46	7.84	0.44	0.88	0.73	2.57	3.10	1.82	4.73
2 Alto Palermo S A	Argentina	3.34	13.89	0.24	0.49	0.32	1.41	3.18	1.13	10.53
3 Companhia De Bebidas Das Amers	Brazil	3.14	8.13	0.39	0.65	0.68	2.25	2.80	1.59	4.58
4 America Movil A B De C V Series A	México	0.27	6.73	0.04	0.06	0.82	0.23	-0.14	-0.15	0.32
5 America Movil A B De C V Series L	México	0.27	6.71	0.04	0.06	0.83	0.23	-0.15	-0.16	0.31
6 Banco De Chile	Chile	2.44	7.69	0.32	0.61	0.89	1.85	1.99	1.21	2.72
7 Banco Macro S A	Argentina	-0.26	13.25	-0.02	-0.03	1.33	-0.11	-0.92	-0.32	-0.20
8 Banco Santander Brasil S A	Brazil	-0.79	11.49	-0.07	-0.10	1.26	-0.40	-1.41	-0.60	-0.63
9 Banco Santander Chile New	Chile	1.01	8.20	0.12	0.19	0.86	0.72	0.58	0.30	1.16
10 Bbva Banco Frances Sa	Argentina	1.05	15.01	0.07	0.11	1.83	0.41	0.14	0.20	0.57
11 B R F Brasil Foods S A	Brazil	1.77	8.33	0.21	0.38	0.94	1.24	1.30	0.75	1.88
12 Cemex S A B De C V	México	1.09	15.62	0.07	0.10	1.84	0.41	0.18	0.21	0.59
13 Centrais Eletricas Brasilei	Brazil	-3.82	10.86	-0.35	-0.36	0.76	-2.04	-4.20	-2.10	-5.03
14 Coca Cola Femsa S A B De C V	México	2.66	6.31	0.42	0.70	0.27	2.46	2.52	1.51	9.94
15 Companhia Paranaense De Energia	Brazil	-0.39	8.23	-0.05	-0.06	0.69	-0.27	-0.73	-0.53	-0.57
16 Companhia Energetica De Minas Gc	Brazil	1.89	9.52	0.20	0.29	0.76	1.16	1.51	0.75	2.48
17 Companhia Siderurgica Nacional	Brazil	-1.59	12.37	-0.13	-0.19	1.45	-0.75	-2.31	-0.92	-1.10
18 Compania Cervecerias Unidas S A	Chile	2.53	7.78	0.32	0.72	0.50	1.90	2.28	1.26	5.07
19 Compania De Minas Bv Sa	Perú	0.72	9.10	0.08	0.12	0.20	0.46	0.62	0.12	3.64
20 Corpanca	Chile	2.27	8.43	0.27	0.54	0.75	1.57	1.89	1.04	3.03
21 C P F L Energia S A	Brazil	0.81	6.91	0.12	0.18	0.61	0.68	0.50	0.21	1.33
22 Cresud S A C I F Y A	Argentina	-0.63	10.88	-0.06	-0.08	1.16	-0.33	-1.21	-0.55	-0.55
23 Desarrolladora Homex S A De C V	México	-1.60	15.15	-0.11	-0.15	1.41	-0.61	-2.30	-0.77	-1.14
24 Ecopetrol S A	Colombia	3.12	7.35	0.42	0.88	0.65	2.47	2.79	1.68	4.77
25 Empresa Distribuidora Y Comercia	Argentina	-2.48	16.69	-0.15	-0.20	1.25	-0.86	-3.10	-1.01	-1.98
26 Embotelladora Andina S A A Shares	Chile	2.25	7.51	0.30	0.56	0.58	1.74	1.96	1.11	3.88
27 Embotelladora Andina S A B Shares	Chile	2.33	6.90	0.34	0.68	0.52	1.96	2.06	1.21	4.45
28 Embraer S A	Brazil	1.26	8.80	0.14	0.24	1.04	0.84	0.75	0.44	1.21
29 Empresa Nacional De Elect Chile	Chile	0.36	6.12	0.06	0.08	0.54	0.34	0.09	-0.10	0.65
30 Enersis S A	Chile	-0.12	7.03	-0.02	-0.02	0.62	-0.10	-0.44	-0.41	-0.21
