Closed-End Country Funds and International Diversification

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Using data from 1993 to 2002 for eight developed and fifteen emerging markets, we find that return correlations, mean-variance spanning, and Sharpe ratio tests support that closed-end country funds (CECF) can mimic their corresponding foreign indices, and that they are more heavily influenced by their corresponding local markets instead of the U.S. market. This implies that U.S. investors, by investing in CECF, can achieve similar international diversification benefits to those achieved by investing directly in the foreign indices. We also document increased correlation between the U.S. market and foreign markets during this period and find no compelling evidence of economically and statistically significant international diversification benefits, as opposed to a pre 1993 period. These findings could be associated with the financial market liberalization that was prevalent during the period (JEL: G15).

Keywords: closed-end country funds, international diversification, emerging markets, liberalization, spanning tests.

I. Introduction

This paper examines the ability of closed-end country funds (CECF) to mimic their corresponding country indices and evaluates the

* We would like to thank Lenos Trigeorgis, Nikos Vafeas, Irene Karamanou and seminar participants at the University of Cyprus for useful comments. We also acknowledge financial support from the University of Cyprus and from the Institute of Certified Public Accountants of Cyprus (PriceWaterhouseCoopers, Deloitte and Touch, Ernst and Young, KPMG, Chrysanthou and Christoforou, Moore Stevens, Demetriades, Siakos, Pifanis, Gregoriou & Co).

(*Multinational Finance Journal*, 2006, vol. 10, no. 3/4, pp. 251–276)

DOI: 10.17578/10-3/4-4

international diversification benefits available to a U.S. investor. This is done for the period 1993 – 2002 when financial markets were liberalized. For example, the net purchases of foreign stocks by U.S. investors were about $63 billion in 1993, $59 billion in 1996 and $95 billion in 1999. These figures stand in marked contrast to U.S. investor purchases in the eighties, which were below $3 billion during the entire period 1980 – 1989.[1] While the majority of these equity flows was invested in Europe and Japan, a significant amount was invested in Latin American and Asian emerging markets. Bekaert and Harvey (2000) report that U.S. foreign ownership, as a percentage of market capitalization at the end of 1995, was around 22% in Argentina, 19% in Mexico and 12% in Philippines.

Various studies, such as Bailey and Lim (1992), Chang, Eun, and Kolodny (1995), Bekaert and Urias (1996) examine whether the benefits from international diversification can be achieved through the CECF. This is because a U.S. investor may find it difficult to invest directly in foreign market indices due to the high transaction costs, low liquidity and investment constraints, which are more observed in emerging markets. A closed-end country fund (CECF) is an investment company that is traded on a U.S. stock exchange but invests in the securities of a particular foreign country or a particular region. Generally, fund share prices (determined in the U.S. market) deviate from their portfolio value (determined in the local market and it is known as net asset value or NAV). As a result, the returns from holding the fund shares may differ from those of the portfolio in which the fund invests. However, CECF are actually attainable to U.S. investors and represent claims on foreign assets.

Bailey and Lim (1992) provide evidence that CECF are poor substitutes for direct holdings of foreign securities, especially emerging market funds. Chang, Eun, and Kolodny (1995) find that CECF exhibit significant exposure to the U.S. market factor and act more like U.S. securities than do their underlying assets. Furthermore, fund price and NAV are found to be cointegrated for the majority of CECF from North America and Europe, but not for those representing the Asian emerging markets. Bekaert and Urias (1996) show that the emerging market foreign indices offer superior diversification benefits compared with the U.S. emerging market funds. Errunza, Hogan, and Hung (1999) examine

1. Source: U.S. Treasury, Treasury Bulletin. The 1999 figure includes foreign stocks acquired through mergers that involved stock swaps.

whether portfolios of domestically traded securities, not only CECF but also American Depositary Receipts (ADR), multinational corporation (MNC) stocks and U.S. industry portfolios, can mimic foreign indices. They show that for most countries this is the case. They find, however, that CECF alone are not enough to mimic their foreign indices.

A common characteristic of the aforementioned studies is that the time period considered ends in 1993 or earlier. A major difference with this paper is that it addresses similar questions in the most recent period starting in 1993 and ending in 2002. There is evidence in the literature implying that the ability of CECF to mimic their corresponding country indices might have improved in the nineties. For example, Bonser - Neal et al. (1990) show that the relaxation of investment restrictions in foreign financial markets causes the fund price to converge to its NAV. Patro (2002) shows that listing of new country funds also causes the fund prices of old funds to converge to their NAVS. Lee and Hong (2002) find evidence that CECF for the period 1991 – 1999 are more heavily influenced by their corresponding local market returns than by U.S. market returns. Furthermore, they show that the correlations of fund price returns with the NAV returns have increased over time. In light of this evidence, we address the question whether CECF alone can mimic their foreign indices. In other words, can a U.S. investor fully obtain international diversification benefits through the CECF alone?

The increased liberalization that is prevalent in this period also begs the question whether international diversification, especially from emerging markets, still provides a U.S. investor with significant gains. DeSantis (1994), Divecha, Drach, and Stefek (1992) and Harvey (1995a and 1995b) document that emerging markets provide U.S. investors with substantial diversification benefits, due to their low return correlations with the U.S. market. However, more recently, Kan and Zhou (2001) find no compelling evidence that a U.S. investor can benefit by diversifying in seven developed markets for the period 1970 – 1999, possibly due to the increased integration among the global equity markets.

