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## Benefits of international diversification with investment constraints: An over-time perspective

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### ABSTRACT

This paper investigates the benefits and asset allocation of the optimal international diversification for the U.S.A. investor while considering various portfolio constraints. Although the global financial market is becoming more integrated, the findings suggest that adding lower and upper weighting bounds reduces, but does not completely eliminate, the potential economic value of international investment. The addition of investment constraints makes asset allocation more feasible and decreases the volatility in portfolio return. The time-variation in the optimal asset allocation implies that fund managers should rebalance international portfolios dynamically. The out-of-sample test suggests that the Markowitz model with constraints realizes trivial improvement in mean-variance efficiency but still demonstrates significant reduction in risk.

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### 1. Introduction

In an increasingly integrated global capital market, understanding the impact of investment constraints on the benefits and portfolio allocation of international diversification is crucial for financial economists and professionals. The benefits of global diversification have been documented over the past decades.<sup>1</sup> However, since the analytical framework of Markowitz (1952) does not take portfolio liquidity into account, investors may not be able to allocate funds internationally by following

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<sup>1</sup> For a more detailed discussion, see De Roon et al. (2001); De Santis and Gerard (1997); Driessen and Laeven (2007); Fletcher and Marshall (2005); French and Poterba (1991); Harvey (1995); Li et al. (2003); Novomestky (1997); and Obstfeld (1994).

the unrestricted efficient frontier. Adding various constraints, such as eliminating short-selling and incorporating upper bounds, helps asset managers to fashion realistic diversification portfolios. Furthermore, an empirical exploration is necessary to document the characteristics that can be generated from the addition of weighting limitations in international investing strategies. Finally, when global markets are known to have become more integrated, it is natural to question whether international diversification still benefits domestic investors. In this paper, I consider more realistic weighting constraints when evaluating the magnitude of economic values and components of globally diversified portfolios.

There are three reasons for fund managers to consider the unattainability of the corner solutions on the efficient frontier. First, both the profitability and liquidity of the diversifying portfolio should be taken into account when investors determine asset allocation in international markets. The heavy weightings of investments in the minor markets recommended by less-constrained strategies may cause illiquidity of the portfolio. Second, the excessive foreign capital in- and out-flows in small markets tend to trigger volatility in asset values. This hot money effect may generate dramatic alterations in mean-variance efficiencies and correlations in international financial markets. Third, in many countries, particularly developing nations, government regulations prohibit foreign investors from short-selling and/or holding more than a certain proportion of company shares.<sup>2</sup> From legal and institutional aspects, managing an international portfolio without considering investment constraints is impractical.

My study synthesizes the major concepts and/or *modi operandi* of the previous research and tries to maximize the practicability in managing international portfolios. In particular, I take into account the upper bounds that are explicitly associated with the sizes of capitalization in the global market. By constructing time-rolling efficient frontiers with restraints, I can evaluate the impacts of investment constraints on the benefits and portfolio components of diversification in the world financial market.

My empirical findings confirm the international diversification benefits under various portfolio constraints, which are *simul justus et peccator* for asset management. Although the lower and upper bounds of weights worsen the mean-variance efficiency of the optimal portfolio, they generate some of the desired attributes for asset management, and therefore enhance the feasibility of asset allocation strategies. Specifically, the adding overweighting investment constraints substantially reduces the time-variation in gains and weights of the global diversification. The expansion of coverage in the optimal portfolio makes the asset allocations more realistic. The out-of-sample tests under various rebalancing frequencies confirm slight increases in the mean-variance efficiency of the optimal portfolio as compared to a market value weighted portfolio. However, there still is unambiguous evidence of risk reduction.

The rest of the paper proceeds as follows. Section 2 reviews the studies on the issues of international diversification. Section 3 presents the assessments for the global diversification benefits. Section 4 describes the data. Section 5 reports the empirical findings of diversification benefits and the results of the out-of-sample test. Section 6 concludes.

## 2. Literature review

Previous empirical evidence suggests that investment constraints may not completely eliminate the benefits brought about by international diversification. Bekaert and Urias (1996), Chiou (2008), Chiou et al. (2008), De Roon et al. (2001), Harvey (1995), Li et al. (2003), Pástor and Stambaugh (2000), and Wang (1998) confirm the benefits of international diversification even when short-selling is not allowed. Cosset and Suret (1995) find that including securities from high political-risk countries in a portfolio can increase mean-variance efficiency. Green and Hollifield (1992) and Jagannathan and Ma (2003) investigate the impacts of imposing short-sales and upper-bound investment constraints on mean-variance efficiency and portfolio risk. They suggest that imposing the constraints is equivalent to constructing the optimal portfolio with shrinkage in the estimators of covariances. Errunza et al.

<sup>2</sup> For instance, the ownership of listed companies by foreigners cannot exceed the limit of 10% in Chile, 25% in South Korea, 10% in Taiwan, and 49% of voting stocks in Brazil. See Solnik and McLeavey (2009) for a detailed discussion.

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