31 Fibria Celulose S A	Brazil	-1.11	12.36	-0.09	-0.12	1.67	-0.52	-1.93	-0.71	-0.67
32 Gafisa S A	Brazil	-1.57	19.48	-0.08	-0.12	2.02	-0.46	-2.57	-0.61	-0.78
33 Gruma S A B De C V	México	2.17	11.44	0.19	0.33	1.04	1.11	1.65	0.78	2.07
34 Grupo Aeroportuario Del Centro N	México	2.16	8.60	0.25	0.46	1.09	1.47	1.62	0.96	1.98
35 Grupo Aeroportuario Del Pac Sab	México	2.41	7.78	0.31	0.59	0.87	1.81	1.98	1.18	2.75
36 Grupo Aeroportuario Del Sur S A	México	2.98	9.48	0.31	0.54	0.97	1.83	2.49	1.34	3.07
37 Grupo Financiero Galicia S A	Argentina	1.56	15.54	0.10	0.17	1.35	0.59	0.89	0.38	1.16
38 Grupo Simec S A B De C V	México	1.78	7.67	0.23	0.38	0.65	1.35	1.45	0.80	2.74
39 Grupo Televisa Sa	México	1.05	8.28	0.13	0.21	0.96	0.74	0.58	0.33	1.10
40 Empresas Ica S A De C V	México	0.96	12.48	0.08	0.12	1.58	0.45	0.18	0.20	0.60
41 Industrias Bachoco S A B De C V	México	0.96	7.11	0.13	0.20	0.44	0.79	0.74	0.30	2.17
42 I R S A Inversiones Y Rep S A	Argentina	0.45	10.10	0.04	0.06	0.86	0.26	0.02	-0.02	0.52
43 Latam Airlines Group S A	Chile	1.58	9.67	0.16	0.27	0.93	0.95	1.11	0.57	1.68
44 Maxcom Telecomunicaciones Sab De	México	-2.12	13.13	-0.16	-0.22	0.81	-0.94	-2.53	-1.09	-2.62
45 Oi S A	Brazil	-1.63	11.87	-0.14	-0.16	0.91	-0.80	-2.08	-0.97	-1.81
46 Pampa Energia S A	Argentina	-2.72	10.85	-0.25	-0.30	0.84	-1.45	-3.14	-1.57	-3.22
47 Petrobras Energia S A	Argentina	-0.38	12.10	-0.03	-0.05	1.06	-0.18	-0.91	-0.39	-0.36
48 Petroleo Brasileiro Sa Petrobras	Brazil	-1.67	10.60	-0.16	-0.21	1.30	-0.92	-2.32	-1.08	-1.29
49 Companhia De Saneamento Basico	Brazil	2.81	9.57	0.29	0.57	0.97	1.71	2.33	1.24	2.88
50 Sociedad Quimica & Minera Chl Sa	Chile	1.72	8.69	0.20	0.32	1.08	1.16	1.18	0.70	1.58
51 Telecom Argentina S A	Argentina	-0.12	9.50	-0.01	-0.02	0.91	-0.07	-0.57	-0.33	-0.14
52 Tenaris S A	Argentina	0.73	11.11	0.06	0.09	1.41	0.38	0.03	0.11	0.51
53 Ternium S A	Argentina	-0.20	11.93	-0.02	-0.02	1.31	-0.09	-0.85	-0.31	-0.16
54 Transportadora De Gas Del Sur Sa	Argentina	0.53	11.39	0.05	0.07	0.92	0.27	0.07	0.01	0.57
55 Vale S A	Brazil	-0.03	10.16	0.00	-0.01	1.41	-0.02	-0.73	-0.27	-0.03
56 Vina Concha Y Toro S A	Chile	0.19	7.07	0.03	0.04	0.54	0.16	-0.08	-0.20	0.35
57 Y P F Sociedad Anonima	Argentina	-1.53	13.47	-0.11	-0.14	0.85	-0.66	-1.96	-0.83	-1.80
MSCI EAFE		0.50	5.82	0.08	0.12	1.00	0.50	0.00	0.00	0.49
US 4-Week Treasury Bill		0.01	0.00	0.00	0.00	0.00	0.01	0.00	-0.51	0.00