Examining data for eight developed and fifteen emerging markets, we find that return correlations, mean-variance spanning, and Sharpe ratio tests support the hypothesis that closed-end country funds (CECF) can mimic their corresponding foreign indices, and are more heavily influenced by their corresponding local markets instead of the U.S. market. This implies that U.S. investors, by investing in CECF, can achieve similar international diversification benefits to those that can be

achieved by investing directly in the foreign indices. We also document increased correlations between the U.S. market and foreign markets during 1993 – 2002 and find no compelling evidence of economically and statistically significant international diversification benefits, as opposed to a pre 1993 period.

The paper is organized as follows. Section II describes the sample and provides descriptive statistics. Section III examines the ability of CECF to provide similar diversification benefits to a U.S. investor as the foreign indices and if there exist substantial international diversification gains. Section IV examines the relative importance of the domestic and U.S. factor in explaining country fund price returns. Finally, in section V we provide some concluding remarks.

II. Data Description

The study examines eight CECF investing in developed markets and fifteen CECF investing in emerging markets. For each fund, we collected time series data for fund share prices. For some countries there exist multiple funds. In these cases we selected the fund with the longest history.[2] We used Morgan Stanley Capital International market indices (MSCI) and International Finance Corporation indices (IFC) to proxy foreign markets, and their prices were obtained in US dollars.[3] The New York Stock Exchange Composite Index (NYSE) was used to proxy the U.S. market portfolio, Datastream was used to obtain the observations on funds and foreign indices. As a risk-free rate, the average of the three-month T-bill rates was used and collected by the Federal Reserve Board.

Table 1, reports monthly descriptive statistics for the returns of the foreign indices for the period 1993 – 2002. Emerging market returns are characterized by high volatility (12.30% on average) compared to the volatility of developed markets returns (6.47% on average). Moreover, the average minimum and maximum returns of emerging markets are

2. Adding more than one closed-end fund for each country into our analysis would only strengthen our (already strong) results. We would essentially have a more diversified closed-end fund portfolio for these countries, which would make it easier to mimic their corresponding foreign indices.

3. IFC indices were used for emerging markets in the pre 1993 period as the MSCI indices did not go back far enough.

–33.49 and 45.16 percent, respectively, whereas the corresponding values for the developed markets are –16.44 and 21.15 percent. The average mean return of developed markets is slightly higher (0.55%) than that of emerging markets (0.54%). The NYSE index has a higher mean return (0.66%) and a lower standard deviation (3.87%) than the average mean and standard deviation of both developed and emerging markets.

Table 2, reports monthly descriptive statistics for the price returns of CECF. Emerging market CECF have higher average return volatility (12.36 %) than developed markets (7.92%). Their average minimum and maximum returns are –31.72% and 48.56%, respectively, whereas the average minimum and maximum returns of developed market country funds are –21.24% and 26.10%, respectively.

Surprisingly, emerging market fund returns are closer to the returns of their corresponding foreign indices than developed market fund returns are to the returns of their corresponding indices.[4] The difference between the mean market index and fund returns across developed markets is 0.53% and is statistically significant (t-statistic = 6.40). The corresponding difference between the mean returns across emerging markets is 0.31% and is not statistically significant (t-statistic = 1.49). This last finding is consistent with Nishiotis (2004), who shows that both premiums and discounts in emerging market fund prices relative to their net asset values significantly shrink towards zero after market liberalization.

III. Country Funds as Substitutes for Direct Holdings of Foreign Equity

Comparison of correlation coefficients

As a first step to examine the ability of CECF to provide similar diversification benefits as those of foreign indices we compare the correlation between country fund and U.S. market returns to the correlation between their corresponding foreign index and U.S. market

4. If developed countries are more integrated with the U.S. than emerging markets, we would expect country funds from developed markets to be closer to their underlying assets than the funds from emerging markets. The greater disparity for the developed country funds might be related to the closed-end fund puzzle. See Lee, Schleiffer, and Thaler (1991) for a discussion of other potential factors affecting the differential pricing of closed-end funds.

TABLE 1. Descriptive Statistics for Foreign Indices, U.S. Market and Closed-End Country Funds

Developed Markets (dm)	mean(%)	std. dev.(%)	min(%)	max(%)	wilcoxon t–test
Australia	0.476	5.625	–12.249	12.940	0.867
France	0.591	5.843	–17.295	16.339	1.174
Germany	0.501	5.991	–20.351	14.475	1.703*
Japan	–0.065	6.811	–11.627	24.864	0.932
Italy	0.747	7.169	–14.198	21.717	0.747
Singapore	0.297	8.234	–20.203	31.904	0.223
Spain	0.898	6.908	–20.736	26.655	1.289
Switzerland	0.911	5.188	–14.823	20.308	2.352**
Average	0.545	6.471	–16.435	21.150	
Emerging Markets (em)					
Brazil	1.088	12.730	–34.069	45.309	0.720
Chile	0.072	7.236	–26.460	17.668	0.062

(*Continued*)

TABLE 1. (Continued)

