DETERMINANTS OF THE TIME-VARIATION IN EMERGING-MARKET CLOSED-END FUND PREMIUMS: A COMPARISON BETWEEN EQUITY AND BOND FUNDS

The American Economist, Fall 2008, 54-64

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Abstract

This paper explores the determinant factors of the time-variation in emerging markets closed-end fund premiums, price returns, and NAV returns. After controlling for the variables previously proposed in the EM closed-end funds literature, such as the U.S. stock market risk, local stock market return, and the percentage change in exchange rates, two hypothesis are used to explain the variation in fund premiums by fund type: the U.S. investor sentiment and the market segmentation theory. The results of the time-series analyses show that country funds, regional equity funds, and global bond funds are influenced quite differently by the suggested factors.

* Lubin School of Business, Pace University, New York, NY, 10038, iismailescu@pace.edu. This paper is an excerpt from my doctoral dissertation. I would like to thank my dissertation committee: Hossein Kazemi, John Buonaccorsi, Ben Branch, and Nikunj Kapadia, and seminar participants at University of Massachusetts Amherst and 2008 Eastern Economic Association Annual Meetings for insightful comments and suggestions. All remaining errors are mine.

I. Introduction

A closed-end fund is a publicly traded investment company that holds a portfolio of securities, whose composition is typically determined by the fund manager. Once started, a closed-end fund trades on the secondary market and sells either at a discount or a premium from its underlying value. Typically, it trades initially at a premium, but starts selling at a discount several months later. This fact, and the related observation that large premiums/discounts are not arbitraged away, lie at the center of the so-called "closed-end fund puzzle" (De Long et al., 1990; Lee et al., 1991; Bodurtha et al., 1995; Pontiff, 1996; Gemmill and Thomas, 2002).

While a great deal of academic work has sought to solve the closed-end fund puzzle, the factors responsible for the time variation of a fund's premium have received little attention. This is the aim of this study and its contribution to the existing literature. The focus is on a relatively new group of closed-end funds – emerging-market (EM) funds, whose underlying portfolios comprise equity and/or bond securities from emerging economies. EM funds have generated increasing interest among investors in the early 1990s[1], but have fallen out of grace by the beginning of 2000s[2]. Currently approximately 40 EM funds are listed in the United States with an aggregate market capitalization slightly exceeding 13.95 billion dollars.

Previous studies show that while EM fund premiums depend on the U.S. market returns through fund prices (Hardouvelies et al., 1993; Bodurtha et al., 1995), they are also sensitive to the local market returns and foreign exchange risk due to fund NAVs (Hardouvelies et al., 1993). Domowitz, Glen, and Madhavan (1998) find evidence of a positive and significant relationship between the premium of a U.S.-based Mexican

closed-end fund and changes in Mexico's risk premium after the Mexican currency crisis of 1994, which they largely attribute to the market segmentation hypothesis. The importance of U.S. investor sentiment and its relationship with fund premiums have been documented by Hardouvelies et al. (1993), Bodurtha et al. (1995), and Gemmill and Thomas (2002), among others. While both Hardouvelies et al. (1993) and Bodurtha et al. (1995) propose U.S. investor sentiment as a systematic component that explains the variation in EM fund premiums, Gemmill and Thomas (2002) argue that the U.S. investor sentiment fails to account for cross-sectional differences in EM country fund premiums.

Well anchored in this body of work, this paper explores the determinant factors of time variation in emerging markets closed-end fund premiums, prices, and NAVs. In addition to the variables previously proposed in the international closed-end funds literature, such as the U.S. stock market risk, local stock market return, U.S. investor sentiment, and the change in the local currency/U.S. dollar exchange rates, I also incorporate the country credit risk, excess volatility, and fund liquidity in the regression models. To examine whether the findings are sensitive to fund type, I group the funds in the sample into three categories: country funds, regional and global equity funds, and global bond funds.

Consistent with the U.S. investor sentiment hypothesis of Bodurtha et al. (1995), premiums and prices of the majority of EM funds in my sample fully capture movements in the U.S. investor sentiment, while fund underlying assets (which determine the NAV) display absolutely no exposure to the U.S. investor sentiment. This finding reflects the time-varying sentiment of U.S. fund investors relative to their foreign counterparts.

Another interesting implication emerging from the difference between the investor base of an EM fund and that of its underlying portfolio lies in the market segmentation hypothesis. If it holds true, U.S. investors may react more slowly than local investors to perceived changes in country credit risk, widening or narrowing a fund's premium. While I find evidence of a strong positive impact of credit risk on bond fund premia, premiums of regional and global equity funds in my sample are in general negatively correlated with the credit spread changes, and country fund premia show no exposure to credit risk.