Table 1 also reports the values of Betas, M Squared measures, Jensen’s Alphas (and their t-statistics), and Treynor measures, all of which are computed using the benchmark MSCI EAFE Index. The ADR with the highest systematic risk (Beta=2.02) is Gafisa of Brazil, as was the case with total risk. In comparison, the Beta of the benchmark MSCI EAFE Index is, by definition, exactly 1.00. The ADR with the highest M Squared measure (2.57) is again Admin Fondos Pensiones Provida, as expected. In comparison, the benchmark MSCI EAFE index has an M Squared measure of 0.50. The ADR with the highest Alpha measure is Alto Palermo of Argentina with Alpha equal to 3.18. None of the Alphas are significant at the five percent level. The Alpha of the benchmark MSCI EAFE Index is, by definition, zero. Finally, the ADR with the highest Treynor measure (10.53) is also Alto Palermo of Argentina. In comparison, the Treynor measure for the MSCI EAFE Index is 0.49.

Table 2 reports the rankings of all the ADRs. The Sharpe and Sortino ranks indicate that 26 ADRs have returns (adjusted for both total risk and downside risk) that exceed the risk-adjusted returns of the MSCI EAFE Index. The Treynor and Alpha ranks in Table 2 indicate that 34 ADRs have returns (adjusted for systematic risk) that exceed the risk-adjusted returns of the MSCI EAFE Index. By definition, the ranking based on the M Squared measure is identical to the ranking based on the Sharpe measure. However, the M Squared measure enables us to draw some inferences, which cannot be drawn from the Sharpe measure and these are detailed at the end of this section.

Table 2. Three-Year Ranking (2010-2012)

ADRs	Country	Sharpe Rank (M Squared Rank)	Sortino Rank	Treynor Rank	Alpha Rank
Admin Fondos Pensiones Provida	Chile	1	1	5	2
Ecopetrol S A	Colombia	2	2	4	4
Coca Cola Femsa S A B De C V	México	3	4	2	5
Companhia De Bebidas Das Amers	Brazil	4	6	6	3
Embotelladora Andina S A B Shares	Chile	5	5	7	9
Compania Cervecerias Unidas S A	Chile	6	3	3	8
Banco De Chile	Chile	7	7	15	10
Grupo Aeroportuario Del Sur S A	México	8	11	10	6
Grupo Aeroportuario Del Pac Sab	México	9	8	13	11
Embotelladora Andina S A A Shares	Chile	10	10	8	12
Companhia De Saneamento Basico	Brazil	11	9	12	7
Corpbanca	Chile	12	12	11	13
Grupo Aeroportuario Del Centro N	México	13	14	19	15
Alto Palermo S A	Argentina	14	13	1	1
Grupo Simec S A B De C V	México	15	15	14	17
B R F Brasil Foods S A	Brazil	16	16	20	18
Companhia Energetica De Minas Gc	Brazil	17	19	16	16
Sociedad Quimica & Minera Chl Sa	Chile	18	18	22	19
Gruma S A B De C V	México	19	17	18	14
Latam Airlines Group S A	Chile	20	20	21	20
Embraer S A	Brazil	21	21	24	22
Industrias Bachoco S A B De C V	México	22	23	17	23
Grupo Televisa Sa	México	23	22	27	25
Banco Santander Chile New	Chile	24	24	25	26
C P F L Energia S A	Brazil	25	25	23	27
Grupo Financiero Galicia S A	Argentina	26	26	26	21
MSCI EAFE		27	27	35	35

