SURROGATE INVESTMENT STRATEGY: THE CASE OF SPAIN FOR LATIN AMERICA

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ABSTRACT

This study analyzes a surrogate investment strategy by using a developed market as a possible candidate for investment in developing markets. It examines the markets of Spain and four Latin American countries: Argentina, Brazil, Mexico and Chile. Both short-run and long-run relationships are analyzed in this paper by using vector autoregression (VAR) and cointegration methodology respectively. It is found that Spain is affected by the Latin American countries in question, but does not affect them. Thus, it has exposure to these markets. This relationship is also maintained in the long run. Thus, Spain serves as an excellent surrogate for investment in Latin America.

INTRODUCTION

Financial diversification is an important tenet in portfolio investments. Recently stocks in developing markets have performed handsomely compared to the US markets. However, it is not always possible for investors to find low-cost diversified investments in these developing markets. Also, there are cases where there are restrictions on investing in these markets. Managed accounts, such as pension funds, have specific restrictions on investing in emerging markets. These restrictions may be for the protection of principal or a fiduciary responsibility that the mangers have to the fund's beneficiaries. In some instances, rather than being voluntary, the restrictions may be due to political pressures or legal requirements. Such restrictions could cause significant financial underperformance. For example, in the case of California's public employees' retirement system, fund managers are restricted based on country and market criteria. Two-thirds of such funds have underperformed their peers when the peers did not have such restraints (Chernoff, 2007). In these cases, managers facing such constraints could use a surrogate investment strategy to get exposure and yet provide security to investments. Thus, it would be beneficial to find a surrogate market that has exposure to these markets.

This paper investigates one such relationship between Spain and four Latin American markets. It hypothesizes that Spain with its cultural and economic ties has exposure to these markets and is affected by these markets. Hence, Spain would act as an excellent alternative to investment in Latin American markets. Past studies have investigated international (both interregional and regional) linkages. However, none of them have investigated such linkages from the perspective of the exposure they provide to a particular market and the resulting diversification into a particular region. Such an investigation might provide many benefits to investors.

First, by investing in a surrogate, the cost of investing is reduced because of the fewer number of investments. Second, if a surrogate is chosen from a developed market, there is a possibility for investors to reduce risks. Third, it allows them access to markets that would have not been available due to possible restriction of investments in these markets as explained earlier. In all, it will create a unique strategy for investors seeking international diversification. Such an approach, if widely accepted, can help the financial industry develop and market products that allow for surrogate investment. The benefits and insights of this study can also be extended to other markets and regions in the world.

In the case of Spain and Latin America, Spain has had political and cultural ties with the region for centuries. Colonization of most of Latin America by Spain has resulted in its cultural influence on the region. The main influence is the Spanish language, which is spoken by most Latin American countries

(except Brazil, which speaks Portuguese). According to Chislett (2002), the upper strata of the society in Latin America share a similar lifestyle to that of Spain. Culture and language have been cited as reasons for expanding into Latin America by companies holding Spanish assets (Chislett, 2002).

Spain has also had a political influence on Latin America, as suggested by Toral (2006a). He cites journalistic work regarding political agreements between Spain and Latin American governments that may have led to some of the privatization deals in Latin America. Privatization of state-owned companies is another similarity between Spain and Latin America, with Spain preceding Latin America and thus being able to share its experience with the region (Toral, 2006b). He further mentions that some companies that have Spanish partners or relationships with Spanish banks follow these banks or partners to Latin America. He cites culture as a reason for Spanish investment in Latin America over and above Central and Eastern Europe, Africa, and Asia. The 1990s saw a marked increase in outside investment in Latin America. This was due to the liberalization process in Latin America during that time period. Spanish involvement in the Euro zone allows it to gain leverage while investing in Latin America. On the other hand, many Latin American companies are able to source Euro capital using Spanish capital markets.

Spanish companies, trying to capitalize on the political, cultural, and linguistic edge that they have over other foreign investors in the region, have been heavily investing in the region in the 1990s. Companies such as Santander, Central Hispano, Banco Bilbao Vizcaya Argentaria, Repsol-YPF Telefonica, and Endesa that have invested in the region represent about 70% of the trading on the Madrid stock exchange (Vitzthum, 2003). Hence, any fluctuations that happen in Latin America can be easily captured by these companies and the Spanish stock market. This exposure would provide a basis for Spain being a surrogate for Latin American markets. Looking just at short-term correlations, one may not appreciate the exposure of Spain to these Latin American markets. However, long-run relationships along with short-term effects might help one appreciate this link between these markets. Such an appreciation would help open up a whole new avenue for investments.