The rest of the paper proceeds as follows. Section II describes the data. Section III presents the methodology and summarizes the empirical results. Section IV concludes.

II. Data

1. Closed-end funds

The initial sample consists of 57 emerging-market closed-end funds publicly traded on U.S. exchanges between January 1, 1990 and December 31, 2006. For each fund, weekly prices and net asset values (NAVs) were collected from the Wall Street Journal, and weekly volume data from the Center for Research in Security Prices (CRSP) database. Both share prices and NAVs are reported in US dollars. Typically international closed-end fund NAVs are reported as of Friday's close in the foreign country, but few funds are valued as of either Wednesday or Thursday's close[3].

To be eligible for inclusion in this study, a fund has to have a minimum of three years of weekly data. Given its short NAV history, one fund (Emerging Tigers Fund) was excluded from the initial sample, leaving a total of 56 emerging-market closed-end funds

in the final sample. Based on their composition, thirty one of the resulting funds are classified as single country funds, 15 are regional and global equity funds, and 10 are global bond funds. Country funds are predominantely equity invested. Descriptive statistics for the closed-end funds in the sample are given in Table 1. The fund premium is computed as follows:

$$premium = \frac{price - NAV}{NAV} \times 100$$

A negative premium indicates a discount.

Consistent with previous research, most closed-end funds in my sample trade on average at a discount from their NAVs. Table 1 shows that regional and global equity funds on average sell at deeper discounts than either country funds or global bond funds. However, with premiums going as high as 16.37% (Thai Fund) and as low as -17.31% (Pakistan Investment Fund), country funds are by far the most cross-sectionally volatile in my sample. In order to obtain additional insight into the time-series behavior of premiums by fund type, I construct three equally weighted portfolios of country, regional equity, and global bond funds. Their premiums are plotted in Figure 1.

<Insert Figure 1 here>

Table 1 also sets forth summary statistics for fund price returns and NAV returns. Typically, funds in the sample have positive price and NAV returns, with the majority of average price returns slightly exceeding their NAV counterparts (see also Branch et al., 2006). Moreover, consistent with previous literature (Hardouvelis et al., 1993; Pontiff, 1997; and Chandar and Patro, 2000), emerging-market fund price returns are more volatile than their corresponding NAV returns. This finding suggests that the risk/return

characteristics of closed-end funds may be different from those of their underlying assets. Across fund types, regional equity funds exhibit on average the highest share price and NAV returns, but are less volatile than country funds.

<Insert Table 1 here>

2. Other variables

For 19 of the 31 closed-end country funds in my sample I collect data on country credit risk, country stock market indices (in local currency as well as US dollars), the U.S. market index, and local currency/U.S. dollar exchange rates from Datastream. I measure a country's credit risk by the country's JP Morgan Emerging Market Bond Index (EMBI Global) spread over a U.S. Treasury of comparable maturity. I consider the S&P 500 the proxy for the U.S. stock market. Because of the discrepancies among funds' NAV reporting dates, for each fund, the price, volume, credit risk, U.S. market index, exchange rate, and local market index are observed simultaneously with the fund NAV. All country-specific stock market indices are in domestic currencies. For the remaining 12 countries, EMBI Global spread is not available, therefore I exclude them from this study.

For regional (global) funds, the region (global) credit risk and the region (global) stock market index are substituted for the country credit risk and the country stock market index, respectively. I use the JP Morgan EMBI Global regional (composite) index as a measure for the region (global) credit risk and S&P/IFC Emerging Market regional (global) indices as proxies for regional (global) stock market indices. All S&P/IFC Emerging Market regional and global indices are expressed in US dollars. To create

regional substitutes for the country foreign exchange rates, I construct an equally-weighted foreign exchange index for each region in the sample. A regional foreign exchange index includes the weekly percentage changes in currency rates of all emerging economies in the region that are available in Datastream. Similarly, an equally-weighted global foreign exchange index is formed with the foreign exchange rates of all emerging markets available in Datastream.

In order to analyze the impact of the U.S. investor sentiment on emerging-market closed-end fund premiums, I use the methodology advanced by Bodurtha, Kim, and Lee (1995) and measure the U.S. investor sentiment by the change in a foreign fund premium index (FFI). The index is created with the initial 57 funds in my sample and other international closed-end funds traded in the U.S. that have minimal, if any, exposure to U.S. securities[4]. Price and NAV data of these funds are also obtained from the Wall Street Journal. Seventy five funds are eligible for inclusion in the foreign fund index weekly series. The weekly change in the foreign fund index (ΔFFI_t) is defined as:

$$\Delta FFI_t = FFI_t - FFI_{t-1}$$

and it reflects investors' optimism or pessimism about international closed-end funds.