Compania De Minas Bv Sa	Perú	28	28	9	24
Empresas Ica S A De C V	México	29	29	29	29
Cemex S A B De C V	México	30	31	30	28
Bbva Banco Frances Sa	Argentina	31	30	31	30
Tenaris S A	Argentina	32	32	34	33
Empresa Nacional De Elect Chile	Chile	33	33	28	31
Transportadora De Gas Del Sur Sa	Argentina	34	34	32	32
I R S A Inversiones Y Rep S A	Argentina	35	35	33	34
America Movil A B De C V Series A	México	36	36	37	37
America Movil A B De C V Series L	México	37	37	38	38
Vina Concha Y Toro S A	Chile	38	38	36	36
Vale S A	Brazil	39	39	39	42
Telecom Argentina S A	Argentina	40	40	40	40
Ternium S A	Argentina	41	41	41	43
Enersis S A	Chile	42	42	43	39
Banco Macro S A	Argentina	43	43	42	45
Petrobras Energia S A	Argentina	44	44	44	44
Companhia Paranaense De Energia	Brazil	45	45	46	41
Cresud S A C I F Y A	Argentina	46	46	45	46
Banco Santander Brasil S A	Brazil	47	47	47	47
Gafisa S A	Brazil	48	49	49	55
Fibria Celulose S A	Brazil	49	48	48	48
Desarrolladora Homex S A De C V	México	50	51	51	51
Y P F Sociedad Anonima	Argentina	51	50	53	49
Companhia Siderurgica Nacional	Brazil	52	53	50	52
Oi S A	Brazil	53	52	54	50
Empresa Distribuidora Y Comercia	Argentina	54	54	55	56
Petroleo Brasileiro Sa Petrobras	Brazil	55	55	52	53
Maxcom Telecomunicaciones Sab De	México	56	56	56	54
Pampa Energia S A	Argentina	57	57	57	57
Centrais Eletricas Brasilei	Brazil	58	58	58	58

Table 3 reports the average returns that accrue to the ADRs with and without risk-adjustment. The risk-adjustment is performed using the Modigliani methodology. The returns are annualized for the convenience of investors. This is done by compounding the monthly mean returns over twelve periods. In that table, Alto Palermo of Argentina, which ranks second based on unadjusted returns, falls back to rank 14 on the basis of returns adjusted for risk. On the other hand, Coca Cola Femsa of Mexico, which ranks seventh on an unadjusted basis, ranks third when the returns are adjusted for risk. Also, Embotelladora Andina of Chile ranks 11th on the basis of unadjusted returns, but ranks fifth based on returns adjusted for risk. The leverage factor for this ADR is 0.84, which implies that an investor, who is comfortable bearing at most the same level of risk as in the benchmark MSCI EAFE index, could unlever this ADR (lend 16 percent of available funds at the risk-free rate of interest, if possible, and invest the rest in the ADR) and thereby attain an annual return of 26.28 percent which is considerably higher than the annualized return on the benchmark index.

