Journal of the Academy of Finance: Summer & Fall 2009

Exchange Traded Funds: Impact on Diversification

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Abstract

The diversification potential of iShares is investigated by using sixteen iShares representing two different regions. VAR is used to detect both bidirectional relations between iShares and indexes and regional relations within iShares and indexes. Though iShares do capture information from their home markets, they also have an impact on their home market. Thus, it may be difficult for US investors to avoid systemic impact from the US market. Also, there are regional influences on individual European indexes and iShares and on Asian indexes leading to limitations for diversification. However, Asian iShares do not demonstrate any regional relationships and hence would lend themselves for diversification purposes.

Introduction

This study analyzes the diversification potential of exchange traded funds (ETFs) representing international markets. Relationships among assets are detrimental for diversification. If there are relationships in underlying markets, such relationships may get propagated in assets trading in the US. Furthermore, if assets trading in the US affect their underlying markets, investors may not realize the desired diversification. Hence, it is not only important to investigate just whether ETFs in the US mimic their underlying country markets; it is equally important to detect if ETFs impact their respective country markets and whether (present or absent) regional relationships among markets are demonstrated in the ETFs. This study contributes this important extension to the literature by using iShares trading in the U.S.

Morgan Stanley originally launched exchange traded funds, called World Equity Benchmark Shares (WEBS), that track the Morgan Stanley capital indexes representing world markets. WEBS were later renamed as iShares. iShares are distributed by SEI Investments distribution company and Barclays Global Fund Advisors serves as the investment advisor to the funds. MSCI country indices include every listed security in that country adjusted for free float (MSCI Barra Online).

Past studies have analyzed the effect the US market and home markets on iShares. This line of literature has argued that, as iShares representing a country's index trade in the US, both the US market and the home market will have an impact on the iShare. (Zhong and Yang 2005), (Cheng, Fung, and Tse 2008), and (Pennathur, Delcoure and Anderson 2002) all find that iShares are affected by the US market. They imply that such an effect is detrimental for US investors seeking diversification through the conduit of iShares. (Zhong and Yang 2005) also argue that diversification benefits are questionable as they find that the US market is the permanent driving factor rather than the home country market. (Tse and Martinez 2007) use the price discovery and informational efficiency approaches to argue against any diversification benefits of iShares. Studies have also investigated effects iShares have on their underlying indexes. One such study by (Simon and Sternberg 2005) demonstrates the forecasting power of German, UK, and French iShares on NAVs. (Lin and Chiang 2005) show that establishment of the Taiwan Top 50 Tracker Fund, a Taiwanese ETF, increases the volatility of component stocks of the Taiwan 50 Index.

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Thus, both the above studies find an impact of ETFs trading in the US on the underlying index or its components.

A different set of literature incorporates relationships among iShares. They have mostly used developed markets. For example: Datar, So, and Tse (2008) find commonality and spillover among US and Japanese ETFs trading in the US. In their study, (Barari, Lucey and Voronkova 2008) find lower long-term and short-term relationships among indexes and thus higher diversification potential. On the other hand, they show evidence that iShares representing G7 markets show increasing conditional correlations and significant time-varying long-run relationships with the US. They argue such evidence would limit the case for diversification via iShares.

The above studies use a limited number of iShares to study effects on country indexes. This study incorporates many more iShares from two different regions. In addition to looking at the impact of indexes on ETFs, this study investigates the impact ETFs have on their underlying indexes. Thus, it expands the literature by looking at bidirectional relationships between iShares and indexes. This provides an insight for investors intending to diversify away from their home markets. As iShares trade in investors' home markets, an impact of iShares on respective underlying markets may not be desirable.

The study further investigates regional relationships among indexes in Asia and Europe, and it identifies if such relationships are demonstrated in iShares. To the extent that regional relationships are absent in iShares, it is beneficial for investors to hold multiple iShares from the same region.