III. Methodology and empirical results.

Previous studies show a strong response of EM fund premiums to the U.S. market returns (Hardouvelies et al., 1993; Bodurtha et al., 1995), local market returns and foreign exchange risk (Hardouvelies et al., 1993), as well as the U.S. investor sentiment (Hardouvelies et al., 1993; Bodurtha et al., 1995). Besides these variables, are there any

other factors significantly responsible for the time-variation of EM closed-end fund premiums?

In a study based on the Mexico Fund, Domowitz et al. (1998) argue that equity prices abroad may react faster in response to changes in country credit risk than US closed-end fund prices. If this is the case, perceived changes in a country credit risk may significantly widen or narrow an international fund's premium. Additionally, in the period following a currency crisis, Chandar and Patro (2000) find that the excess volatility of an EM fund is significantly related to the fund premium. Does the relationship also exist in more tranquil periods? Last, holding other attributes constant, investors prefer highly liquid securities, and are wiling to pay a higher premium for a fund that is more actively traded. In light of the above findings, while controlling for the four fundamental variables (U.S. stock market return, the local stock market return, exchange rate risk, and U.S. investor sentiment), I also test the power of country credit risk, excess volatility, and fund liquidity in explaining the variation in closed-end fund premiums. I define excess volatility as the difference between fund price volatility and the volatility of fund assets. Fund illiquidity is the weekly average of the daily ratio of its absolute price return to dollar volume (Amihud, 2002).

In order to examine the time-series response of fund premiums to the explanatory variables described above, for each closed-end fund *i* I estimate the following regression model:

$$RET_{i,t} = \beta_0 + \beta_1 \Delta SPRD_{i,t} + \beta_2 LMR_{i,t} + \beta_3 USMR_t + \beta_4 \Delta FFI_t + \beta_5 EXR_{i,t} + \beta_6 ExVol_{i,t} + \beta_7 lqdty_{i,t} + \varepsilon_{i,t}$$

where *RET* denotes the weekly change in fund premium. $\Delta SPRD_i$ is the change in the credit spread of the country (region) associated with fund *i*, and, as mentioned before, it is a proxy for the country (region) credit risk. LMR_i is the return on the local market associated with fund *i*. *USMR* is the U.S. stock market return. ΔFFI is the change in the foreign fund premium index that I use as a proxy for the U.S. investor sentiment. EXR_i is the percentage change in the currency rate associated with fund *i*. $ExVol_i$ is the excess volatility of fund *i*. Finally, $lqdty_i$ is Amihud's (2002) illiquidity measure of fund *i*, and ε_i is the residual error corresponding to fund *i*. All independent variables in the above equations are observed simultaneously with the dependent variable.

The change in a fund premium is a rough approximation of the difference between its share price return and its NAV return[5]:

$$\Delta premium_t = \left(price\_ret_t - NAV\_ret_t \right) \text{x} \frac{price_{t-1}}{NAV_t}$$

where *price_ret* and *NAV_ret* are respectively the price and NAV returns at time *t*. Therefore, the impact of many of the above variables on a fund's premium depends on the differential influence they exercise on the fund price and its NAV. With this in mind, I also run the above regressions with the weekly return on the fund price, and the weekly NAV return as the dependent variables. The response of the closed-end fund premium to each economic variable considered above can thus be viewed as the aggregate sensitivity of the fund price return and NAV return to the respective variable.

I perform all estimations by ordinary least square regressions. To correct for heteroskedasticity and serial correlation in regression residuals, standard errors are

calculated with GMM using a Newey West estimator with six lags. My choice of six Newey West lags is dictated by the autocorrelation orders in the residual errors. In order to control for nonsynchronous trading, I also include in my regression equations the one-week lag in U.S. stock market returns and one-week lag in changes in foreign fund premium index. As the estimated coefficients of the two lags are largely insignificant, for the sake of brevity I report only the results of contemporaneous relationships. To examine whether my findings are sensitive to fund type, I group the funds in my sample into three categories: country funds, regional/global equity funds, and global bond funds.

Tables 2 to 4 summarize the results of the time-series regressions by fund type[6]. Each cell in Tables 2 through 4 reports the number of same-type funds in the sample whose premium change (price return or NAV return) is impacted by the column-head variable at a level of significance of five percent or better. It also shows the predominant sign of the column-head variable in the regression model. For example, the premium change of all 19 country funds is significantly and positively influenced by the US investor sentiment (Table 2). This indicates that an increase (decrease) in the U.S. investor's optimism results in a significant rise (decline) in the premium of all 19 country funds in my sample. A bold number indicates that the relation between the dependent variable and the column-head variable is significant at 5% or better for more than 50 percent of the funds in that category.

