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Foreign bias in Australia's international equity holdings

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ABSTRACT

The paper uses various approaches: capital asset pricing, mean-variance, global minimum-variance, Bayes-Stein, Bayesian and multi-prior to develop foreign equity bias measures for Australia's international equity holdings in 41 countries, over the period 2001 to 2012. Bayesian models allow for various degrees of mis-trust in the ICAPM model. Multi-Prior restricts the expected return for each asset to lie within specified confidence interval around its estimated value. Mean-Variance computes optimal weights by sample estimates of mean and covariance matrix of sample return. Bayes-Stein shrinks each asset's historical mean return toward the return of the minimum variance portfolio and improves precision associated with estimating the expected return of each asset. The plausible sources of foreign equity bias are trade, GDP per capita, real GDP growth rate, exchange rate volatility, tax credit, stock market development, familiarity and institution variables. The paper finds that economic cost of the observed foreign bias is low. The paper analyses correlation effect on the foreign bias and finds that economic loss decreases with an increase in correlation.

1. Introduction

Australia's equity holdings as a percentage of total international equity holdings are primarily concentrated in United States (43%), United Kingdom (10%) and Japan (5%).[1] Australian investors are found to exhibit bias towards these three foreign countries in their international equity holdings. The paper focuses on the extent to which Australian investors' underweight or overweight foreign markets in their international equity holdings.

There are no papers which specifically study foreign bias in Australia's international equity holdings across a range of developed and developing countries.[2] This is first paper to develop measures of foreign equity bias for Australia that takes into account the scepticism of investors in the CAPM model.[3] This paper also develops foreign bias measures for Australia's international equity holdings based on Garlappi, Uppal, and Wang (2007) Multi-Prior model's volatility correction technique.[4]

The paper develops foreign equity bias measures for Australia's international equity holdings based on a Bayes–Stein shrinkage estimator that minimizes the impact of estimation error by shrinking the sample mean towards a minimum-variance portfolio, thus improving precision in estimating the expected return from each asset. The improved ability to estimate expected returns results in improved out-of-sample performance.[5]

The paper develops measures of foreign equity bias for Australia's international equity holdings in 41 countries, using capital asset pricing (CAPM), mean–variance, global minimum–variance, Bayes–Stein, Bayesian and multi-prior approaches. The paper also identifies the plausible sources of foreign equity bias in Australia's international equity holdings. In a dynamic panel setting over the period 2001–2012, it relates the measures of foreign bias to various categories of variables: economic development (trade, gross domestic product per capita, real gross domestic product growth rate), stock market development (size, turnover, foreign listing), familiarity (language, trade), institution (institutional quality, legal) and other variables (real exchange rate volatility, reward risk, tax credit, global financial crisis, distance). The empirical estimation employs Arellano–Bover/Blundell–Bond linear dynamic panel-data methods to account for country specific heterogeneity and to control for simultaneity bias caused by the possibility that some of the explanatory variables are endogenous.[6]

The paper contributes to the existing literature by assessing the economic cost of the observed foreign bias in the Australian context. The paper analyses the effect of correlation on foreign bias. Levy (2013)

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[1] Author's own calculations based on 2012 Coordinated Portfolio Investment Survey (CPIS) dataset.

[2] Mishra (2011) studies home bias that relies on the ICAPM approach. Warren (2010) examines equity home bias for Australia superannuation funds using a model that reflects observed decision processes.

[3] There are few papers in the global context that employ Bayesian approach to take into account investors' scepticism in the ICAPM model (Pastor (2000), Pastor and Stambaugh (2000), Li (2004), Asgharian and Hansson (2006), Baele et al. (2007) and others).

[4] Knight (1921) states that the Bayesian decision maker is neutral to uncertainty.

[5] See Stein (1955), Berger (1974), Gorman and Jorgensen (2002), Herold and Maurer (2003), Ledoit and Wolf (2003), Wang (2005), Zellner (2010) for shrinkage approach.

[6] Ahearne et al. (2004) and Chan et al. (2005) use pure cross-sectional analysis.

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computes economic costs for the investment home bias in the US market and also analyses the correlation effect on the economic home bias.

This paper differs from the work of Mishra (2015). He develops measures of home bias for 42 countries by employing various models: international capital asset pricing (ICAPM), mean–variance, global minimum–variance, Bayes–Stein, Bayesian and multi-prior correction to Bayesian. My paper focuses exclusively on developing measures of foreign equity bias for Australia. The paper assesses economic costs of the observed foreign bias in the Australian context. The paper also analyses the effect of correlation on the foreign bias.

The paper addresses the following research questions: What are the various measures of foreign equity bias in the Australia's international equity holdings? What are the plausible sources of foreign equity bias? What is the economic cost of the observed foreign bias? What is the effect of correlation on foreign bias? The paper finds that trade, gross domestic product per capita, real gross domestic product growth rate, real exchange rate volatility, tax credit, familiarity and institution variables all have significant impacts on foreign bias.

The next section presents a review of the relevant literature; Section 3 discusses foreign bias measure, optimal portfolio weight models and economic cost; Section 4 describes data, variables, summary statistics and their correlation; Section 5 reviews the validity of ICAPM and foreign bias measures; Section 6 presents the methodology and empirical results and Section 7 concludes.

