ELSEVIER

The Quarterly Review of Economics and Finance
47 (2007) 159–174

The QUARTERLY REVIEW of ECONOMICS and FINANCE

www.elsevier.com/locate/qref

# Empirical properties of currency risk in country index portfolios

V.T. Alaganar [a], Ramaprasad Bhar [b,*]

[a] *State Street Global Advisers, Sydney, Australia*
[b] *School of Banking and Finance, The University of New South Wales, Sydney 2052, Australia*

Received 18 August 2003; received in revised form 7 June 2005; accepted 18 July 2005
Available online 18 December 2006

**Abstract**

We test the first- and second-order effects of exchange rates on World Equity Benchmark Series (WEBS). WEBS are a relatively recent asset class traded in the U.S., which tracks international equities corresponding to the Morgan Stanley Capital International (MSCI) indices closely. We also test the asymmetric effect of currency movement on WEBS using a variant of the GARCH-M methodology. This aspect has not been documented in the finance literature in the context of international equities. With the help of Sign and Size Bias Tests, we find that past exchange rate changes as well as its volatility has a significant bearing on WEBS return. However, most WEBS returns do not carry a significant risk premium for its own volatility. One plausible explanation is that WEBS volatility mostly incorporates the diversifiable risk for the U.S. investors. Our empirical results provide evidence as to where the phenomena, such as momentum, persistence, and reversal are present in this asset class.


*JEL classification:* C5; E3

*Keywords:* WEBS; GARCH-M; Sign Bias Test; Size Bias Test; Exchange rate risk

## 1. Introduction

International equity investments are generally undertaken to achieve greater diversification and higher equity returns relative to a domestic only equity portfolio. It could be said that currency exposure is a by-product of the international investment decision. Currency is not regarded as

* Corresponding author. Tel.: +61 2 9385 4930; fax: +61 2 9385 6347.
*E-mail address:* R.Bhar@unsw.edu.au (R. Bhar).

1062-9769/$ – see front matter 
doi:10.1016/j.qref.2005.07.002

an investment, since no capital is invested to create the currency exposure. Nonetheless, foreign currency exposure is risky.

Given that the exchange rate risk is one of the significant risk factors, firms may engage in active risk management strategies, such as hedging. In this context, it is important to understand how currency risk varies across different international equity markets. Such knowledge is useful in constructing hedging strategies by multinationals and in portfolio decisions made by international equity managers.

The interest on exchange rate and international equity returns is greater in the recent times since the emergence of new capital markets and the adoption of more flexible exchange rate systems, and the rapid growth of international capital flows and investments. These developments have increased the interest of researchers to study the interactions between the exchange rate and equity returns. Some of the recent research articles, however, do not report a coherent finding in this respect. Griffin and Stulz (2001) find the impact of exchange rate shocks on equity return from Canada, France, Germany, Japan, the UK, and the U.S.A. not significant. They suggest that the firms choose to organise themselves such a way that this happens. On the other hand, Doukas, Hall, and Lang (1999) show that large multinational and export oriented Japanese firms carry a significant exchange rate risk premium that is time varying. This contradicts the finding in the earlier study by Jorion (1991). Iorio and Faff (2002) report that the exchange rate risk premium for Australian stocks is only significant in certain sub-periods, which they classify as economically uncertain.

These results indicate rather diverse behaviour of the impact of exchange rate on equity return and probably depend on the data used and the methodology employed. Besides, only a handful of countries have been examined in earlier research. The introduction of World Equity Benchmark Shares (WEBS) has given a unique opportunity to examine the relationship between international equity returns and exchange rates. It is unique because of the particular characteristics of these new securities. WEBS are traded on the American Stock Exchange and thus help us avoid empirical difficulties, such as different market trading hours and currency conversions. These are investable assets readily available to the U.S. investors unlike the market indexes (e.g. S&P500, CAC40) used in most empirical research in the past.

In this paper, we examine the impact of exchange rate changes and its volatility on the return generating process of the WEBS. Although, the WEBS are traded in U.S. dollar units the underlying assets are essentially foreign securities. It, therefore, makes sense to examine any impact of lagged exchange rate changes and its volatility on the return from WEBS. Our research, in addition to the novelty of WEBS, differs from existing research since we adopt the GARCH-M model for excess return in WEBS, which includes Glosten, Jagannathan, and Runkle (1993) modification to account for differential impact of positive and negative unexpected returns. Casual examination of evidence from empirical research on currency risk and equity returns reveals an inconclusive picture. Using the Glosten, Jagannathan, and Runkle (GJR) framework, which incorporates the asymmetric currency impact, we aim to shed more light on how currency risk is related to equity returns. We postulate and test a number of hypotheses based on the GJR model.

Our results show that past exchange rate volatility impacts positively on WEBS return volatility. However, WEBS returns do not carry a significant risk premium for its own volatility, although there is evidence of significant volatility persistence. This is possibly due to the U.S. investors' perception that such volatility risks are diversifiable. Most WEBS series also exhibit asymmetric effect of past innovations in exchange rate changes. Past exchange rate changes are also priced into the current WEBS return. The estimates of the model parameters are also