1. Country funds

Although, in general, country credit risk ($\Delta SPRD$) has a consistent negative sign, it has no explanatory power for country fund premium changes in my sample (Table 2).

This finding may be justified by the low response of country fund prices (Table 3) and NAVs (Table 4) to increases in perceived country risk. It may also be explained by the potential correlation between credit risk and foreign exchange risk, which may capture some of the significance of the country risk. A country's currency depreciation is often associated with low levels of foreign currency reserves, which in turn may signal the country's inability to make payments on foreign debt in the future. Thus, a country' exchange rate risk is frequently related to its credit risk. In order to test if the significance of country credit risk in explaining changes in fund premiums is overwritten by the explanatory power of the currency rate, I eliminate the exchange rate variable from the regression equations. As results (not reported) hardly change, I conclude that currency risk is not a substitute for credit risk.

<Insert Table 2 here>

Turning to the response of country fund premiums, prices, and NAVs to local stock market returns (*LMR*), I notice significantly high positive correlations of the local market returns with both fund price returns and NAV returns, but little correlation, if any, with fund premium changes. Furthermore, consistent with my expectations (and Hardouvelis et al., 1993), for most of the country funds in my sample, local market returns have a stronger impact on fund NAVs than on fund prices.

Similarly, U.S. stock market returns (*USMR*) have strong, positive explanatory power for country fund price and NAV returns, but weak significance in explaining fund premium changes. These results contradict Hardouvelies et al. (1993) and Bodurtha et al. (1995) who find strong correlations between *USMR* and country fund premium changes and price returns, but no or little NAV return exposure to *USMR*. The reason for these

discrepancies may lie in the study sample periods. While Hardouvelies et al. (1993) and Bodurtha et al. (1995) studies cover the late 1980s and early 1990s, the time series of country funds in my analysis spans from January 5, 1990 to December 29, 2006, a period in which world financial markets became more co-integrated and, thus, more exposed to global factors. Hence, the strong response of country fund NAV returns to the *USMR*, which is considered by many a leading indicator of global financial stability, should come with no surprise. Another interesting observation is that when the price return is the dependent variable in the regression model, *LSM* coefficients are in many cases higher than *USMR* betas (not reported). This implies that fund price returns are more strongly correlated with local market returns than with U.S. market factors (see also Anderson et al., 2001; and Tsai et al., 2003).

Consistent with the U.S. investor sentiment hypothesis of Bodurtha et al. (1995), Tables 2 through 4 show that country fund premium changes and price returns are excessively sensitive to U.S. investor sentiment (*ΔFFI*). By comparison, NAV returns display absolutely no exposure to *ΔFFI*. The strong reaction of the fund price returns (and premiums) to the U.S. investor sentiment may be explained by the low institutional ownership of EM closed-end funds (Hardouvelis et al., 1993). The typical EM fund holder is a small investor who understands the benefits of investing internationally, but lacks the sophistication to purchase international equity instruments directly. In the closed-end fund literature he is known as the "noise trader," who trades more on sentiment than on fundamentals. Furthermore, the positive correlation (of approximately 39%) between U.S. investor sentiment and U.S. market returns is what may justify the weak significance of *USMR* in explaining the time-series variability in fund premium

changes (see Table 2). When I remove *ΔFFI* from the regression equation with fund premium changes as the dependent variable, U.S. stock market returns' explanatory power increases significantly (not reported).

<Insert Table 3 here>

Another noteworthy result in Tables 2 - 4 is the persistent significance of the movements in the foreign exchange rates (*EXR*) in explaining the time-series variation in country fund premium changes, price returns, and NAV returns. Consistent with my earlier expectations, most of exchange rate coefficients are significantly negative, suggesting that not only does currency depreciation lower US dollar denominated NAV returns, but also it has a negative effect on price returns. The impact of *EXR* on fund premium changes, although mostly significant, comes with changing signs, which is attributed to the differential influence *EXR* exerts on fund price returns and NAV returns.

Finally, contrary to my belief that liquidity has a positive impact on fund premiums, there is absolutely no fund premium, price, or NAV sensitivity to fund liquidity. Additionally, excess volatility – the large discrepancy between fund price return volatility and NAV return volatility reported in Table 1, has no influence on either fund premium changes, or price returns, or NAV returns.