Emerging Markets (em)	mean(%)	std. dev.(%)	min(%)	max(%)	wilcoxon t-test
China	–1.218	12.083	–42.205	41.596	1.794*
India	0.170	8.930	–19.386	26.066	0.110
Indonesia	–0.042	15.429	–42.350	58.621	0.586
Israel	0.201	8.639	–23.203	26.663	0.440
Korea	0.860	13.235	–34.409	61.364	–0.001
Malaysia	0.531	12.165	–33.152	49.226	0.287
Mexico	0.597	10.026	–33.385	19.903	1.160
Philippines	–0.481	10.825	–31.185	48.208	1.230
Russia	4.060	21.501	–57.410	84.528	1.924*
South Africa	–0.075	8.052	–28.164	29.149	0.321
Taiwan	0.575	10.556	–20.702	41.357	0.097
Thailand	–0.247	14.427	–33.911	60.880	1.194
Turkey	1.962	18.701	–42.407	66.912	0.846
Average	0.537	12.302	–33.493	45.163	
NYSE composite	0.663	3.867	–11.582	12.447	2.060**

Note: The period spans from January 1993 through November 2002, except for Russia and South Africa for which data begin in December 1995 and May 1994, respectively. The column Wilcoxon t-test denotes the t-statistic of the Wilcoxon signed-ranks test, which tests whether the median of each fund return is different from zero.* Wilcoxon t-statistic is significant at the 0.1 level (2–tailed).** Wilcoxon t-statistic is significant at the 0.1 level (2-tailed).

TABLE 2. Monthly Descriptive Statistics for the Price Returns of Closed–End Country Funds (CECF)

Country Funds (dm)	mean(%)	std. dev.(%)	min(%)	max(%)	wilcoxon t-test
Abdn. Aust.eq.	–0.057	6.331	–14.178	18.939	0.597
France growth	–0.168	6.979	–15.730	22.104	0.253
Germany	–0.332	7.548	–21.053	23.083	0.275
Japan equity	–0.187	9.342	–21.194	33.259	1.111
Italy	0.240	8.862	–37.595	25.686	0.048
Singapore	–0.028	10.374	–21.833	40.333	0.875
Spain	0.230	8.514	–19.974	24.889	0.125
Swiss Helvetica	0.453	5.370	–18.334	20.509	0.908
Average	0.019	7.915	–21.236	26.100	

(*Continued*)

TABLE 2. (Continued)

Country Funds (em)	mean(%)	std. dev.(%)	min(%)	max(%)	wilcoxon t-test
Brazil	0.492	11.385	–36.441	40.506	0.318
Chile	–0.339	8.599	–27.778	24.278	0.696
China	0.568	10.920	–29.435	37.264	0.120
India growth	0.105	10.774	–26.981	33.520	0.109
Indonesia	–0.344	16.637	–30.667	71.903	1.771*
First Israel	–0.135	8.069	–17.813	28.258	0.507
Korea	0.800	11.381	–25.554	45.229	0.010
Malaysia	–0.249	14.616	–36.200	90.931	1.360
Mexico	0.275	10.895	–31.214	25.730	0.056
First Philippine	–0.634	11.606	–26.930	57.453	1.933*
Templeton Russia & east Eur	1.962	18.044	–57.020	43.260	0.569
Southern Africa	0.142	9.011	–35.986	38.400	0.198
Taiwan	0.105	12.226	–27.007	43.396	0.908
Thai	–0.197	16.422	–29.762	89.333	1.707*
Turkish inv	0.857	14.882	–37.028	58.933	0.156
Average	0.227	12.364	–31.721	48.560	

Note: The period spans from January 1993 through November 2002, except for Templeton Russia & East European Fund and Southern Africa Fund for which data begin December 1995 and May 1994, respectively. The column Wilcoxon t-test denotes the t-statistic of the Wilcoxon signed-ranks test, which tests whether the median of each fund return is different from zero.*. Wilcoxon t-statistic is significant at the 0.1 level (2-tailed).

returns. Evidence that the two correlations are similar would suggest that the country fund is a good substitute for direct holdings of the underlying country's equity. This methodology was used in Bailey and Lim (1992).

Table 3, presents our results using both monthly and weekly data. The columns labeled indices and funds report the correlations of the index returns and fund returns with the U.S. market returns, respectively. Most of the correlations appear to be close to each other in both developed and emerging markets. In order to determine whether their differences are statistically significant we provide a test statistic for comparison of two correlation coefficients. The test statistic, based on Fisher *z* transformation, is presented in the third and sixth column of table 3 for the monthly and weekly data, respectively.[5] The *z* statistic is distributed approximately as a standard normal variable under the null hypothesis, when the sample sizes are reasonably large (> = 25). For monthly data, we uniformly fail to reject the null hypothesis that the country fund return correlation with the U.S. market return is equal to the foreign index return correlation with the U.S. market return. The findings are similar when we use weekly data, where we fail to reject the null hypothesis for 17 out of 23 countries.

The results imply that CECF can be a good substitute for their foreign underlying assets and provide similar diversification benefits. These results stand in marked contrast to the results of Bailey and Lim (1992). They use weekly data for an earlier period and conclude that CECF do not offer the diversification benefits of their corresponding indices.[6]

Table 4, using monthly data, reports correlation coefficients between the U.S. market return and a number of developed and emerging market returns for two periods: the 1993 – 2002 period and an earlier period (1983 – 1992).[7] [8] In all cases (except for Singapore and Malaysia) the

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5. For inferences on correlation coefficients and details on the Fisher z transformation see Neter et al. (1996), pp. 640 – 645.