Finally, this study indirectly (tangentially) supports and proves the benefits of globalization. Companies, by doing business in various countries, including countries that prohibit portfolio investments, are exposed to the markets of these countries. In turn, investors investing in the home markets of these companies get an indirect investment exposure to restricted markets. Thus, globalization that allows multinational companies (MNCs) to do foreign direct investment (FDI) also provides a diversification benefit to investors, thereby reducing their risks. Results show that the Spanish market is affected by Brazil, Chile and Mexico, indicating exposure to these markets. Also, it has a long-run relationship with these markets. Thus Spain may serve as a good surrogate for investment in Latin American markets.

LITERATURE REVIEW

The idea of diversifying internationally stems from the fact that international markets do not behave in lock step fashion. Thus, it is possible for US investors to reduce risk by investing in foreign markets. Initial work in this area has been provided by Grubel (1968), Levy and Sarnat (1970) and Solnik (1974), among others. Since then many studies have tried to analyze the relationships among various stock markets. Studies such as those by King and Wadhwani (1990), Hamao, Masulis and Ng (1990), Koch and Koch (1991), Chelley-Steeley, Steeley and Pentecost (1998), Richards (1995), and Solnik, Boucrelle and Fur (1996), rather than focusing on a particular region, try to investigate the relationship among countries throughout the world.

There are numerous studies that investigate within region interdependencies around the world. For example Monadjemi and Perry (1996) study the Organisation for Economic Co-operation and Development markets; Wang, Yang and Bessler (2003), Africa; Chelley-Steeley, Steeley and Pentecost

(1998), Europe; Chowdhury (1994), Ng (2002), Dekker, Sen and Young (2001), Ng (2000), Daly (2003) and Treepongkaruna, Gan and AuYong (2003), Asia or Southeast Asia or Pacific Basin; and Bailey, Chan and Chung (2000), Soydemir (2000), Soydemir (2002), Haque, Hassan and Varela (2001), Fernandez-Serrano and Sosvilla-Rivero (2002) and Edwards and Susmel (2003), Ratner, Arbelaez and Leal (1997), Ortiz and Arjona (2001), all study Latin America.

There are studies that explore the relationships between the US and Latin American countries. Fernandez-Serrano and Sosvilla-Rivero (2002) use cointegration to find evidence in favor of a long-run relationship between Brazil, Mexico, and the Dow Jones index before the 1998 turmoil and between Argentinean, Chilean, and Venezuelan indices and the Dow Jones index after 1998. They further suggest that the investor has limited gains from long-term international diversification.

Soydemir (2000) using VAR methodology finds significant links between the US and Mexican stock markets and weaker links between the US, Argentinean, and Brazilian stock markets. This research also demonstrates that these links are consistent with the trade links between the countries and, hence, are more related to economic fundamentals than to irrational contagion effects.

In summary, previous studies have tried to analyze relationships among Latin American markets or their relationship with the US market. This study differs from earlier studies in that it explores the possibility of surrogate investing. Specifically, it examines whether a particular market is exposed to the Latin American country markets based on its cultural and economic ties. By this virtue, an investor in such a market would be exposed to Latin American markets. This would decrease the number of country investments and thus reduce costs. Further, it might open up an alternative strategy to investors trying to expose their portfolios to these markets.

The remainder of this paper is organized as follows: The next section describes the data and methodology. The following two sections deliberate on the empirical results and conclusions.

DATA AND METHODOLOGY

Data for this study includes daily observations of indices compiled by the Morgan Stanley Capital Index (MSCI) for Argentina, Brazil, Chile, Mexico, and Spain from March 15, 1999 to March 14, 2004, totaling 1305 observations. These four Latin American countries have the largest market capitalization at the beginning of the time period of this study and the largest GNP (Chen, Firth, and Rui, 2002). Also, these countries were ranked in the top 30 countries for trade and expansion in 2000 (Sowinski, 2000). The MSCI computes data for developed and emerging markets by including 85% of the free float adjusted market capitalization in each industry group within each country (MSCI online). Although not completely investing in all the shares within a country, the MSCI country index is the best approximation to the market index of a particular country. Daily log returns are obtained by taking logarithms of the indices and then taking first difference of these log prices. Such returns are then used to determine the short-term relationship amongst the indices.