Table 3. Three-Year Annualized Performance: Unadjusted and Adjusted for Risk

ADRs	Country	Unadjusted Annualized Returns	Unadjusted Rank	Adjusted Annualized Returns (%)	Adjusted Rank	Leverage Factor
Admin Fondos Pensiones Provida	Chile	50.45	1	35.63	1	0.74
Ecopetrol S A	Colombia	44.53	4	34.00	2	0.79
Coca Cola Femsa S A B De C V	México	37.04	7	33.81	3	0.92
Companhia De Bebidas Das Amers	Brazil	44.93	3	30.60	4	0.72
Embotelladora Andina S A B Shares	Chile	31.76	11	26.28	5	0.84
Compania Cervecerias Unidas S A	Chile	35.03	8	25.31	6	0.75
Banco De Chile	Chile	33.55	9	24.60	7	0.76
Grupo Aeroportuario Del Sur S A	México	42.19	5	24.31	8	0.61
Grupo Aeroportuario Del Pac Sab	México	33.14	10	23.99	9	0.75
Embotelladora Andina S A A Shares	Chile	30.59	13	23.06	10	0.78
Companhia De Saneamento Basico	Brazil	39.46	6	22.60	11	0.61
Corpbanca	Chile	30.89	12	20.55	12	0.69
Grupo Aeroportuario Del Centro N	México	29.26	15	19.09	13	0.68
Alto Palermo S A	Argentina	48.40	2	18.23	14	0.42
Grupo Simec S A B De C V	México	23.51	17	17.44	15	0.76
B R F Brasil Foods S A	Brazil	23.47	18	15.95	16	0.70
Companhia Energetica De Minas Gc	Brazil	25.18	16	14.82	17	0.61
Sociedad Quimica & Minera Chl Sa	Chile	22.75	19	14.78	18	0.67
Gruma S A B De C V	México	29.42	14	14.14	19	0.51
Latam Airlines Group S A	Chile	20.66	20	12.05	20	0.60
Embraer S A	Brazil	16.26	22	10.53	21	0.66
Industrias Bachoco S A B De C V	México	12.15	28	9.86	22	0.82
Grupo Televisa Sa	México	13.41	24	9.29	23	0.70
Banco Santander Chile New	Chile	12.78	26	8.95	24	0.71
C P F L Energia S A	Brazil	10.14	29	8.50	25	0.84
Grupo Financiero Galicia S A	Argentina	20.43	21	7.30	26	0.37
MSCI EAFE		6.14	33	6.14	27	1.00
Compania De Minas Bv Sa	Perú	9.01	31	5.71	28	0.64
Empresas Ica S A De C V	México	12.20	27	5.58	29	0.47
Cemex S A B De C V	México	13.88	23	5.03	30	0.37
Bbva Banco Frances Sa	Argentina	13.30	25	5.02	31	0.39
Tenaris S A	Argentina	9.10	30	4.71	32	0.52
Empresa Nacional De Elect Chile	Chile	4.43	35	4.22	33	0.95
Transportadora De Gas Del Sur Sa	Argentina	6.50	32	3.32	34	0.51
I R S A Inversiones Y Rep S A	Argentina	5.55	34	3.20	35	0.58
America Movil A B De C V Series A	México	3.29	36	2.85	36	0.87
America Movil A B De C V Series L	México	3.24	37	2.82	37	0.87
Vina Concha Y Toro S A	Chile	2.33	38	1.93	38	0.82
Vale S A	Brazil	-0.39	39	-0.19	39	0.57
Telecom Argentina S A	Argentina	-1.44	40	-0.86	40	0.61
Ternium S A	Argentina	-2.36	42	-1.12	41	0.49
Enersis S A	Chile	-1.47	41	-1.21	42	0.83
Banco Macro S A	Argentina	-3.11	43	-1.34	43	0.44
Petrobras Energia S A	Argentina	-4.48	44	-2.14	44	0.48
Companhia Paranaense De Energia	Brazil	-4.53	45	-3.20	45	0.71
Cresud S A C I F Y A	Argentina	-7.29	46	-3.93	46	0.54
Banco Santander Brasil S A	Brazil	-9.04	47	-4.64	47	0.51
Gafisa S A	Brazil	-17.25	50	-5.42	48	0.30
Fibria Celulose S A	Brazil	-12.52	48	-6.05	49	0.47

Desarrolladora Homex S A De C V	México	-17.58	52	-7.08	50	0.38
Y P F Sociedad Anonima	Argentina	-16.93	49	-7.64	51	0.43
Companhia Siderurgica Nacional	Brazil	-17.52	51	-8.60	52	0.47
Oi S A	Brazil	-17.93	53	-9.16	53	0.49
Empresa Distribuidora Y Comercia	Argentina	-26.00	56	-9.85	54	0.35
Petroleo Brasileiro Sa Petrobras	Brazil	-18.33	54	-10.46	55	0.55
Maxcom Telecomunicaciones Sab	México	-22.69	55	-10.69	56	0.44
Pampa Energia S A	Argentina	-28.13	57	-16.12	57	0.54
Centrais Eletricas Brasilei	Brazil	-37.33	58	-21.96	58	0.54

To explore this possibility fully, consider an investor who would like to bear only an average level of risk and still earn returns superior to the benchmark index. In this context, the average level of risk is measured by the standard deviation of the benchmark MSCI EAFE index, which is 5.82 percent on a monthly basis. Now consider the following investment strategy: Suppose that the investor has \$1,000 to invest. The investor could lend \$160 and invest \$840 in the Embotelladora Andina ADR. The end of month return from the ADR portion of the portfolio will be  $\$840 \times 0.0233 = \$19.57$ . Suppose that the loaned funds were deposited at the monthly risk-free rate of 0.01 percent. In that case, the loaned funds will earn interest of  $\$160 \times 0.0001 = \$0.02$ . The portfolio return is  $\$19.57 + \$0.02 = \$19.59$ , which is a return of 1.96 percent on a monthly basis or 26.23 percent annualized. This return is considerably higher than the annualized return on the EAFE index (6.14 per cent). Note that the monthly risk of the portfolio is  $0.84 \times 6.90 = 5.80$  percent, approximately equal to the 5.82 percent risk of the MSCI index in Table 1. This investment strategy, therefore, enables the investor to earn substantially better returns for an average level of risk. It may be noted that the above example assumes that the returns on the ADR are not correlated with the returns on risk-free US treasury bills.