6. The beginning of the data varies across funds with the data ending June 30, 1989.

7. The qualitative findings for weekly data are very similar.

8. Note that we had to drop some emerging markets because of non-availability of index returns for the earlier period. Furthermore, the data for Malaysia, Philippines and Taiwan start on 1/85 and for Turkey on 1/87.

correlations coefficients are higher in the more recent period.[9] [10] The average correlation among developed markets for the pre and post 1993 period is 0.397 and 0.559, respectively. The difference between the two is statistically significant at the 1% level (t-statistic is 4.387). The average correlation among emerging markets pre and post 1993 is 0.178 and 0.369, respectively. The difference is statistically significant at the 1% level (t-statistic is 3.092). This increase in the correlation with the U.S. market for most countries signals a possible reduction in international diversification benefits.

This increase in correlations could be associated with the fact that the emerging markets in the sample underwent major financial liberalizations in the early nineties or late eighties. For example, Brazil opened in May 1991, Korea in January 1992 and India, the last market in the sample to be liberalized, in November 1992 (see Kim and Singal [2000]). Kim and Singal (2000) also report that "…stock market liberalization is often accompanied by other economic reforms, such as relaxation of product market controls, trade liberalizations and privatization." For example, a careful examination of the Emerging Stock Markets Factbook reveals that the market openings of Brazil, India and Mexico were part of a more general plan of fiscal reforms and privatization. While the market liberalizations improved the ability of foreign investors to invest in emerging markets, the economic and other reforms increased their willingness to do so.[11] The figures on net purchases of foreign stocks by U.S. investors reported in the introduction confirm these liberalizations. Net purchases were below $3 billion for the entire 1980 – 1989 period and $63 billion just in 1993. The 1993 – 2002 period we examine in this paper is a period when all markets are open and most countries had already undergone economic and other reforms that made them more attractive and accessible to foreign investors.

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9. For Malaysia the correlation with the U.S. in the post 1993 period drops to less than half of what it was during the pre 1993 period. This drop is consistent with the reintroduction of strong capital controls in September 1998 after the market has been opened since 1984 or earlier (see Kim and Singal [2000]).

10. This result is consistent with Solnik, Bourcelle, and Le Fur (1996) who show that there is a tendency for return correlations to increase over time and Bekaert and Harvey (2000) who argue that correlations and betas with the world market increase after equity market liberalizations.

11. For further discussion of the effects of investment barriers on market integration see Bekaert (1995) and Nishiotis (2004).

TABLE 3. Correlations of Country Funds and Foreign Indices Returns with the U.S. Market Returns: Periods January 1993 – November 2002

Developed Markets	Monthly indices	Monthly funds	*z*-statistic	Weekly indices	Weekly funds	z-statistic
Australia	0.570**	0.494**	0.982	0.417**	0.451**	–0.642
France	0.629**	0.597**	0.590	0.596**	0.516**	2.382
Japan	0.430**	0.462**	–0.301	0.198**	0.347**	–1.849
Germany	0.640**	0.606**	0.660	0.569**	0.524**	1.281
Italy	0.384**	0.384**	0.000	0.443**	0.311**	2.125
Singapore	0.530**	0.531**	–0.013	0.351**	0.422**	–1.166
Spain	0.638**	0.520**	1.885	0.513**	0.397**	2.369
Switzerland	0.648**	0.649**	–0.022	0.477**	0.474**	0.065
Average	0.559	0.530		0.446	0.430	

(*Continued*)

TABLE 3. (Continued)

Emerging markets	Monthly indices	Monthly funds	z-statistic	Weekly indices	Weekly funds	z-statistic
Brazil	0.544**	0.546**	–0.027	0.354**	0.427**	–1.212
Chile	0.458**	0.498**	–0.420	0.402**	0.339**	0.988
China	0.373**	0.470**	–0.850	0.223**	0.402**	–2.450
India	0.076	0.227*	–0.714	0.145**	0.338**	–2.254
Indonesia	0.386**	0.351**	0.261	0.168**	0.244**	–0.818
Israel	0.399**	0.452**	–0.468	0.386**	0.337**	0.749
Korea	0.417**	0.426**	–0.078	0.251**	0.360**	–1.453
Malaysia	0.194*	0.355**	–0.964	0.160**	0.355**	–2.357
Mexico	0.513**	0.477**	0.402	0.462**	0.481**	–0.406
Philippines	0.424**	0.407**	0.145	0.242**	0.327**	–1.077
Russia	0.516**	0.568**	–0.588	0.320**	0.398**	–1.011
South Africa	0.524**	0.455**	0.707	0.402**	0.365**	0.565
Thailand	0.380**	0.382**	–0.015	0.214**	0.341**	–1.590
Taiwan	0.337**	0.407**	–0.529	0.167**	0.318**	–1.757
Turkey	0.350**	0.379**	–0.214	0.179**	0.294**	–1.317
Average	0.393	0.428		0.272	0.355	

Note: The first (fourth) and second (fifth) columns present the monthly (weekly) correlations coefficients of the index returns and fund returns with the U.S. market return, respectively, for the period January 1993 to November 2002. The third (sixth) column presents the z-statistic (based on the Fisher z transformation), which tests whether each pair of monthly (weekly) correlations is statistically different. The z-statistic follows the standard normal distribution under the null.**. Correlation is significant at the 0.01 level (2-tailed).*. Correlation is significant at the 0.05 level (2-tailed).