<Insert Table 4 here>

2. Regional and global equity funds

Results in this subsection are largely similar to those obtained for country funds, but a couple of issues are worth noting. First, the exchange rate change loses some or all of its power in explaining the time-series variation of regional and global equity fund

premiums, prices and NAVs. I attribute this finding to the benefit of regional/global diversification. Second, credit risk becomes an important determinant of the regional fund premium changes, while it was irrelevant for almost all country funds. In the case of country funds, share prices were approximately as sensitive to credit risk as NAVs. For the majority of regional equity funds, however, I observe a somehow significant negative correlation between fund price returns and credit risk, but absolutely no NAV exposure to credit risk, which may be attributed again to the benefits of diversification. Overall, the greater, negative effect of $\Delta SPRD$ on fund prices prevails in explaining the impact of credit risk on regional and global EM equity fund premium changes.

3. Global bond funds

While premia, price returns, and NAV returns of country funds and regional equity funds are driven by more or less the same economic factors, bond funds are clearly a different asset class. An important result in my analysis is the strong positive response of bond fund premia to credit risk, which, in terms of the size of the regression coefficients (not reported), dominates the positive correlation between fund premiums and U.S. investor sentiment. In other words, market segmentation hypothesis competes with the U.S. investor sentiment hypothesis in explaining the time-series behavior of bond fund premiums. The fund premium-credit risk relationship of bond funds can be entirely attributed to the differential sensitivity of bond fund price and NAV returns to credit risk. The underlying value of bond funds is based on bond prices, whose returns are highly negatively correlated with yield spreads. Consequently, bond fund NAV returns are highly negatively correlated with credit risk, fact that is consistent with my

findings. For the same reason, a similar relationship is expected between bond fund price returns and credit risk. Nonetheless, although negative, the exposure of bond fund price returns to credit risk is lower compared to that of bond fund NAVs. That is why, when the effect of credit risk on bond fund price and NAV returns is aggregated, the ensuing effect on fund premiums is positive and consistent with my results in Table 2.

A graphical illustration of the positive relationship between credit risk and bond fund premiums as well as more insight into my statement that EM equity and bond funds are different asset classes are provided in Figure 1. From figure 1 it is evident that a jump in equity fund premia is frequently accompanied by a significant decline in bond fund premiums and *vice versa*. These episodes of premium ups and downs can easily be linked to regime shifts in credit spreads. For example, in the aftermath of the Russian government default, when the global credit risk reached unprecedented highs, bond fund premiums skyrocketed, while equity fund premiums plummeted. Furthermore, the financial stability and low credit risk emerging markets have reached in the last four to five years have also been reflected in emerging market fund premiums: since mid-2002 bond fund premia have been declining, while equity fund premia have consistently risen.

IV. Summary and conclusions

This paper explores the determinants of the time-series behavior of EM fund premium changes, price returns, and NAV returns. Besides the factors previously posited to have a significant effect on the fund premiums, such as the U.S. stock market return, local market return, U.S. investor sentiment, and the percentage change in exchange rates, I also incorporate the country credit risk, excess volatility, and fund liquidity in the

time-series regression models. Consistent with the U.S. investor sentiment hypothesis of Bodurtha et al. (1995), premiums and prices of the majority of EM funds in my sample fully capture movements in the U.S. investor sentiment, while fund underlying assets (which determine the NAV) display absolutely no exposure to the U.S. investor sentiment. This finding reflects the nature of the investor clientele of the EM closed-end funds, which are primarily U.S. individuals "prone to trade on sentiment and to misperceive fundamental value" (Hardouvelis et al., 1993, 34).

A competing hypothesis in explaining the change in a fund's premium is the market segmentation hypothesis, according to which U.S. investors may react more slowly than local investors to perceived increases (decreases) in country credit risk, widening (narrowing) the fund's premium. The strong positive response of bond fund premiums to an increase in credit risk in emerging markets confirms this hypothesis, but it is refuted by the negative correlation between regional/global equity fund premiums and the credit spread changes, and the lack of exposure of country fund premiums to credit risk. Therefore, the market segmentation hypothesis could successfully explain the change in fund premiums in debt markets, but not in equity markets.

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[1] Prior to December 1989 there were only 13 EM closed-end funds listed on U.S. exchanges. By the end of 1995, 41 more were created. Several factors that have accelerated the increased interest in emerging markets in the late 1980s and early 1990s were the lifting of some of investment restrictions in several East Asian countries, the collapse of communism followed by the development of active stock markets in Eastern Europe, and the strong performance of Latin American markets that came after a decade of default and instability.

[2] Thirteen EM funds were closed by August 2003 due primarily to the economic and financial instability most emerging economies have experienced in the late 1990s and early 2000s.

