North American Journal of Economics and Finance 41 (2017) 190–203

Contents lists available at ScienceDirect

North American Journal of Economics and Finance

journal homepage: www.elsevier.com/locate/ecofin

The benefits of international diversification: Re-examining the effect of market allocation constraints

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ARTICLE INFO

Article history:
Received 29 September 2016
Received in revised form 17 April 2017
Accepted 18 April 2017

Keywords:
Portfolio choice
International financial markets

ABSTRACT

This paper makes adjustments to the data, methods and perspective as presented in Chiou (2008) to report lower potential benefits from international diversification for U.S. investors during the previously reported 1988–2004 investment period. The extended results for 1988–2014 are also presented. Naive international diversification is not found to provide positive return-to-risk (RR) gains or volatility reducing benefits versus the U.S. market. Portfolios optimized with no short sales and weakened weight constraints on positive market allocations can provide RR gains and volatility reducing benefits. The positive RR benefits from diversification out of the U.S. market portfolio are not found to be statistically significant for both periods measured.

1. Introduction

Quantifying the potential gains from international diversification is useful for assessing the magnitude of the home bias puzzle. Early literature reports weak correlations between markets and concludes that there are benefits from international diversification (e.g., Grubel, 1968; Levy & Sarnat, 1970; Lessard, 1973). Trade constraints that reduce the benefits from international diversification can increase the relative efficiency of the naively diversified local market portfolio. Restrictions on short sales have been shown to reduce the potential benefits from diversification into developed and emerging markets for U.S. investors (De Roon, Nijman, & Werker, 2001; Li, Sarkar, & Wang, 2003), U.K. investors (Fletcher & Marshall, 2005) and investors in other countries (Driessen & Laeven, 2007). These benefits are reported to be further reduced for U.S. investors, but not eliminated, when weight constraints on market allocations are considered (Chiou, 2008). In this paper I make adjustments to the data, methods and perspective used in Chiou (2008) to report lower benefits from diversification for the previously presented period of 1988–2004. The benefits for a U.S. investor diversifying out of the U.S. market are shown to weaken further into the extended 1988–2014 investment period. With this re-examination of the benefits of diversification available to U.S. investors with a long investment horizon, I ask the following questions: Is a U.S. investor likely to achieve significant benefits from diversification into the naive global market capitalization weighted (1/M) portfolio? Does relaxing the weight constraints on market allocations improve the significance of the diversification gains? Do these optimal portfolios provide positive diversification benefits during the various market cycles that occur throughout a long investment horizon?

Correlations between markets have oscillated over the twentieth century (Goetzmann, Li, & Rouwenhorst, 2007; Quinn & Voth, 2008), peaking at the end of the 19th century, the Great Depression and the late 20th century. Strengthening correla-

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http://dx.doi.org/10.1016/j.najef.2017.04.005
1062-9408/

tions are reported to be reducing the benefits of diversification (e.g., Baele, Pungulescu, & Ter Horst, 2007; Christoffersen, Errunza, Jacobs, & Langlois, 2012; You & Daigler, 2010). The time-varying nature of market returns and correlations introduces estimation error into ex-ante mean–variance optimization which can result in poor out-of-sample performance relative to naive investment strategies (e.g., DeMiguel, Garlappi, & Uppal, 2009; Jorion, 1985). Strategies designed to reduce estimation error through sample covariance matrix shrinkage (Ledoit & Wolf, 2003; Ledoit & Wolf, 2004a, 2004b) or constraints on the allocation weights in the optimization solution (Behr, Guettler, & Miebs, 2013; DeMiguel, Garlappi, Nogales, & Uppal, 2009; Levy & Levy, 2014) have been reported to provide inconsistent ex-ante performance improvements over naive portfolios of U.S. equities. Constraints on asset weights is equivalent to constructing an unconstrained portfolio optimized using the shrunk covariance matrix derived using Lagrange multipliers from the constraints (Jagannathan & Ma, 2003). Jacobs, Mller, and Weber (2014) finds estimation error reduction strategies do not provide significant improvement over naive allocation strategies for European investors diversifying amongst the four regional equity indices of North America, Europe, Asia and emerging markets.