TABLE 4. The Monthly Correlations of the U.S. Market With the Developed Market Returns

Developed Markets (dm)	1983 – 1992	1993 – 2002
Australia	0.426**	0.570**
France	0.468**	0.629**
Japan	0.227**	0.430**
Germany	0.348**	0.640**
Italy	0.285**	0.384**
Singapore	0.567**	0.530**
Spain	0.360**	0.638**
Switzerland	0.495**	0.648**
Average	0.397	0.559
Emerging Markets (em)	**1983 – 1992**	**1993 – 2002**
Brazil	0.073	0.544**
Chile	0.137	0.458**
India	–0.099	0.076
Korea	0.093	0.417**
Malaysia	0.462**	0.194*
Mexico	0.332**	0.513**
Philippines	0.218*	0.424**
Thailand	0.315**	0.380**
Taiwan	0.157	0.337**
Turkey	0.091	0.350**
Average	0.178	0.369

Note: The monthly correlation coefficients of the U.S. market with the developed market returns and the emerging–market returns are presented for the 1983 – 1992 period and for the 1993 – 2002 period. We had to drop some emerging markets because of non-availability of index returns for the earlier period. Furthermore, the data for Malaysia, Philippines and Taiwan start on 1/85 and for Turkey on 1/87. ** Correlation is significant at the 0.01 level (2-tailed). * Correlation is significant at the 0.05 level (2-tailed).

In summary, this subsection provides two important implications for international diversification. First, it appears that international diversification benefits that can be achieved by investing in country indices can also be achieved by investing in the corresponding CECF. Second, the correlations among international capital markets and the U.S. capital market have increased in recent years implying that the gains from international diversification may have been reduced. In the next two subsections we investigate these claims more formally, by conducting mean-variance spanning tests and estimating efficient frontiers.

Mean -variance spanning tests

In this section we examine whether CECF can mean-variance span their corresponding market indices and thus allow U.S. investors to mimic these indices using only the domestically traded country funds and the U.S. index. Huberman and Kandel (1987) show that for any partition of assets into a set of test assets and benchmark assets, the inclusion of additional test assets into the set of benchmark assets shifts the efficient frontier to the left if, and only if, the test assets are not mean-variance spanned by the benchmark assets.

Errunza, Hogan, and Hung (1999) conduct similar tests for the period 1976 – 1993, but use as benchmark assets in addition to CECF three other domestically traded portfolios. They find that CECF, ADR and MNC stocks in addition to U.S. industry portfolios mean-variance span the foreign indices for most countries and thus allow U.S. investors to achieve home-made diversification benefits. Given our findings for the period 1993 – 2002 that CECF and their corresponding foreign indices have similar return correlations with the U.S. market, we examine whether in this more recent period, U.S. investors could achieve home-made diversification benefits merely by using the CECF.

As in Errunza, Hogan, and Hung (1999), we use the Huberman Kandel (HK) F-test. However, Kan and Zhou (2001) identify a typo in the Huberman and Kandel (1987) original paper, which unfortunately carried over to a number of studies that followed.[12] Furthermore, they show that the HK F-test was incorrectly used by some studies for the single test asset case. In the present study, as in Errunza, Hogan, and Hung (1999), the number of test assets is equal to one. We use the correct HK F-statistic as stated in Kan and Zhou (2001, equation 27). The HK F-test involves estimation of the following equation:

$$R_{i,t} = a_i + \beta_1 R_{US,t} + \beta_2 R_{CECF,t} + \varepsilon_{I,t} \qquad (1)$$

where $R_{I,t}$ is the return on the I-th foreign index, $R_{US,t}$ is the return of the U.S. market and $R_{CECF,t}$ is the price return of the I-th country fund. Huberman and Kandel (1987) show that $R_{I,t}$ is spanned by $R_{US,t}$ and $R_{CECF,t}$ if and only if the following two conditions hold:

12. For more details and reference of the studies affected by this error see Kan and Zhou (2001).

TABLE 5. Tests of Mean–Variance Spanning

Developed Markets	HK F-test	p-value
Australia	0.706	0.496
France	1.712	0.185
Germany	1.344	0.265
Japan	4.270	0.016
Italy	2.120	0.125
Singapore	0.194	0.824
Spain	1.205	0.303
Switzerland	1.496	0.228
Emerging Markets	**HK F-test**	**p-value**
Brazil	1.771	0.175
Chile	2.999	0.054
China	2.800	0.065
India	7.610	0.001
Indonesia	0.450	0.639
Israel	0.118	0.889
Korea	0.565	0.570
Malaysia	2.157	0.120
Mexico	0.392	0.676
Philippines	0.028	0.972
Russia	1.665	0.196
South Africa	0.525	0.593
Thailand	0.090	0.914
Taiwan	1.741	0.180
Turkey	1.011	0.367
eqw. portfolio	3.457	0.035

Note: The HK F-test tests the null hypothesis of spanning. Each foreign index is used as a test asset each time. Each benchmark set includes the NYSE index and the associated closed-end country fund. The last row of the table performs a test having as test asset an equally weighted portfolio of foreign indices and as benchmark assets the NYSE index and an equally weighted portfolio of country funds. Russia and South Africa and their corresponding funds are excluded from this test because their data do not begin at the same dates as those of the other countries in our sample.

$$a_i = 0 \tag{2}$$

$$\sum_{i=1}^{2} \beta_i = 1 \tag{3}$$

They test these restrictions based on OLS estimates of equation (1).

Table 5 reports the correct HK F-tests for the null hypothesis of spanning and the corresponding p-values.