[3] Brazil, Brazilian Equity, Emerging Mexico, JF India, Mexico, Mexico Equity & Income, Singapore, Taiwan, Taiwan Equity, Templeton China World, and Templeton Russia funds report their NAV as of Thursday's close. India Growth and Taiwan Greater China funds report their NAV as of Wednesday's close.

[4] Table A.1 in the Appendix lists all additional international closed-end funds that were used to create the foreign fund premium index.

[5] A fool proof is available from the author upon request.

[6] To save space, I did not report the regression coefficients, but they are available from the author upon request.

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Table 1. Descriptive statistics of individual closed-end funds.

Fund name	Ticker	Sample period	No. of weekly obs.	Premium		Price return		NAV return		Price std / NAV std
				Mean(%)	St. dev	Mean(%)	St. dev.	Mean(%)	St. dev.	
Country Funds										
Argentina Fund	AF	10/91-12/01	522	-6.93	15.53	0.04	4.71	0.04	3.81	1.24
Brazil Fund	BZF	01/90-06/06	846	-10.34	11.57	0.36	5.97	0.33	5.22	1.14
Brazilian Equity Fund	BZL	04/92-04/05	674	-9.60	11.52	0.14	6.07	0.21	5.39	1.13
Chile Fund	CH	01/90-12/06	884	-11.32	10.95	0.16	4.19	0.15	2.98	1.41
China Fund	CHN	07/92-12/06	747	-4.25	16.48	0.23	4.88	0.19	3.44	1.42
Emerging Mexico Fund	MEF	10/90-04/99	433	-7.57	12.59	0.09	6.08	0.01	5.41	1.12
First Philippines Fund	FPF	01/90-06/03	692	-16.18	7.76	-0.13	4.56	-0.12	3.61	1.26
Greater China Fund	GCH	07/92-12/06	737	-11.39	10.28	0.23	5.01	0.23	3.76	1.33
India Fund	IFN	02/94-12/06	669	-9.92	14.83	0.29	4.98	0.24	3.70	1.35
India Growth Fund	IGF	01/90-05/03	666	-6.54	18.24	0.03	5.11	0.06	4.06	1.26
Indonesia Fund	IF	03/90-12/06	872	14.18	24.29	0.22	7.22	0.08	5.18	1.39
Jakarta Growth Fund	JGF	04/90-06/01	567	7.71	19.51	-0.21	6.28	-0.29	4.63	1.36
JF India	JFI	03/94-06/03	477	-13.93	12.51	0.03	4.78	-0.00	3.69	1.30
Korea Equity & Income	KEF	11/93-12/06	683	-7.85	12.64	0.12	5.08	0.13	4.86	1.05
Korea Fund	KF	01/90-12/06	872	2.08	19.73	0.16	5.34	0.22	4.67	1.14
Korea Investment	KIF	03/92-11/01	501	-2.05	15.70	0.11	5.45	0.12	5.64	0.97
Malaysia Fund	MF	01/90-12/06	882	0.83	21.06	0.00	5.20	0.00	3.83	1.36
Mexico Equity & Income	MXE	08/90-12/06	800	-9.57	9.89	0.22	4.79	0.19	4.01	1.19
Mexico Fund	MXF	01/90-12/06	876	-12.75	9.24	0.27	4.93	0.26	4.41	1.12
MS India Investment	IIF	02/94-12/06	664	-9.02	14.51	0.31	4.99	0.26	3.45	1.45
Pakistan Investment	PKF	12/93-06/01	384	-17.31	10.48	-0.37	5.04	-0.34	4.00	1.26
Singapore Fund	SGF	07/90-12/06	849	-8.59	10.41	0.11	3.95	0.07	2.79	1.42
Taiwan Equity Fund	TYW	07/94-05/00	297	-11.89	10.81	0.19	4.66	0.23	4.10	1.14
Taiwan Fund	TWN	01/90-12/06	858	-3.66	16.06	0.04	5.32	0.07	3.70	1.44
Taiwan Greater China	TFC	01/90-12/06	883	-7.90	9.92	0.01	5.00	-0.04	3.72	1.34
Templeton China World	TCH	09/93-08/03	512	-13.51	10.48	0.09	4.24	0.09	3.62	1.17
Templeton Russia	TRF	09/95-12/06	589	8.07	13.72	0.59	7.55	0.37	5.14	1.47
Templeton Vietnam Oppty	TVF	09/94-09/02	412	-15.50	8.68	-0.04	4.08	-0.03	3.03	1.35
Thai Capital Fund	TF	05/90-12/06	810	5.43	24.79	0.03	6.14	-0.02	4.02	1.53
Thai Fund	TTF	01/90-12/06	881	16.37	30.76	0.06	6.01	0.01	4.58	1.31
Turkish Investment	TKF	01/90-12/06	880	0.89	18.07	0.25	6.58	0.31	7.42	0.89
Average				-5.55	14.61	0.12	5.30	0.10	4.25	1.27

Table 1 (continued). Descriptive statistics of individual closed-end funds.

