Time-varying performance of international mutual funds

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ABSTRACT

We examine the ability of one- and two-factor regime switching models to describe US, developed, and emerging market mutual fund returns. We find that a two-factor fixed transition probability model adequately describes the multivariate series of mutual fund returns without the need to model time-varying transition probabilities. Mutual fund performance, as measured by a state dependent Jensen's alpha, varies with economic regimes that are defined according to the global equity market mean. Our primary two-factor fixed transition probability model shows that emerging market mutual fund alphas are often significantly positive in global bull regimes. Consideration of alternative second risk factors suggests that both the foreign exchange factor, or the recently proposed Hou, Karolyi and Kho (2011) value factor can improve series forecasts and out-of-sample portfolio performance.

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1. Introduction

Mutual funds are an important investment alternative for US investors. In 2010, combined assets in US mutual funds exceeded 11.8 trillion US dollars. Approximately 90 million individuals hold mutual funds in the United States, and of these individuals, 65% maintain more than half of their financial assets in mutual funds (Investment Company Institute, 2011).

The performance of mutual funds has been extensively studied by a wide range of authors beginning with the seminal works of Sharpe (1966), and Jensen (1968). Recent studies have examined the persistence in mutual fund winners and losers (Carhart, 1997), the role of luck in observed portfolio performance (Fama and French, 2008, 2010; Kosowski et al., 2006), and the importance of economic information in affecting conditional measures of performance (Ferson and Schadt, 1996; Jha et al., 2009; Kosowski, 2006).[1]

Since Solnik's (1974b) seminal work, the potential benefits to adding international investments to a well-diversified US-based portfolio continue to be actively debated. For example, De Santis and Gerard (1997) estimate that the expected gain from international diversification is more than 2% per year. Li et al. (2003) further show that international diversification benefits remain substantial for US investors even with short selling constraints. In contrast, Lewis (2007) finds that the diversification benefit,

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[1] Kosowski (2006) examines domestic mutual fund performance in the context of a regime-switching model. He finds that risk-adjusted mutual fund alphas are higher in recessions than in expansions with both single and multi-factor models. His model differs from ours in that he assumes a single regime for all risk factors, with fund returns that vary across regimes. Our specification models regime-specific moments for all risk factors and fund excess returns.

either from investing in foreign equities directly, or in American Depository Receipts traded in the US, is diminishing due to the increase of world equity market integration (also see Pukthuanthong and Roll, 2009). In our primary two-factor fixed transition probability model we find that emerging market funds can be used to generate superior out-of-sample Sharpe ratios.

Motivation to study international mutual funds, and especially emerging market funds, continues due to market frictions such as barriers to information flows, costs of information transmission, and cultural, legal and other institutional differences. However, empirical evidence regarding the performance of emerging markets funds is limited. Huij and Post (2009) use the rank portfolio method of Hendricks et al. (1993) to examine persistence in mutual fund performance. They find evidence of strong persistence in emerging market funds that is pervasive even among previous winners.[2] Conover et al. (2002) consider the linkages between developed economies and find that when an exogenously specified measure of monetary policy is tight, emerging market funds outperform domestic funds.

We analyze emerging market, (non-US) developed market, and US mutual funds returns in the context of a multivariate Markov regime-switching model with one or two risk factors, and with either fixed or time-varying transition probabilities. We investigate the significance of regime dependent alphas in an econometric model that admits changes in means and covariances across regimes for all assets and risk factors along with a transition matrix to characterize the likelihood of regime shifts. Transition probabilities between regimes are either fixed or time-varying as a function of the Organization for Economic Cooperation and Development (OECD) composite leading indicator. Both the fixed and time-varying transition probability models produce regime probabilities that evolve over time. Our single factor model includes a global equity market risk factor. Our primary two-factor specification also includes a foreign exchange risk factor supported by Solnik (1974a), Adler and Dumas (1983), Dumas and Solnik (1995), and De Santis and Gerard (1998), among others. We also examine two-factor specifications with a second risk factor given by the value factor of Fama and French (1998), the momentum factor of Hou, Karolyi and Kho (HKK 2011), or the HKK (2011) cash to price value factor.