This paper uses in-sample mean–variance optimization with constant correlations to extend the literature investigating the potential benefits of international diversification for investors with long investment horizons in several ways. First, adjustments to the data, methods and perspective used in Chiou (2008) to measure the potential benefits from diversification into portfolios optimized with market allocation constraints are identified which result in lower benefits than previously presented for the 1988–2004 investment period. The results for the extended investment period of 1988 to 2014 report a further reduction in the benefits from diversification for a U.S. investor diversifying out of the U.S. market.

Next, this study reports the potential benefits achieved from diversifying into the 1/M portfolio. The mutual fund theorem (Sharpe, 1964; Lintner, 1965) and the capital asset pricing model (CAPM) extended to an international setting (Solnik, 1974; Sercu, 1980) assume risk-sharing investors can improve portfolio efficiency by diversifying into the 1/M portfolio. In this paper the 1/M portfolio is the most strongly weight constrained portfolio presented. Chiou (2008) does not present the potential benefits from investing in the 1/M portfolio. This paper addresses this omission and reports that the 1/M portfolio results in reduced portfolio efficiency versus the U.S. market portfolio for both periods measured.

An additional contribution is the use of the Ledoit and Wolf (2008) studentized time series bootstrap confidence interval tests to report the significance of the benefits achieved by the optimized portfolios versus the local market. These tests are designed to address the non-normality of returns and fat-tail events that occur with historical financial data. Using a bootstrap technique, inference methods are performed on paired data points of a given block size between the monthly returns of two portfolios to provide a p-value measuring the significance of the hypothesis that the difference between the two portfolios is zero.

Given that the optimal portfolio results presented in this paper are formed using the data in-sample, the measured benefits from diversification will likely be greater than those achievable by an investor forming optimal portfolios ex-ante. As a result, the use of the Ledoit and Wolf (2008) bootstrap testing methods assists in determining at what level of relaxed weight constraints an optimized portfolio has the potential to offer statistically significant positive diversification benefits that may justify an investor's attempt to capture the diversification benefits from optimization. The test results find that the 1/M portfolio and all optimal maximum return-to-risk portfolios (MRRPs) with and without positive weight constraints do not provide statistically significant RR improvements beyond the domestic U.S. market portfolio for both periods studied. The minimum variance portfolios (MVPs) with relaxed weight constraints can provide lower volatility levels that are statistically different from the U.S. market. However, these MVPs do not provide RR ratios that exceed the U.S. market for both periods.

Finally, I report the benefits that these optimal portfolios provide during the various market cycles that occur through the 1988–2014 investment period. No MRRP is found to achieve positive RR gains for all market cycles. While MVPs with weakened weight constraints can achieve volatility reducing benefits during the different market cycles, the RR benefits are often negative.

This paper is divided into four more sections. Section 2 describes the data and identifies adjustments used to re-examine the benefits of diversification reported in Chiou (2008). The average correlation of returns between the 34 markets studied for the 1988–2014 period are also reported. Section 3 presents the methods used to measure the potential benefits. Section 4 reports the returns and the standard deviation of returns used in this study for the 34 markets. The MRRP and MVP optimized with no short sales and no weight constraints on positive market allocations for the 1988–2004 and 1988–2014 periods are also presented. Section 4 presents the results of this study. Section 5 concludes with suggestions for future study.

2. Data

The monthly price and total return MSCI equity index data in U.S. dollars for the 21 developed and 13 emerging markets presented in Chiou (2008) are used in this study. The sample period covers December 31, 1987 to December 31, 2014. The price index data is used to replicate the results presented in Chiou (2008) and identify the methods used in that paper. The total return data, which is adjusted for reinvested gross dividends, is used to report the adjusted results for the 1988–2004 period previously presented in Chiou (2008) and the extended 1988–2014 period presented in this paper.

Annual market capitalization data in U.S. dollars for 1988–2012 is from two sources: the World Bank and the World Federation of Exchanges. The World Bank data is available for 33 of the 34 markets from 1988 to 2012. The data is incomplete for Korea and Ireland. Korea is missing the 1988 capitalization and Ireland is missing the 1988–1994 capitalization. This incom-