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Which demands affect optimal international portfolio choices?

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ABSTRACT

This study analyzes the asset allocations of simple international portfolios that include domestic risky assets, foreign risky assets, and domestic risk-free bonds, through a theoretical analysis. A close-form solution for the optimal holding rates is derived, and can be further sub-divided into three categories of demand: speculative demand, diversified demand, and hedging demands. We carefully explore the essential problem of identifying the underlying reasons for asset allocations, which in turn allows us to answer the question of *which* of these demands are critical in influencing holding changes.

1. Introduction

Nowadays, with financial trading activities having gradually become globalized, investors are concerned not only with risks and returns of risky assets, but also with risks of the exchange rate. Due to international financial markets being globalized and integrated, domestic investors can easily hold foreign financial assets denominated in foreign currency. Therefore, asset allocations of international portfolios have become an important issue for both academics and market participants. Of particular importance is the possibility of exchange rates varying greatly over a period of time, especially since many nations have deregulated currency transfers and exchange rate variations.

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Investing in foreign financial assets benefits the wealth allocations for a domestic individual because the return-risk features of foreign assets differ from those of domestic assets. Although adding a foreign asset into a domestic portfolio can enhance the mean-variance efficiency, it also brings with it the risk of the exchange rate because foreign assets are denominated in foreign currencies. Therefore, balancing the benefits and disadvantages of investing in foreign assets is a challenge for these investors.

There are numerous reasons for investing foreign assets. First, the holding of foreign assets has a speculative demand due to the relative performances of various risky assets. Investors would like to allocate more wealth on assets that have better performance. Second, holding foreign assets also has a hedging demand that stems from the desire to avoid the risk of the exchange rate. Third, diversified risks are also considered in investors' diversified demands. That is to say, holding foreign assets presents a risk-return trade-off in international portfolios. One question that naturally arises is *whether* the speculative demand, diversified demand, or the hedging demand is more critical in terms of affecting an individual's international portfolio choices. This study discusses possible demands of holding risky assets, and looks at what roles these demands play in determining the total holding rates in a market with a stochastic setting of the exchange rate.

This study attempts to analyze the asset allocations of international portfolios for a representative individual who is exposed to the risk of the exchange rate. We derive the optimal decision-making for a simple international portfolio including domestic risk free assets, domestic risky assets, and foreign risky assets in a stochastic environment in terms of the exchange rate. Framing a continuous-time decision model, we concern ourselves with how individuals form their speculative demand, diversified demand, and hedging demand for both domestic and foreign assets in response to the volatility risk and the jump risk of the exchange rate. Thus, we can answer the question of *whether* the individual should increase his holding rates of domestic stock or foreign stock if the volatility of the exchange rate increases. Specifically, this study identifies *which* the reason for increasing one's holdings of domestic assets or foreign assets stems from speculative demand, diversified demand, or hedging demands. This study also explains *why* several determinants can change one of demands, without changing the other demands.

Although previous studies have provided some observations on international portfolios, none of them has gone so far as to derive closed-form solutions for optimal fractions of wealth between domestic and foreign assets (see e.g., Biger, 1979; Das and Uppal, 2004; Smedts, 2004; Lioui and Poncet, 2003; Veraart, 2010; Topaloglou et al., 2008; Martinez and Nava, 2009). Topaloglou et al. (2008) developed a sequence of investment decisions at discrete points in time for international portfolio management using a multi-stage stochastic programming model. They confirmed that an appropriate use of currency forward contracts could reduce risks of international portfolios. Larsen (2010) analyzed how investors choose their optimal strategies in an international market, and showed that the observed investment gain came from speculative investment only. In our study, a simple continuous-time, three-asset model can yield a closed-form solution, and can analyze which demands matter most in terms of affecting the holding rates of various assets.

In addition, in his pioneering studies, Merton (1971, 1990) documented the speculative demand and hedging demand for risky assets. That is to say, he analyzed the reasons for holding risky assets as coming from these two demands. Our study further analyzes the financial implications of asset holdings by breaking demand down into several components. Specifically, in addition to speculative demand and hedging demand against the volatility risk, we observe other reasons for holding risky assets, namely, diversified demand and hedging demand against the jump risk of the exchange rate. That is, although previous numerous studies have mentioned the demand categories of holding risky assets, they lost the contrasts of which demands are important for determining the asset holdings.

In short, our contributions are follows. First, compared to the numerical solutions of optimal holdings in numerous previous studies, we provide a closed-form solution for the problem of optimal weights of international portfolios. Second, this study answers the question of *how* investors allocate the assets in their wealth portfolio in response to the volatility risk and jump risk of the exchange rate. Third, speculative demand, diversified demand, and hedging demands for these assets will be clearly analyzed as the individual's portfolio exposes him to the risks of the exchange rate. That is to