We do not reject spanning for 21 countries (except Japan and India) at the 95 percent level of significance, which implies that CECF can mimic their corresponding foreign markets. For Japan, we do not reject spanning at the 99 percent level of significance. However, the India Growth Fund seems to be a poor substitute for the Indian market. At the end of the table we report the results of a test where the test asset is an equally weighted portfolio of foreign indices and the benchmark assets are the U.S. market portfolio and an equally weighted portfolio of CECF.[13] In this case we do not reject spanning at the 97.5 percent level of significance.

Efficient frontiers and Sharpe ratios

In this section we assess the diversification benefits of a U.S. investor that chooses to invest in a portfolio of CECF in addition to the U.S. market and compare these benefits to those achieved by investing in a portfolio of foreign indices and the U.S. market. We achieve this by plotting the efficient frontiers from the two sets of assets and comparing the Sharpe ratios of the corresponding tangency portfolios.

Figure 1 presents the efficient frontier of indices with the U.S. market and the efficient frontier of funds with the U.S. market.[14] The NYSE Composite Index is also presented alone. The efficient frontier using the indices is above the frontier with the CECF and the difference is higher for high variance portfolios. However, the graphical analysis does not answer the question of whether the frontier significantly shifts to the left. Bekaert and Urias (1996) suggest that economic significance can be assessed by evaluating the change in the Sharpe ratio. To test whether the change in the Sharpe ratio is statistically significant is difficult due to its unknown distribution. Bekaert and Urias (1996), using Monte Carlo techniques, find that changes in the Sharpe ratio of less than 0.057 are not statistically significant at a 95 percent level of

13. Russia and South Africa are excluded because of non-availability of data for the entire period

14. The frontiers are estimated using monthly data from the 1993 – 2002 period. Russia and South Africa are excluded for the same reason as above. The efficient frontiers are constructed using historical returns and under a short sales constraint.

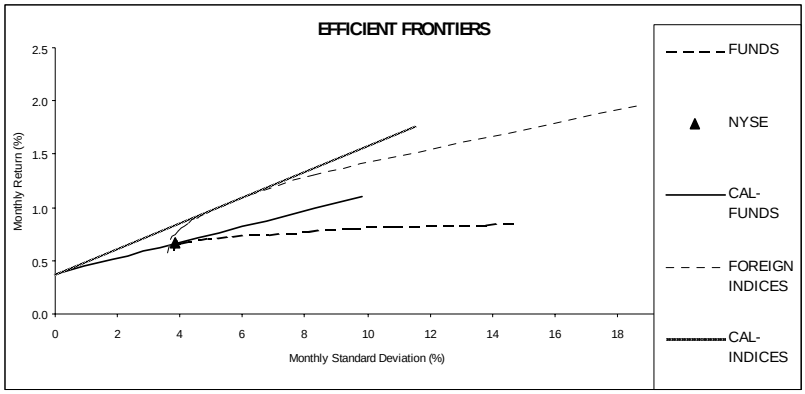

FIGURE 1.—Foreign Markets vs. Closed-End Country Funds.
The efficient frontier of foreign indices with the U.S. market, the efficient frontier of country funds and the U.S. market and the U.S. market alone are presented for the period 1993 to November 2002. Frontiers are constructed using historical monthly returns under a short sale constraint. The Capital allocation line (CAL) for each of the frontiers is also presented using the average of the three-month T-bill rate, as a risk-free rate.

significance.[15] Considering the change in the Sharpe ratio between the two frontiers, we observe that the tangency portfolio of the frontier with the foreign indices and the NYSE index has a Sharpe ratio that is 0.047 higher than that of CECF and the NYSE index. If we were to follow the Bekaert and Urias (1996) critical value of 0.057, it would appear that the difference is not statistically different from zero and CECF provide similar diversification benefits with the foreign markets. This finding is consistent with the spanning test results.

Another noteworthy result is that we find no compelling evidence that a U.S. investor can significantly benefit from international diversification. The NYSE index has a Sharpe ratio equal to the one of the tangency portfolio of the frontier with the CECF and only 0.047 lower than the Sharpe ratio of the tangency portfolio of the frontier with the foreign indices. This result is consistent with the findings of Kan and Zhou (2001), who find no compelling evidence that a U.S. investor can benefit from international diversification using seven developed country indices. However, the findings here are stronger as the sample

15. The Bekaert and Urias (1996) study is based on 152 observations. Our results are based on 118 observations. Thus, applying their simulation results to our sample is an approximation at best. Errunza, Hogan and Hung (1999) also use the Bekaert and Urias (1996) critical values.

also includes a significant number of emerging markets.[16]

In order to evaluate our earlier findings that correlations of international market returns with the U.S. have increased in the period 1993 – 2002 compared to the period 1983 – 1992, we compute the efficient frontier using the NYSE and country indices for the earlier period. Figure 2 plots the frontier and the NYSE portfolio. The difference in the Sharpe ratio of the tangency portfolio with that of the NYSE is 0.237, which according to the critical value of Bekaert and Urias (1996) is highly significant. This difference in the Sharpe ratio indicates statistically and economically significant diversification benefits for the U.S. investors as opposed to the findings in figure 1, where we used data for the more recent period.[17] This is consistent with our earlier finding of increased return correlations in the more recent period relative to the earlier period. Bekaert, Harvey, and Ng (2002) also document an increase in correlation around financial liberalizations, but they argue that it is not enough to reduce the diversification benefits offered, unlike what we find for the post liberalization period 1993 – 2002.

