

## **Inflation Hedging, Real Returns and Optimal Portfolios**

Frans A. de Roon

Jinqiang Guo

Jenke ter Horst

Tilburg University

28 October 2009

The issue of inflation hedging has received much attention for a long time. Most investors with sufficiently long investment horizon care about the real purchasing power of their portfolios. Relatively safe assets such as nominal government bonds providing high nominal returns and low volatility may be risky from the real return's perspective. In contrast, some asset classes such as commodities, real estates, infrastructure funds and inflation-linked bonds are good inflation protection instruments as their returns positively correlate with inflation. An investor with real return/risk objectives will take into account inflation hedging in choosing the optimal portfolio.

The literature related to this paper can be loosely divided into two closely linked strands. The first strand deals with the inflation hedging property of various assets (e.g. Fama and Schwert (1977), Gultekin (1983), Nijman and Swinkels (2003)). The second strand looks into the implication of inflation to portfolio investors (e.g. Brennan and Xia (2002), Schotman and Schweitzer (2000), Solnik (1978)). For instance, Fama and Schwert (1977) examine inflation hedging effectiveness of government bonds and bills, real estates, labour income, and common stocks. They find that while the bonds and bills are effective hedges against expected inflation, common stocks are negatively related to both expected and unexpected inflation. The private real estate is a good hedge against both expected and unexpected inflation. Nijman and Swinkels (2003) find the significance of commodities in the strategic asset allocations in reducing the risk on the funding ratio from an inflation-indexed pension scheme. Schotmann and Schweitzer (2000) examine the horizon effect of the inflation hedge of stocks. They conclude that the optimal hedge ratio of stocks depends on the investment horizon.

Our paper contributes to literature in several ways. Firstly, it incorporates the inflation hedging consideration into the investor's objective in a multi-period framework. It extends the dynamic portfolio selection method by Brandt and Santa-Clara (2006) to derive the optimal portfolio and inflation hedge demands. The optimal solution to the multi-period portfolio problem is still in the Markowitz paradigm. Secondly, this paper also examines the horizon sensitivity of stocks, bonds, and commodities. The horizon effect under the multi-period asset allocation perspective that takes into account the time-series covariance of asset returns and inflation, is inherently different from the horizon effect of assets in the single-period framework as in Schotman and Schweitzer (2000). Finally, this paper contributes to the literature of commodities' role in an investor's portfolio. Commodities may offer a good real return, and can be a good hedge against expected and unexpected inflation under both the unconditional strategy and the conditional strategy.