Vector auto regression (VAR) is used to analyze the short-term effects of an individual Latin American country's market on the Spanish market and vice versa. The optimal number of lags is obtained using the Box Ljung statistic and the errors are reduced to white noise. In the case of bidirectional relationships to analyze the effect of the Spanish market on a Latin American market, the Latin American index is treated as a dependent variable, the Spanish index as an independent variable, and all the lags of Spanish index are equated to zero. Rejection of this null hypothesis would imply Spain's effect on that particular Latin American market. The reverse relationship is analyzed with Spain being the dependent variable and the Latin American index the independent variable. The effect of the Latin American market on Spain is

analyzed by equating all the lags of the Latin American index to zero. The rejection of this null hypothesis would imply that the Latin American market affects Spain. The equation is as follows:

$$Y_t = \sum_{i=1}^{i=r} Y_{t-i} + \sum_{i=1}^{i=r} X_{t-i} \quad (1)$$

Where,

Y_t = log returns of dependent variables (Spanish/Latin American index)

X_{t-i} = log returns of independent variables (Latin American/Spanish index)

i = number of lags

The regional effect on any one Latin American market is analyzed by having one Latin American index as the dependent variable and the other Latin American indices, and the Spanish index, as the independent variables. A specific country's effect on a Latin American market is analyzed by having the lags of that index equated to zero. If this null hypothesis is rejected, the Latin American market is affected by the country in question. To analyze the effect of all the countries, including Spain, taken together as a group is analyzed by equating the sum of all the lags of the indices to zero. If the null hypothesis is rejected, all the markets in question affect the Latin American market. Similar relationships are also analyzed with the Spanish index being the dependent variable and only the Latin American indices being the independent variables. The equation is as follows:

$$Y_t = \sum_{i=1}^{i=r} Y_{t-i} + \sum_{n=1,i=1}^{n=k,i=r} X_{n,t-i} \quad (2)$$

Where,

Y_t = log returns of dependent variables

$X_{n,t-i}$ = log returns of independent variables

i = number of lags

n = number of countries

Further analysis of these relationships involves testing whether such short-term relationships are maintained in the long run. The existence of such long-run relationships is investigated using Johansen (1991) cointegration tests. Investigation of long-run relationships using Johansen's cointegration methodology involves the determination of presence of unit roots (non-stationarity) of variables. The null hypothesis of Dickey Fuller (1981) and Phillips Perrone (1988) tests, which are used to determine non-stationarity, is the presence of unit roots. Rejection of the null hypothesis indicates stationarity of variables. The lag length in Johansen's test is chosen such that errors are reduced to white noise based on the Box Ljung Q statistic for serial correlation in the residuals. The null hypothesis in Johansen's test is that there are at most r cointegrating vectors. When either the λ-max or trace statistic

$$\text{Trace statistic} = -T \sum_{i=r+1}^{p} \ln(1-\lambda_i) \quad (3)$$

and maximum Eigen value test:

$$\lambda_{\max} = -T \ln(1 - \lambda_{r+1}) \quad (4)$$

is significant, the null hypothesis is rejected in favor of r + 1 cointegrating vectors.

There can be a minimum of zero and a maximum of n (number of variables) cointegrating vectors. Thus in the case of each Latin American country's relationship with Spain (bivariate tests) there can be at most two vectors. In addition, in the case of all Latin American countries and Spain there can be a maximum of five vectors. This is a sequential test starting with the null hypothesis of zero cointegrating vectors. Rejection would indicate one cointegrating vector. This testing is continued with the null hypothesis of an increasingly higher number of cointegrating vectors until the null hypothesis cannot be rejected and thus until no additional cointegrating vectors are found.

RESULTS

Short-Term Relationships

Short-term relationships are investigated using VAR beginning with the bidirectional relationships between the Spanish index and each Latin American country index. First, the effect of the Spanish index on a Latin American country index is investigated by equating the lags of the Spanish index to zero. If this hypothesis is rejected, the Spanish market affects that Latin American market. The reverse effect is investigated by equating the lags of the Latin American index to zero. If this null hypothesis is rejected, the Spanish market is affected by the Latin American market.