Fund name	Ticker	Price starting date	No. of weekly obs.	Premium		Price return		NAV return		Price std / NAV std
				Mean	St. dev	Mean	St. dev.	Mean	St. dev.	
Regional/Global Equity Funds										
Asia Pacific	APB	01/90-12/06	882	-6.88	12.77	0.12	4.37	0.11	3.17	1.38
Asia Tigers	GRR	11/93-12/06	678	-12.47	8.32	0.13	3.91	0.10	2.89	1.35
Central Europe and Russia	CEE	02/90-12/06	875	-15.63	6.41	0.21	4.10	0.22	3.16	1.30
Fidelity Adv East Asia	FAE	04/94-06/99	268	-11.92	4.50	0.05	4.05	0.17	2.95	1.37
JF China Region	JFC	07/92-12/06	740	-11.25	11.02	0.16	4.59	0.12	3.38	1.36
Latin America Discovery	LDF	06/92-12/06	747	-12.35	7.56	0.21	4.99	0.19	4.54	1.10
Latin America Equity	LAQ	07/90-12/06	853	-13.17	8.85	0.24	4.37	0.21	3.57	1.22
MS Asia Pacific	APF	07/94-12/06	644	-15.86	5.50	0.11	3.48	0.10	2.38	1.46
MS Eastern Europe	RNE	09/96-12/06	532	-10.43	10.49	0.30	5.79	0.25	4.53	1.28
Schroder Asia Growth	SHF	12/93-03/98	220	-9.20	5.58	-0.23	3.56	-0.18	2.45	1.45
Scudder New Asia	SAF	01/90-04/06	843	-10.20	9.83	0.12	3.99	0.05	3.04	1.31
Templeton Dragon	TDF	09/94-12/06	641	-14.79	7.29	0.17	4.07	0.15	2.94	1.38
Emerging Markets Telecom Fund	ETF	06/92-12/06	752	-12.55	9.53	0.11	4.03	0.12	2.92	1.38
MS Emerging Markets	MSF	10/91-12/06	785	-8.79	10.46	0.17	4.10	0.18	3.10	1.32
Templeton Emerging Markets Fund	EMF	01/90-12/06	874	4.97	11.85	0.14	4.70	0.10	3.09	1.52
Average				-10.70	8.66	0.13	4.27	0.13	3.21	1.35
Global Debt Funds										
Alliance World Dollar Gvt	AWG	10/92-12/06	730	-0.53	10.46	0.02	2.76	0.03	2.60	1.06
AllianceBernstein Global High Income Fund	AWF	07/93-12/06	688	-4.82	7.42	0.02	2.66	-0.00	2.38	1.12
DWS Global High Income	LBF	04/93-12/06	744	-4.34	9.76	-0.02	3.27	0.02	2.81	1.16
Global High Income Fund	GHI	09/93-12/06	677	-5.18	10.03	0.04	2.56	0.02	1.41	1.82
MS Emerging Mkts Debt	MSD	07/93-12/06	694	-5.47	6.99	0.01	3.24	-0.00	2.63	1.23
Templeton EM Income	TEI	09/93-12/06	679	-6.21	5.80	0.04	3.39	0.04	1.56	2.17
Western Asset EM Debt	ESD	12/03-12/06	161	-7.58	6.90	-0.06	1.86	0.06	1.37	1.36
Western Asset EM Income	EMD	10/92-12/06	729	2.42	8.18	0.06	3.32	0.06	3.20	1.04
Western Asset EM Inc. II	EDF	06/93-12/06	695	4.37	9.94	0.03	3.16	0.05	3.08	1.03
Western Asset Worldwide Income Fund	SBW	12/93-12/06	675	0.03	8.68	0.03	2.94	0.05	2.72	1.08
Average				-2.73	8.42	0.02	2.92	0.03	2.38	1.31

Table 2. Time-series regressions of fund premium changes

	ΔSPRD	LMR	USMR	ΔFFI	EXR	lqdty	ExVol	Adj R^2
Country funds (19)	1	7	4	**19**	**11**	2	3	
	(-)	(-)	(+)	(+)	(+)	(-)	(+)	0.1795
Regional equity funds (15)	**11**	**9**	3	**14**	4	0	1	0.1473
	(-)	(-)	(+)	(+)	(-)		(-)	
Global bond funds (10)	**7**	2	1	**10**	1	1	1	0.2101
	(+)	(+)	(-)	(+)	(-)	(+)	(-)	