IV. The Relative Importance of the Domestic and U.S. Factors in Explaining Country Fund Returns

As a final test of the ability of CECF to mimic the underlying equity markets, we examine the relative importance of the domestic and U.S. factor in explaining country fund price returns. We follow the methodology of Errunza, Senbet and Hogan (1998). Firstly, we compute the R_2 from the regression of the country fund price return (R_c) on each of the factors in isolation; i.e., the return on the foreign market (R_l) and the U.S. market (R_{us}). Next, we compute first order partial correlation coefficients, i.e.,

16. Gorman and Jorgensen (2002) argue against the theoretically attainable international diversification benefits and show that extreme home bias asset allocations are insignificantly different from optimal allocations.

17. Note that the frontier in figure 2 does not include China, Indonesia, Israel, Malaysia, Philippines, Taiwan and Turkey, which are included in figure 1. For these countries, we do not have data for the entire 1983 – 1992 period.

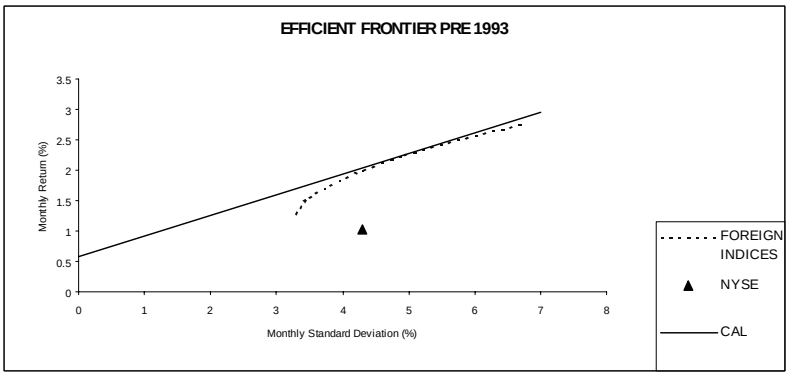

FIGURE 2.— Foreign Markets vs. U.S. Market

The efficient frontier of foreign indices with the U.S. market and the U.S. market alone are presented for the period 1983 to 1992. This frontier does not include China, Indonesia, Israel, Malaysia, Philippines, Taiwan and Turkey, which are included in figure 1. For these countries, we do not have data for the entire 1983 – 1992 period. Frontiers are constructed using historical monthly returns under a short sale constraint. The Capital allocation line (CAL) of the frontier is also presented using the average of the three-month T-bill rate, as a risk-free rate.

$$\rho\left(R_c Ri / Rj\right) = \frac{\rho\left(R_c, R_i\right) - \rho\left(R_c, R_i\right)\rho\left(R_c, R_j\right)}{\sqrt{1-\rho\left(R_c, R_i\right)^2}\sqrt{1-\rho\left(R_c, R_j\right)^2}} \quad \text{for } i \neq j \qquad (4)$$

The square of the partial correlation represents the portion of the country fund price return explained by factor *i* after controlling for factor *j*.

Table 6 presents the results. *A* is for the period 1993 – 2002 and *B* is for the pre 1993 period.[18] The first column in both panels presents the squared correlation coefficient between funds and their corresponding index returns and the third column presents the squared correlation coefficient between fund and U.S. market returns. These correlations explain the portion of the variance of the fund price return explained by the domestic market alone and by the U.S. market alone, respectively. For the 1993 – 2002 period we observe that the domestic factor explains a large portion of the variance of the funds (on average 0.618 for the emerging markets and 0.622 for the developed markets) and much larger than the U.S. factor (on average 0.189 for the emerging markets and

18. For the pre 1993 period data start with the starting date of each fund except for Mexico, which starts on 1/1/1983 and Italy, which starts on 1/1/1987.

0.288 for the developed markets). For the pre 1993 period, the domestic factor is also more important than the U.S. factor but their difference is much smaller than the corresponding difference in the 1993 – 2002 period (on average 0.166 as opposed to 0.334 for developed markets and 0.168 as opposed to 0.429 for emerging markets).

The second (fourth) column in both panels presents the squared first order partial correlation coefficient of the country fund return with the domestic (U.S.) factor net of the effects of the U.S. (domestic) factor. For the 1993 – 2002 period, the correlations between the funds and foreign indices net of the effects of the U.S. factor remain in high levels, showing a small decline (on average 0.551 for the emerging markets and 0.489 for the developed markets). The correlations between the funds and U.S. market net of the effects of the domestic factor show a greater decline with very low absolute levels. They are on average, 0.043 for the emerging markets and 0.036 for the developed markets. The corresponding figures for the pre 1993 period are 0.136 and 0.062, respectively.

The findings for the 1993 – 2002 period reveal that fund returns are more heavily influenced by their corresponding markets and much less by the U.S. market and are consistent with the evidence provided by Lee and Hong (2002), who examine in a VAR framework the dual characteristics of CECF for the period 1991 – 1999. We also find that the importance of the domestic factor net of the effect of the U.S. factor has increased and the importance of the U.S. factor net of the effect of the domestic factor has decreased for both developed and emerging markets in the 1993 – 2002 period relative to the pre 1993 period. Our results are significantly different from the findings of Chiang, Eun and Kolodny (1995) and Bodurtha, Kim and Lee (1995), who provide evidence that country funds exhibit significant exposure to the U.S. market. Bodurtha, Kim and Lee (1995) suggest that the significant U.S. factor in closed-end fund prices may be interpreted as U.S. market sentiment affecting the discounts in closed-end fund prices. Our results however, are consistent with a rational, market segmentation explanation of discounts/premiums, which is proposed by Swaminathan (1996) for U.S. domestic funds and by Nishiotis (2004) for emerging market funds. As markets become more integrated with the U.S., fund share prices align with the prices of their underlying assets.