This study finds bidirectional relationships among iShares and their underlying indexes. It also finds regional relationships among European indexes being evident in iShares. However, even when Asian indexes show regional relationships, there are no such relationships between Asian iShares. Thus, investors seeking exposure to the foreign markets may not be able to avoid systemic impact from their home market. However, this does not preclude them from seeking diversification using multiple Asian iShares.

Data

Data for this study includes sixteen iShares and their respective indexes representing Austria, Belgium, France, Germany, Hong Kong, Italy, Japan, Korea, Malaysia, the Netherlands, Singapore, Spain, Sweden, Switzerland, Taiwan, and the UK. This allows investigation of two regions: Asia and Europe. For this study, the data included closing prices of iShares spanning March 8, 2004 through February 29, 2008. iShare price information has been obtained from Yahoo! Finance. The index information represents Morgan Stanley Capital Index (MSCI) indexes for the countries under investigation as obtained from MSCI Barra.

Methodology and Results

This study investigates bidirectional relationships amongst the ETFs and their respective indices. Vector Auto Regression (VAR), as indicated in the model below, is used to investigate such relationships.

$$Y_t = \sum_{i=1}^{i=r} a_i Y_{t-i} + \sum_{i=1}^{i=r} b_i X_{t-i} + e_t \qquad (1)$$

Where,
Y_t = Log returns of dependent variable (index/iShares)
X_t = Log returns of independent variable (iShares/index)
i = number of lags.

Box- Ljung Q-statistic for serial correlation in the residuals is used to indentify optimal number of lags.

To investigate the effect of an index on a country's iShare trading is the US, the coefficient of all the lags of the index (independent variable) are equated to zero, while treating the iShare as a dependent variable. Rejection of this hypothesis indicates an effect of the index on the iShare. The above procedure is repeated individually for all the countries (included in this study) in Europe and Asia that have iShares trading in the US. The reverse relationship from iShare to index is investigated by switching the dependent and independent variables to index and iShare respectively.

Panels A and B of Table I display results for the impact of the indexes on the iShares for Europe and Asia respectively. As is evident from the results for each of the European iShares, there is an impact from their respective indices. For Europe, the null hypothesis of no impact from index to iShare is rejected for all countries at 1% level of significance and for Japan and Korea at 5% level of significance. However, the hypothesis cannot be rejected for Singapore and Taiwan. Thus, Asian indices affect their iShares in the case of Hong Kong, Malaysia, Japan, and Korea but not in the case of Singapore and Taiwan.

Panels A and B in Table II indicate the effect of the iShares on the indexes. In the case of Europe, the null hypothesis of no effect from an iShare to an index is rejected at 1% level of significance for all countries. Similar results are also found for all Asian countries. Thus, for both regions, individual iShares trading here in the US affect their respective country indices.
Regional relationships amongst iShares are investigated using the following VAR model

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

Where,
Y_t = log returns of dependent variables (iShares/index)
$X_{n, t-i}$ = log returns of independent variables (iShares/index)
i= number of lags
n= number of countries within a region

The effect of regional iShares as a group affecting a single iShare within a region is identified by equating the coefficients of all lags of all independent variables (iShares) to zero. The rejection of this null hypothesis indicates that regional iShares as a group affect that (dependent) country's iShare. This test is repeated by alternatively treating each country's iShare as a dependent variable for both regions (Asia and Europe). Similar tests are performed for all indexes.

Tables III and IV display the results of the above tests for iShares and indexes, respectively. It is evident from the results in Panel A of Table III that in the European case, the null hypothesis of regional iShares as a group affecting a single iShare in that region cannot be rejected where Austria, Belgium, Germany, the Netherlands, and Switzerland are the dependent variables. However, such hypothesis can be rejected at 5% level of significance in the case of the UK, France, Sweden, and Spain and at 10% level of significance in the case of Germany and Italy.

Thus, the group of European iShares affects the iShares of France, Germany, Italy, Spain, Sweden and the UK but not those of Austria, Belgium, the Netherlands, and Switzerland.