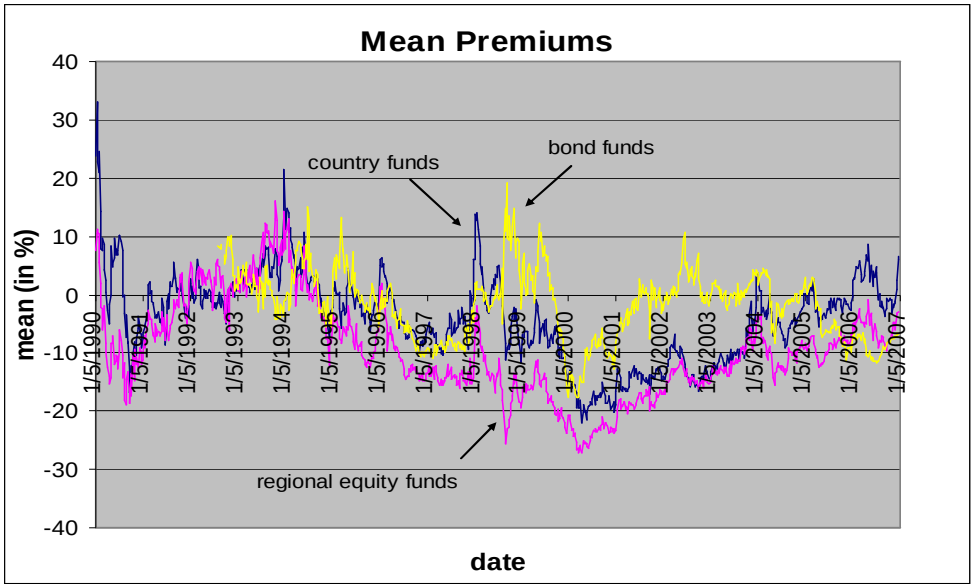
Table 3. Time-series regressions of fund price returns

	ΔSPRD	LMR	USMR	ΔFFI	EXR	lqdty	ExVol	Adj R^2
Country funds (19)	7	**18**	**12**	**19**	**10**	0	1	0.5250
	(-)	(+)	(+)	(+)	(-)		(-)	
Regional equity funds (15)	7	**15**	**10**	**13**	5	0	2	0.5423
	(-)	(+)	(+)	(+)	(-)		(-)	
Global bond funds (10)	**10**	3	2	**10**	5	1	1	0.2527
	(-)	(+)	(-)	(+)	(-)	(+)	(+)	

Table 4. Time-series regressions of fund NAV returns

	ΔSPRD	LMR	USMR	ΔFFI	EXR	lqdty	ExVol	Adj R^2
Country funds (19)	9	**19**	**11**	1	**15**	0	1	0.6892
	(-)	(+)	(+)	(-)	(-)		(-)	
Regional equity funds (15)	1	**15**	**14**	1	7	0	0	0.6829
	(-)	(+)	(+)	(-)	(-)			
Global bond funds (10)	**10**	0	0	0	**6**	0	0	0.6745
	(-)				(-)			

Figure 1. Time-series behavior of premiums of equally weighted fund portfolios.



Appendix

Table A.1. Developed market closed-end funds included in the foreign fund index.

Fund name	Ticker	Sample period	Geographical focus
Aberdeen Asia-Pacific Income Fund	FAX	1/90-12/06	Asia Pacific region
Aberdeen Australia Equity Fund	IAF	1/90-12/06	Australia
Aberdeen Global Income Fund	FCO	3/92-12/06	global income
Blackrock Europe Fund	EF	4/90-10/06	European region
Central Fund of Canada	CEF	2/90-12/06	Canada
The European Equity Fund	EEA	1/90-12/06	Euro countries
First Israel Fund	ISL	10/92-12/06	Israel
Global Income Fund	GIF	2/97-12/06	global income
Japan Equity Fund	JEQ	8/92-12/06	Japan
Japan Smaller Capitalization Fund	JOF	3/90-12/06	Japan
Morgan Stanley Global Opportunity Bond Fund	MGB	5/94-12/06	global income
New Germany Fund	GF	1/90-12/06	Germany
New Ireland Fund	IRL	3/90-12/06	Ireland
Spain Fund	SNF	1/90-12/06	Spain
Strategic Global Income Fund	SGL	1/92-12/06	global income
Swiss Helvetia Fund	SWZ	1/90-12/06	Switzerland
Templeton Global Income Fund	GIM	1/90-12/06	global income
Western Asset Global Partners Income Fund	GDF	10/93-12/06	global income