2. Literature review

Cooper, Sercu, and Vanpee (2012) provide an excellent review of the home bias literature. Some papers compute alternative home bias measures by scaling the benchmark weights: Ahearne, Griever, and Warnock (2004) define the home bias measure as one minus the ratio of the share of foreign equities in US and world portfolios. Beakert and Wang (2009) apply a Fisher transformation to the original home bias measure. Chan, Covrig, and Ng (2005) and Lau, Ng, and Zhang (2010) employ the home bias measure as the log of the ratio of the actual portfolio weight to the benchmark weight. Jenske (2001) uses an estimated tangency portfolio as a benchmark.

Pastor (2000) proposes a Bayesian approach that combines both positive and normative approaches. Baele, Pungulescu, and Horst (2007) employ the Bayesian approach of Pastor (2000) and the multi-prior approach of Garlappi et al. (2007).

Cooper and Kaplanis (1986) develop the international capital market equilibrium model to derive shadow costs of the barriers to cross border investment. Cooper and Kaplanis (1994) provide a point estimate of each country's cost of either inward or outward investments, conditional on an assumed value of risk estimates.[7] Sercu and Vanpée (2008) provide a complete matrix of costs for all combinations of home and host countries and are also able to estimate relative risk aversion. De Moor, Sercu, and Vanpee (2010) use the time-varying volatility model of Bekaert and Harvey (1995) to estimate a covariance matrix of return on risky assets.[8] Levy (2013) find that for reasonable degrees of risk aversion and with 25 years multivariate distribution, that the annual economic home bias loss is merely 0.1%, despite the large domestic overinvestment of about 40% in the US.

Several research papers consider the effect of indirect barriers such as information asymmetries, on equity investment and home bias. French and Poterba (1991) use a simple model of investor preferences and behaviour to show current portfolio patterns imply that, for choices to be mean–variance rational, investors in each nation must expect returns in their domestic equity market to be several hundred basis points higher than returns in other markets. Tesar and Werner (1995) state that there is a strong evidence of a home bias in national investment portfolios despite the potential gains from international diversification. Coval and Moskowitz (1999) state that portfolios of domestic stocks exhibit a preference of investing close to home. Huberman (2001) observes that shareholders of the Regional Bell Operating Company (RBOC) tend to live in the area which it serves, and RBOC's customers tend to hold its shares rather than other RBOCs equity. People invest in the familiar while often ignoring the principles of portfolio theory. Chan et al. (2005) find robust evidence that mutual funds, in aggregate, allocate a disproportionately larger fraction of investment to domestic stocks. Campbell and Kraussl (2007) state that due to greater downside risk, investors may think globally, but act locally, and their model's results provide an alternative view of the home bias puzzle. Berkel (2007) finds that besides a home bias in equities, a 'friendship bias' can be observed for some country pairs. Barron and Ni (2008) link the degree of home bias across portfolio managers to portfolio size. Nieuwerburgh and Veldkamp (2009) state that investors profit more from knowing information others do not know and learning amplifies information asymmetry. Mondria and Wu (2010) state that home bias increases with information capacity and decreases with financial openness. Solnik and Zuo (2012) develop a global equilibrium asset pricing model that assumes investors suffer from foreign aversion, demonstrating a preference for home assets based on their familiarity. Pool, Stoffman, and Yonker (2012) find that familiarity affects the portfolio decisions of mutual fund managers. Coeurdacier and Rey (2013) review various explanations of the home bias puzzle highlighting recent developments in macroeconomic modelling that incorporate international portfolio choices in standard two-country general equilibrium models.

Coen (2001) and Pesenti and Van Wincoop (2002) focus on the effect of non-tradables on home bias. Strong and Xu (2003), Suh (2005) and Lutje and Menkhoff (2007) provide a behavioural explanation of home bias. Dahlquist, Pinkowitz, Stulz, and Williamson (2003) and Kho, Stulz, and Warnock (2009) link corporate governance to home bias.

3. Foreign bias measure, optimal portfolio weight models and economic cost

3.1. Foreign bias measure

In foreign bias studies, the actual portfolio holdings are compared to a benchmark. Depending upon the weight given to the benchmark, there are two approaches used in foreign bias studies: the model based approach and the return based approach. In the model based approach, the ICAPM benchmark is characterized by a country's weight in world market capitalization; the ICAPM approach ignores returns. The data based approach uses a time series of returns and computes benchmark weights from a mean–variance optimization. These two approaches give different benchmark weights and consequently, foreign bias measures are quite different. A Bayesian framework considers both the ICAPM asset-pricing approach and mean–variance data-based approach.

Foreign bias is the relative difference between Australia's actual international equity holdings (w_j) and optimal foreign weights(w_j^*).

$$FB_i = 1 - \left(\frac{w_j}{w_j^*}\right) \tag{1}$$

$$w_j = \frac{FA_j}{FA_j + MC - FL_j} \tag{2}$$

[7] Glassman and Riddick (2001) find that no single set of adjustments can explain home asset bias by itself. Combining adjustments is promising but the implied correlation structure among asset returns is puzzling.

[8] There are papers which discuss shrinking of covariance matrices: Chan, Karceski, and Lakonishok (1999), Green and Hollifield (1992), Ledoit and Wolf (2003, 2004), Frost and Savarino (1988), Chopra (1993), Jagannathan and Ma (2003), DeMiguel, Garlappi, Nogales, and Uppal (2009).

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