The results, as indicated in Table 1, show that Spain affects only Brazil at a 10% level of significance. On the other hand, Spain is affected by all the Latin American countries at a 1% level of significance. Thus, it is evident that the Spanish market incorporates the effects of the Latin American markets.

Table 1: Short Term Bidirectional Relationships between Spain and Each Latin American Country[a]

	Dependent Variables				
Independent Variable[b]	Spain	Argentina	Brazil	Chile	Mexico
Spain	--	1.90	2.54*	0.53	1.94
Argentina	3.53***				
Brazil	12.47***				
Chile	15.01***				
Mexico	18.65***				

** 10% level of significance, ** 5% level of significance, *** 1% level of significance. [a]VAR is used to analyze the short-run relationship between the dependent and independent variable. The optimal number of lags is such that the errors are reduced to white noise based on Box Ljung statistic. [b]The null hypothesis that the dependent variable is not affected by the independent variable is tested by equating all the lags of independent variables to zero. Rejection of the null would imply the independent variable affects the dependent variable individually.*

Further evidence for the effect of the Latin American markets on the Spanish market, individually or as a group, is tested using the multivariate framework. First, one Latin American index is treated as a dependent variable while the other Latin American indices and that of Spain are treated as independent variables. The effect of the independent index on the dependent Latin American index is investigated by equating the lags of the independent index to zero. The group effect is investigated by equating the sum of all the independent variables equal to zero.

The results, as indicated in the Table 2, show that Argentina is affected by Brazil at a 10% level of significance. Brazil is affected by Mexico and Spain at 5 and 10% level of significance respectively. Chile

is affected by Brazil at a 1% level of significance. There are no other individual or group effects on the Latin American indices. Spain, on the other, is affected individually by every Latin American index, except Argentina's, at a 1% level of significance. The Latin American indices taken together as a group also affect the Spanish index at a 1% level of significance.

Table 2: Short-Term Relationships for Latin American Countries and Spain[ab]

	F-Values for Dependent Variable				
Independent Variable[c]	Argentina	Brazil	Chile	Mexico	Spain
Argentina		0.29	2.61	0.83	1.19
Brazil	4.25*		5.50***	1.46	5.22***
Chile	3.66	1.46		0.87	4.71***
Mexico	1.78	3.75**	1.66		4.45***
Spain	2.48	2.57*	1.21	1.54	
All except dependent variable	3.07	9.05	2.46	1.31	12.86***

** 10% level of significance, ** 5% level of significance, *** 1% level of significance. aVAR is used to analyze the short-run relationship between the dependent and independent variable. The optimal number of lags is such that the errors are reduced to white noise based on Box Ljung statistic. bThis table investigates the effect that Latin American indices and the Spanish index have on each other individually and as a group. cThe null hypothesis that the dependent variable is not affected by the independent variable is tested by equating all the lags of independent variables to zero. Rejection of the null would imply the independent variable affects the dependent variable individually.*

The above results show that there are few relationships among the Latin American countries. Brazil affects Chile and Argentina, which may be because Brazil is the largest market in the region. As Brazil and Mexico are the two largest markets in the region, they are bound to have an effect on each other. However, since Mexico is also a part of NAFTA, its market may experience other influences rendering the effect of the Brazilian market insignificant. The bidirectional effect between the Spanish and Brazilian markets may be due to the large investment made by Spain in Brazil in the late 1990s (ECLAC, 2000). All the included Latin American markets (except Argentina) affect the Spanish market, implying that all investment by Spanish companies in the region is being reflected in the Spanish market. Thus, Spain serves as an excellent candidate for diversification to an investor who wants exposure to the Latin American markets but is leery of their volatility and hence would like a stable market outside the region.
There is a possibility of the relationships being present in the short-run but disappearing on a long-term basis. In such a case, investors may not get the desired benefit of diversification by being invested in Spain as it is exposed to these markets only in the short run. Hence, it is important to test the validity of the relationships during the long run. Cointegration tests are used for testing long-run relationships.

Long-Term Relationships

Stationarity of variables is investigated using the Dickey Fuller (1981) and Phillips Perrone (1988) tests. Results, as indicated in Table 3, show that the null hypothesis of presence of unit roots cannot be rejected for variables in level, but can be rejected in first differences. Thus, all variables are I(1).