Our empirical results suggest that a two-factor model with fixed transition probabilities can adequately describe the multivariate series of mutual funds considered. Further in our primary fixed transition probability (FTP) model, the estimated alpha for emerging market funds increases by over 1.3% per month when the environment changes from a global bear to a global bull market. When global equity returns are large, emerging market funds provide a substantially increased Jensen's alpha. Our approach is similar in spirit to Conover et al. (2002) in that we find that the economic environment impacts emerging fund returns. The primary differences are that our regimes are endogenously determined, and are related to global equity bull and bear markets rather than the monetary environment. Our finding that emerging market mutual funds provide superior state dependent alphas in bull markets is consistent with Conover et al. (2002) if tight money policy coincides with global bull markets.

We provide the following contributions to the literature. First, we find that a two-factor fixed transition probability (FTP) model provides a parsimonious description of the multivariate return series according to both the AIC and SBC information criteria. This result is consistent with much of the extant literature in related contexts (cf., Kon and Jen, 1978; Turtle et al., 1994; Hamilton, 1989; Ang and Bekaert, 2002a, 2002b; Guidolin and Timmermann, 2008a, 2008b; or Guidolin and Nicodano, 2009). Information criteria find little evidence that time-varying transition probabilities are particularly helpful in characterizing our sample. Nonetheless, the likelihood of various regimes displays substantial variability over time even in our simpler FTP setup. Second, we find that the single-factor FTP model seems to adequately capture the impact of changes in the OECD leading economic indicator without explicitly requiring transition probabilities to evolve with this variable. The model seems to have a tendency to identify bear regimes in equity markets even when the OECD indicator is quite positive and when the NBER does not identify a recession. This puzzle is partially resolved by recognizing that the model identifies global equity market regimes rather than economic regimes per se. That is, we find that global equity markets are noisy predictors of recessions.[3] Plots of the bear regime probability show a close relationship with one-year global equity market returns.

Many of our regime-switching specifications provide good out-of-sample predictability relative to the single regime results, but there is little evidence that time-varying transition probabilities improve out-of-sample forecasts. In general, the world market risk factor substantially improves the prediction for all mutual funds returns. Based on the extant international finance literature we also consider a second risk factor given by a foreign exchange risk factor. Out-of-sample, this factor most improves the predictability of emerging market fund returns. Of the other potential second factors considered, the HKK (2011) value factor improves the out-of-sample forecasts for all mutual funds series.

We also consider out-of-sample Sharpe ratios for various portfolios formed using the Okhrin and Schmid (2006) expected utility maximizing portfolios for various model-specific moment forecasts and risk aversion levels. This analysis offers potentially important differences relative to the simple forecast results in that portfolio choices are impacted by changes in both conditional means and covariances that will impact the resultant weight vectors chosen by our representative investor. In general, we find that FTP models offer superior out-of-sample Sharpe ratios relative to portfolios based on unconditional sample moments.

The remainder of the paper is organized as follows. Section 2 describes the data and their sources. Section 3 presents the regime-switching model and its application in mutual fund performance evaluation. Section 4 presents the primary empirical results of one- or two-factor fixed or time-varying transition probability regime-switching models. In Section 5 we present our primary out-of-sample analyses including a comparison of the various models using 60 one-month forecasts, as well as a related analysis of out-of-sample Sharpe ratios from the various FTP models. The latter is important in that they employ the model-generated covariance matrices in portfolio choice. Section 6 summarizes and concludes.

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[2] This finding of persistence contrasts with the lack of persistence found in Carhart (1997) when examining US mutual funds.
[3] As Paul Samuelson famously noted " … the stock market has predicted nine of the previous five recessions."