Table IV, Panel A indicates that the null hypothesis of regional European indexes as a group not affecting individual country indexes of Europe is rejected at 1% level of significance in the case of Austria, Belgium France, Germany, Italy, the Netherlands, Spain, and Sweden, but not in the case of Switzerland and the UK. Thus, regional European indices as a group affect individual country indexes in all cases, except in the case of Switzerland and the UK.

Table III, Panel B shows that for Asia, the null hypothesis of Asian iShares having no group effect on individual country iShares cannot be rejected at 1% level of significance. Thus, Asian iShares as a group do not affect individual country iShares in the region.

According to Table IV, Panel B, for Asian indexes, the null hypothesis of them as a group not affecting individual regional indexes is rejected for all countries at 1% level of significance. Thus, the group of Asian indexes affects individual country indexes.

Discussion of Results

Results show that all European iShares are affected by their respective indexes. This is beneficial to investors seeking exposure to these foreign markets of Europe. Such exposure to foreign indexes can also be obtained in the case of Japan, Hong Kong, Malaysia, and Korea by investing in their respective iShares in the US. However, investors do not get exposure to the Singaporean and Taiwanese markets by investing in their iShares here in the US.

Investing in foreign markets is desirable for diversification benefits. To the extent that iShares trading in the US affect their respective country indexes, US market factors affect them. Hence, diversifying away from the US market is limited. It is evident from the results that iShare prices do affect their respective indexes in both regions. Hence, the extent of the diversification benefit obtainable to investors is unclear.

Regional indexes in both Europe and Asia affect individual indexes within the respective region (in all the case of Asia and all except Switzerland and the UK in Europe). Hence, indexes within the same region do not offer themselves for diversification. However, the iShares have interesting relationships for the two regions. In the case of Spain, France, Germany, the UK, Italy, and Sweden their iShares are affected by regional iShares in Europe. Hence, holding more than one of these iShares may not provide appropriate diversification for investors. On the other hand, investors may still get diversification by holding one of the aforementioned European iShares and the iShares of Austria, Belgium, the Netherlands, and Switzerland.

Like Europe, in the case of Asia, regional indexes as a group affect individual indexes. Hence, exposure to all indexes in Asia at the same time may not be in the best interest for investors. However, in contrast to Europe where there are some regional affects, for Asia there are no regional effects on any one iShare. This creates diversification opportunities for investors who want to hold multiple Asian iShares.

These results are interesting because iShares trading in the US do affect their respective indexes. But, that does not reduce the potential for diversification to investors. Nevertheless, they have to be aware of the region that they are investing in, as Asia offers all of its iShares for

diversification, but in Europe only select iShares can be used.

Conclusion

This study demonstrates that if investors are cognizant about the region, they can obtain diversification benefits by investing in iShares. It focuses on the bidirectional impact that iShares and respective indexes have on each other. Additionally it compares the regional impact for the two regions. It compares this potential in two regions (Asia and Europe) whose iShares trade here in the US.

Results show that iShares in both Europe and Asia (except Singapore and Taiwan) are exposed to their respective indexes. This exposure is beneficial to investors seeking diversification from the U.S. market. In comparison, iShares in both regions do affect their respective indexes. This implies an impact of U.S. systemic risk on foreign markets. Hence, the notion of reducing the impact of US market risk by investing in foreign markets is severely hampered. On the other hand, a closer look at regional iShares builds a case for holding multiple iShares within a region. Even if there are regional influences in the indexes, no such influences are carried over in the case of any Asian iShare. Similarly, in the case of European iShares (Austria, Belgium, the Netherlands, and Switzerland), there are no regional effects. Thus, investors can hold multiple iShares in Asia and select European countries and enjoy the benefits of diversification. It shows that iShares can still be used as vehicles for diversification.

