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International portfolio diversification: Currency, industry and country effects revisited

Esther Eiling [a,*], Bruno Gerard [b], Pierre Hillion [c], Frans A. de Roon [d]

[a] University of Toronto, Rotman School of Management, 105 St. George Street, Toronto, Ontario M5S 3E6, Canada
[b] Norwegian School of Management BI and Tilburg University, Nydalsveien 37, 0442 Oslo, Norway
[c] INSEAD, 1 Ayer Rajah Avenue, 138676 Singapore, Singapore
[d] Tilburg University, P.O. Box 90153, 5000 LE Tilburg, The Netherlands

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A B S T R A C T

We examine the relative importance of country, industry, world market and currency risk factors for international stock returns. Our approach focuses on testing the mean-variance efficiency of the various factor portfolios. An unconditional analysis does not show significant differences between country, industry and world portfolios, nor any role for currency risk factors. However, when we allow expected returns, volatilities and correlations to vary over time, we find that equity returns are mainly driven by global industry and currency risk factors. We propose a novel test to evaluate the relative benefits of alternative investment strategies and find that including currencies is critical to take full advantage of the diversification benefits afforded by international markets.

1. Introduction

One of the core questions in international finance is which factors drive international equity returns. A substantial amount of research focuses on the comparison of country versus industry factors. This was first investigated by Lessard (1974). Renewed attention to the issue and a voluminous literature was sparked by the work of Roll (1992), Heston and Rouwenhorst (1994) and

* Corresponding author. Tel.: +1 416 946 3121; fax: +1 416 971 3048.
E-mail addresses: esther.eiling@rotman.utoronto.ca (E. Eiling), bruno.gerard@bi.no (B. Gerard), pierre.hillion@insead.edu (P. Hillion), F.A.deRoon@uvt.nl (F.A. de Roon).

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Griffin and Karolyi (1998). Today, more than three decades later, the country-industry debate is still ongoing.[1]

A closely related issue is financial market integration. In fully integrated markets, only global risks are priced (e.g., Solnik, 1974a; Sercu, 1980; Adler and Dumas, 1983) while in segmented markets only local risks are priced.[2] Several recent papers provide evidence that national equity markets are becoming more integrated within the world market (e.g., De Jong and De Roon, 2005; Carrieri et al., 2007; Pukthuanthong and Roll, 2009). This suggests that international equity returns are increasingly driven by global rather than by local factors.

Further, currency risk factors could play an important role for global stock returns. Several international asset pricing models show that, in equilibrium, when currency risk induces deviations from purchasing power parity, investors require to be compensated for bearing exchange rate risk (e.g., Stulz, 1981; Dumas and Solnik, 1995). De Santis and Gerard (1998) and Lustig and Verdelhan (2007) report empirical evidence of a premium for currency risk.[3]

This paper investigates to what extent international stock returns are driven by country, industry and currency risk factors. In addition, we consider as benchmark models the world Capital Asset Pricing Model that includes the world market return and the International CAPM that includes several currency returns as well. A common approach for comparing country and industry effects is based on a factor model with country and industry dummy variables (Heston and Rouwenhorst, 1994; Griffin and Karolyi, 1998). This model assumes a unit exposure to the global market shock for all assets, which may lead to biases in comparing country and industry factors (Baele and Inghelbrecht, 2009; Bekaert et al., 2009).

We propose an alternative approach and a novel test to provide new insights into the role of currency, country and industry factors in driving equity returns in the seven largest world economies over the February 1975 to June 2011 period. We proceed in two steps. First, we conduct spanning tests to investigate whether a subset of the portfolios or factors under consideration is mean-variance efficient when tested against the remainder of the assets. If for instance, the Adler and Dumas (1983) version of the international CAPM is the appropriate model to describe equilibrium returns in international markets, the world and currency factor portfolios would span all other asset returns. In a second step we propose a new test to investigate the relative benefits of alternative international diversification strategies based on country, global industry and currency factor portfolios. We perform all our tests both unconditionally and conditionally, as well as both unconstrained and with reasonable limits on short sales.

Our unconditional tests do not detect significant differences between country, industry and world portfolios. Spanning is only marginally rejected for the ICAPM portfolios with respect to global industry returns. Moreover, the unconditional analysis provides no evidence that currency risk factors matter; currency returns are spanned by country, industry and world returns.

In contrast, when we allow for time-varying means and (co)variances using returns on managed portfolios, we can identify which factors dominate. Our conditional results show that international equity returns are primarily driven by industry and currency risk factors. While country returns are spanned by global industry returns, industry returns are not spanned by country returns. This corresponds to a tangency portfolio that is linear in the returns on industry portfolios only. Furthermore, the world market portfolio is efficient with respect to country returns, but not with respect to global industry returns. The dominance of global industry factors over country factors is in line with the seven developed countries in our sample being among the most integrated equity markets in the world. Finally, we find that currency returns significantly improve the mean-variance efficiency of country, industry and world market portfolio returns.

[1] Traditionally, country factors are found to dominate industry factors (among others, Grinold et al., 1989; Drummen and Zimmerman, 1992; Heston and Rouwenhorst, 1994; Griffin and Karolyi, 1998; Brooks and Del Negro, 2005; Ehling and Ramos, 2006; Campa and Fernandes, 2006; Bekaert et al., 2009; Catão and Timmermann, 2010). However, several recent papers show that industry factors are becoming increasingly important (e.g., Cavaglia et al., 2000; Isakov and Sonney, 2004; Ferreira and Ferreira, 2006; Hardouvelis et al., 2007; Baele and Inghelbrecht, 2009). Ferreira and Gama (2005) report an increase in industry volatility, while country volatility has remained relatively stable.

[2] e.g. Stulz (1981), Errunza and Losq (1985), Bekaert and Harvey (1995) - for a survey, see Stulz (1995).

[3] See also Vassalou (2000), De Santis et al. (2003), Dahlquist and Sällström (2002), Chang et al. (2005) and Zhang (2006).