TABLE 6. The Relative Importance of the Domestic and the U.S. Factor

	Domestic Factor		U.S. Factor	
	$\rho^2(R_c,R_d)$	$\rho^2(R_c,R_d/R_{US})$	$\rho^2(R_c,R_{US})$	$\rho^2(R_c,R_{US}/R_d)$
A. Monthly returns from 1993 to 2002				
Country Funds (dm)				
Abdn. Aust.eq.fd.	0.682	0.580	0.244	0.002
France growth fd.	0.676	0.513	0.356	0.033
Germany fund	0.638	0.452	0.367	0.042
Japan equity fd.	0.570	0.484	0.213	0.054
Italy fund	0.545	0.480	0.147	0.026
Singapore fund	0.537	0.395	0.282	0.061
Spain fund	0.661	0.535	0.270	0.000
Swiss Helvetia fd.	0.669	0.471	0.421	0.073
Average	0.622	0.489	0.288	0.036
Country Funds (em)				
Brazil fund	0.785	0.702	0.298	0.027
Chile fund	0.731	0.661	0.248	0.053
China fund	0.520	0.443	0.221	0.098
First Israel fd.	0.473	0.385	0.204	0.071
First Philippine fd.	0.789	0.748	0.166	0.006
India gr. Fund	0.473	0.371	0.052	0.059
Indonesia fd.	0.438	0.371	0.123	0.019

(*Continued*)

TABLE 6. (Continued)

	Domestic Factor		U.S. Factor	
	$\rho^2(R_c,R_d)$	$\rho^2(R_c,R_d/R_{US})$	$\rho^2(R_c,R_{US})$	$\rho^2(R_c,R_{US}/R_d)$
Korea fund	0.629	0.560	0.181	0.030
Malaysia fund	0.246	0.217	0.126	0.092
Mexico fund	0.846	0.801	0.228	0.000
Southern Africa fd.	0.701	0.622	0.207	0.001
Taiwan fund	0.642	0.597	0.166	0.059
Thai fund	0.686	0.639	0.146	0.017
Templeton Russia & east eur. fd.	0.646	0.525	0.323	0.091
Turkish inv. fd.	0.664	0.620	0.144	0.030
Average	0.618	0.551	0.189	0.043
B. Monthly returns pre 1993				
Country Funds (dm)				
Abdn. Aust. eq. fd.	0.408	0.295	0.185	0.030
France growth fd.	0.602	0.523	0.172	0.008
Germany fund	0.321	0.248	0.123	0.029
Italy fund	0.242	0.198	0.091	0.038
Singapore fund	0.341	0.110	0.366	0.144
Spain fund	0.166	0.119	0.073	0.020
Swiss Helvetia fd.	0.493	0.290	0.406	0.167
Average	0.368	0.255	0.202	0.062

(*Continued*)

TABLE 6. (Continued)

	Domestic Factor		U.S. Factor	
	$\rho^2(R_c,R_d)$	$\rho^2(R_c,R_d/R_{US})$	$\rho^2(R_c,R_{US})$	$\rho^2(R_c,R_{US}/R_d)$
Country Funds (em)				
Brazil fund	0.484	0.493	0.079	0.095
Chile fund	0.370	0.353	0.032	0.007
First Philippine fd.	0.460	0.418	0.089	0.018
India gr. Fund	0.165	0.239	0.048	0.131
Korea fund	0.239	0.256	0.235	0.252
Malaysia fund	0.438	0.217	0.388	0.147
Mexico fund	0.428	0.360	0.185	0.089
Taiwan fund	0.094	0.065	0.249	0.225
Thai fund	0.204	0.102	0.176	0.133
Turkish inv.fd.	0.350	0.488	0.068	0.265
Average	0.323	0.299	0.155	0.136

Note: The portion of the variance of the country fund price return explained by the domestic (U.S.) factor alone is inferred from the squared correlation coefficient $\rho^2(R_c,R_d)$ ($\rho^2(R_c,R_d/R_{US})$) ,where R_c is the country fund price return and R_d (R_{US}) is the domestic (U.S.) market return. The squared first order partial correlation coefficients $\rho^2(R_c,R_{US})$ ($\rho^2(R_c,R_{US}/R_d)$) reveal the fraction of country fund price attributable to the domestic (U.S.) factor net of the affect of the U.S. (domestic) factor.

V. Conclusion

In light of the liberalization of world financial markets in the nineties, this paper addresses two important questions. First, can CECF trading in the U.S. mimic their corresponding country indices? Second, are there still significant international diversification benefits from the point of view of a U.S. investor? The results for the period 1993 – 2002 differ significantly from those of prior studies that investigate earlier, pre-liberalization, periods, and from our own pre 1993 analysis. We find strong evidence that CECF can mimic their foreign indices and are more heavily influenced by the local factor than by the U.S. factor. We also document increased correlation between the U.S. market and foreign markets during the 1993 – 2002 period and find no compelling evidence of economically and statistically significant diversification benefits, as opposed to the pre-1993 period.

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