Table I: Effect of Individual Country Indexes on Corresponding Country iShares

PANEL A: EUROPE

	Dependent Variable (iShare)									
Independent variable index	Austria	Belgium	France	Germany	Italy	Netherlands	Spain	Sweden	Switzerland	UK
Austria	12.49***									
Belgium		17.48***								
France			13.27***							
Germany				18.49***						
Italy					21.82***					
Netherlands						18.6***				
Spain							20.24***			
Sweden								4.43**		
Switzerland									1671***	
UK										6.29***

PANEL B: ASIA

	Hong Kong	Japan	Korea	Malaysia	Singapore	Taiwan
Hong Kong	4.35***					
Japan		3.95**				
Korea			3.56**			
Malaysia				13.76***		
Singapore					1.62	
Taiwan						1.8

$$Y_t = \sum_{i=1}^{i=r} a_i Y_{t-i} + \sum_{i=1}^{i=r} b_i X_{t-i} + \varepsilon_t$$

Where,
Y_t = Log returns of dependent variable (index)
X_t = Log returns of independent variable (iShares)
i = number of lags.

*** 1% level of significance
** 5% level of significance

Table II: Effect of Individual iShares on Corresponding Country Indexes

PANEL A: EUROPE

	Dependent Variable (index)									
Independent Variable (iShare)	Austria	Belgium	France	Germany	Italy	Netherlands	Spain	Sweden	Switzerland	UK
Austria	51.57***									
Belgium		50.3***								
France			47.13***							
Germany				47.44***						
Italy					35.48***					
Netherlands						48.00***				
Spain							36.46***			
Sweden								51.28***		
Switzerland									33.96***	
UK										48.47***

PANEL B: ASIA

	Hong Kong	Japan	Korea	Malaysia	Singapore	Taiwan
Hong Kong	76.75***					
Japan		89.98***				
Korea			89***			
Malaysia				104***		
Singapore					84.38***	
Taiwan						70.47***

$$Y_t = \sum_{i=1}^{i=r} a_i Y_{t-i} + \sum_{i=1}^{i=r} b_i X_{t-i} + e_t$$

Where,
Y_t = Log returns of dependent variable (iShares)
X_t = Log returns of independent variable (index)
i = number of lags.

*** 1% level of significance

Table III: Effect of Regional iShares as a Group on Individual iShares within the Region

PANEL A: EUROPE

	Dependent Variable (Country iShare)									
Independent Variable	Austria	Belgium	France	Germany	Italy	Netherlands	Spain	Sweden	Switzerland	UK
European iShares	0.95	0.97	1.87**	1.15*	1.53*	0.98	1.67**	1.65**	1.23	1.78**

PANEL B: ASIA

	Hong Kong	Japan	Korea	Malaysia	Singapore	Taiwan
Asian iShares	0.19	1.07	1.16	0379	0.22	0.52

$$Y_t = \sum_{i=1}^{i=r} a_i Y_{t-i} + \sum_{n=1,i=1}^{n=k,i=r} b_{n,i} X_{n,t-i} + e_t$$

Where,

Y_t = log returns of dependent variables (iShares)

$X_{n,\,t-i}$ = log returns of independent variables (iShares)

i= number of lags

n= number of countries within a region

** 5% level of significance

* 10% level of significance

Table IV: Effect of Regional Indexes as a Group on Individual Indexes within the Region

PANEL A: EUROPE

Dependent Variable(Country index)

Independent Variable	Austria	Belgium	France	Germany	Italy	Netherlands	Spain	Sweden	Switzerland	UK
European index	1.72***	1.88***	2.16***	1.91***	2.02***	2.24***	2.31***	2.37***	1.66	2.25

PANEL B: ASIA

	Hong Kong	Japan	Korea	Malaysia	Singapore	Taiwan
Asian index	5.32***	5.92***	2.68***	3.25***	1.85***	2.40***

$$Y_t = \sum_{i=1}^{i=r} a_i Y_{t-i} + \sum_{n=1,i=1}^{n=k,i=r} b_{n,i} X_{n,t-i} + \varepsilon_t$$

Where,

*** 1% level of significance

Y_t = log returns of dependent variables (index)

$X_{n,\,t-i}$ = log returns of independent variables (index)

i= number of lags

n= number of countries within a region

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The author would like to thank the College of Business and the Office of Research and Sponsored Programs for providing the financial support for this project and Jeri Weiser for her assistance.