Table 3: Dickey Fuller (DF) and Phillips Perrone (PP) Tests for Unit Roots

	Levels		First Difference	
	DFunit	PPunit	DFunit	PPunit
Argentina	-0.08	-0.03	-36.37***	-36.40***
Brazil	-0.94	-1.08	-31.85***	-31.76***
Chile	-0.53	-0.83	-28.54***	-28.48***
Mexico	-2.47	-2.66	-32.62***	-32.58***
Spain	-1.70	-1.66	-35.63***	-35.66***

***1% level of significance

Long-run relationships among the indices are investigated using Johansen's test. A cointegrating vector is identified when either the trace or λ-max statistic (as described in equations 3 and 4 respectively) is significant. This is a sequential test starting with the null hypothesis of a zero cointegrating vector. The results indicated in Table 4 for all indices analyzed together show that the null hypothesis of zero and one cointegrating vector is rejected at a 10% level of significance. Hence, there are two cointegrating vectors in a system of five indices.

Table 4: Johansen's Cointegration Test Results for Latin American Countries and Spain[abc]

H0 ≤ r	λ-max	Trace
0	39.73*	87.37*
1	31.78*	47.65*
2	10.27	15.87
3	4.02	5.59
4	1.57	1.57

** 10% level of significance [a]Johansen's methodology is used to detect the number of cointegrating vectors. The optimal number of lags are obtained using Box Ljung statistic. Lags are increased until errors are reduced to white noise. [b]A cointegrating vector is recognized when at least one of the two statistics reject the hypothesis of r cointegrating vectors in favor of r+1 cointegrating vectors. [c]This is a sequential test starting with zero cointegrating vectors.*

Table 5: Bivariate Johansen's Cointegration Tests between Each Latin American Country and Spain[abc]

	Argentina			**Brazil**	
H0= r	λ -max	Trace	H0= r	λ –max	Trace
0	10.20	11.33	0	21.24*	23.22*
1	1.13	1.13	1	1.98	1.98
	Chile			**Mexico**	
H0= r	λ -max	Trace	H0= r	λ –max	Trace
0	16.05*	17.31*	0	10.23	14.98*
1	1.26	1.26	1	4.75	4.75

** 10% level of significance. [a]Johansen's methodology is used to detect the number of cointegrating vectors. The optimal number of lags are obtained using Box Ljung statistic. Lags are increased until errors are reduced to white noise. [b]A cointegrating vector is recognized when at least one of the two statistics reject the hypothesis of r cointegrating vectors in favor of r+1 cointegrating vectors. [c]This is a sequential test starting with zero cointegrating vectors.*

These results indicate that Spain retains its exposure to the Latin American markets in the long run and thus are supportive of the short-run results. Such support implies that investors seeking diversification into Latin American markets would be well served using Spain as a surrogate.

CONCLUSION

Investors seek international diversification by investing in foreign assets. The recent performance of emerging markets make their addition to a portfolio desirable. However, high volatility in these markets may cause investors to shy away. An alternative would be for a single market to provide diversification into a region. This paper analyzes whether a single market can be used to obtain such exposure to. For this to happen, the market in question should be affected by the regional markets. Investors would be well served if such an exposure is not just short term, but also long term in nature.

This surrogate investment hypothesis is investigated using the case of Spain and the four Latin American markets of Argentina, Brazil, Chile, and Mexico. Spain made direct investments in these markets when they started liberalizing in the 1990s. Because Spain shares cultural and economic ties with the region, it would serve as an excellent surrogate candidate. Results from this study indicate that the Spanish market is affected by the individual Latin American markets studied (except Argentina's). Thus, an investor seeking diversification into Latin America could do so by investing in Spain. However, an investment may have just short-term exposure. Maintenance of long-run exposure is important, though, and is

explored using Johansen's cointegration methodology. Results indicate that short-run relationships are also maintained in the long run.

This indicates that the Spanish market is exposed to and is affected by the Latin American markets. Thus investors seeking exposure to these markets, but concerned about them being from developing countries, can do so by investing in the Spanish market. Such a surrogate investment strategy can also be used in other markets of the world. This is a huge benefit especially to institutional investors who may be restricted from investing in developing country markets. It also provides investors with an option for investing in one market (hence reducing costs) and yet being exposed to multiple markets.

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