### ANALYSIS

This study has clear managerial implications. There may be firms located in Latin America whose ability to raise capital is constrained by the limited size of the local stock market. One possible way out of this constraint is to issue shares in the local stock market, present a credible business plan to an international bank and then request the bank to hold the shares in trust and create a sponsored ADR which is subsequently traded in a developed stock market such as the US. By using this technique of financing, the ability of the issuing company to raise capital is not constrained by a relatively small local stock market.

Further, investors who would like to diversify their global portfolios would do well to examine investment opportunities in Latin America. In particular, stock markets in Brazil, Mexico, Argentina, and Chile have a range of investment opportunities and market depth. A convenient way to access these markets would be via ADRs. These ADRs vary widely in terms of their risk and return, as documented in this study. However, the risk-adjusted returns of some of these ADRs can be quite attractive and may be superior to the return on a benchmark international stock index such as the MSCI EAFE. For investors who seek a level of risk no higher than the benchmark index, this study presents a technique of raising the return on a portfolio by holding the ADR in combination with a risk-free security such as a treasury bill.

Finally, for managers of financial institutions, ADRs present an opportunity to diversify operations by providing financial services to a historically underserved region of the world which has a large

untapped potential for economic growth. These managers may want to evaluate business plans from firms based in Latin America with a view to creating ADRs based on their shares. This activity will not only result in providing much needed capital to firms from developing nations but will also provide fee income for financial services provided by international banks. In many cases the reputation of the issuing bank will facilitate the acceptance of these ADRs by the investing public in the US and other developed financial markets.

### **CONCLUSION**

ADRs represent a convenient investment vehicle to access markets in Latin America for international investors who are contemplating purchase of stocks listed in those markets. These securities are useful in two main ways. First, they enable global investors to earn returns on Latin American stocks without the dual inconvenience of having to deal with local stock brokers and currency conversion. Second, they allow firms incorporated in Latin America to tap U.S. capital markets without having to meet the stringent listing requirements of U.S. stock exchanges. There are 197 ADRs from Latin America that are listed on U.S. markets, and investors have a wide range of choice of companies across diverse industry groups. This study examines the nature of these ADRs sorted on the basis of the depository bank, sponsorship status, industry classification, and market listing.

Prior research has reported the performance of individual Latin American stocks in local currencies. However, risk-adjusted returns on ADRs reported in US dollars are more useful to international investors for, both, security selection and portfolio construction. Hence there is need for thorough evaluation of the performance of ADRs, using measures grounded in modern portfolio theory. Further, given that there is extensive documentation on the performance of U.S. based stocks, especially for the S&P 500 index components, this study serves as an important complement to the existing literature on the construction of global portfolios.

In order to facilitate comparison with international stock markets, this study uses the MSCI EAFE Index to evaluate the risk-adjusted performance of Latin American ADRs. Some of these ADRs have unadjusted returns which are high, but once risk is factored in, the adjusted returns do not appear to be very attractive. On the other hand, some ADRs with modest returns may be quite rewarding to international investors, when their returns are adjusted for risk. Global investors may want to examine each of these securities in detail, in order to evaluate them further for possible inclusion in an investment portfolio. Of course, the contribution of a security to portfolio return and portfolio risk matters more to global investors than the return and risk of an individual security.

Finally, it would be beneficial to update this information on a continuing basis in order to provide ongoing documentation to international investors who would like to diversify their holdings to include investments based on Latin American stocks, but are not sure of which ADRs to hold. Future research may want to focus on decoupling the return to these ADRs into its two components: the financial performance of the underlying firm and the fluctuations in the exchange rate.

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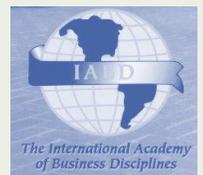
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