WHAT DETERMINES AUSTRALIA'S FOREIGN EQUITY INVESTMENT?

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ABSTRACT

In light of the recent changes to superannuation legislation in Australia, the corresponding heightened exposure to equity markets has highlighted the importance of portfolio diversification as a means to reduce income risk. The International Capital Asset Pricing Model of Sharpe (1964) and Lintner (1965) suggests that in order to obtain maximum gains from diversification, investors should hold the world market portfolio. However, empirical evidence suggests that investors hold too little wealth in foreign assets. This large discrepancy between theory and data is known as the home bias puzzle and still remains robust despite the recent liberalisation of financial markets and removals of direct barriers to investment.

This thesis empirically investigates the distribution of Australian holdings of foreign equities and considers the determinants of equity home bias for a sample of 25 countries. The IMF's high quality Coordinated Portfolio Investment Survey (CPIS) dataset is appropriate for this purpose and is utilised over the period 2001 to 2005. The key findings are that indirect barriers to international investment and information costs are important factors behind international investment patterns and the home bias puzzle.

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CHAPTER I: INTRODUCTION

In light of the recent changes to superannuation legislation, Australian households are dedicating a growing proportion of their household wealth to equity. Between 1990 and 2005, Australian direct equity holdings as a share of total household assets increased from four per cent to seven per cent and superannuation assets increased from 17 per cent to 20 per cent.[1] This heightened exposure to equity markets, both directly and indirectly, has highlighted the importance of portfolio diversification as a means to reduce income risks.

The international capital asset pricing model (ICAPM) of Sharpe (1964) and Lintner (1965) suggests that under assumptions of perfect markets, mean-variance optimising investors can obtain maximum gains from diversification by holding the world market portfolio. However, empirical evidence suggests that investors hold too little of their wealth in foreign assets and are biased towards domestic assets (notably French and Poterba (1991) and Tesar and Werner (1995)). This phenomenon is known as the "home-bias puzzle". The existence of home bias implies that investors may be irrational when they forgo gains from diversification. However, the underweighting of foreign assets may be due to rational reasons such as direct and indirect barriers to investment.

Over the last couple of decades, investors have seen a considerable decrease in direct obstacles to international portfolio investment. Twenty to thirty years ago most countries had restrictions on foreign exchange

[1] http://www.rba.gov.au/Statistics/Bulletin/B20hist.xls

transactions that limited cross-border investment. Global integration of financial markets has seen most investment barriers and capital controls diminished, thereby increasing the opportunities to engage in international diversification. However, despite the fact that direct barriers to international investment have fallen dramatically, foreign ownership is still much smaller than one would expect in the absence of such barriers.

Numerous explanations have been offered for the determinants of international portfolio choice and home bias. Among others they include diversification motives for hedging country specific risk, the existence of transaction costs for buying and selling securities and information asymmetries. However, existing empirical works have been impeded by the problem of accurately estimating bilateral equity holdings, which are stock measures. Instead, data on accumulated capital flows was used to estimate cross border holdings. This data is of poor quality and ill suited to estimate bilateral equity holdings (see Tesar and Werner (1995) and Warnock and Cleaver (2002)). This thesis will contribute to the existing literature by employing the International Monetary Fund's (*IMF*'s) Coordinated Portfolio Investment Survey (CPIS) dataset on bilateral equity holdings for the years 2001 to 2005. This dataset is considered to be of high quality and measures stock holdings of bilateral investment positions.[2]

In addition, the thesis contributes to the current empirical literature by providing a country specific analysis of equity investment from the perspective of an Australian investor. Although Mishra and Daly (2006)

[2]A full explanation on the benefits of the CPIS dataset is discussed in Chapter IV.

conducted a similar study on the geography of Australia's international portfolio investment, their work was limited by the CPIS dataset for 1997 and 2001. Moreover, the thesis will investigate not only the geography of equity holdings but also the determinants of a measure of home-bias. Home bias is measured as the deviation of equity holdings from CAPM benchmark and is in accordance with Ahearne et al (2004).[3]

The structure of this thesis will be as follows: Chapter II will provide an overview of the literature on foreign investment and the home bias puzzle. Chapter III presents two theoretical models on investor behaviour and a definition of home bias. The first model is the international CAPM of Sharpe (1964) and Lintner (1965) and the second model by Martin and Rey (2004) incorporates transaction costs and information asymmetries to derive a gravity model of international portfolio holdings. Chapter IV describes the data used in the estimations. Chapter V reports results for the empirical estimations of equity holdings and home bias and Chapter VI concludes

[3] A full description of the home bias measure is provided in Chapter III.

CHAPTER II: LITERATURE REVIEW

Economists have been trying to explain the geographical location of equity investment for several decades. The finance and macroeconomic literature both provide explanations for theoretically optimal allocations of equities across countries and refer to actual deviations from these benchmarks as the home bias puzzle.

In the finance literature the traditional international capital asset pricing model (ICAPM) based on Sharpe (1964) and Lintner (1965) provides a highly simplified model to explain portfolio diversification across borders. The assumptions underlying this model can be summarised as; (i) investors are risk averse, (ii) they make decisions based on expected returns and the variances of asset returns, (iii) a risk free asset exists where investors can lend or borrow at the same rate, (iv) capital markets are perfect and (v) there are no transaction costs. Under these restrictive assumptions, mean-variance optimising investors can obtain maximum gains from diversification by holding the equities of countries whose returns are negatively correlated with the returns of the home country equities. In order to maximise these gains; the ICAPM proposes that investors hold equities in the proportions that they exist in the market, i.e.: the market portfolio. However, investors appear to fail drastically in obtaining diversified portfolios and tend to heavily over-invest in domestic stocks.

The macroeconomic literature on international risk sharing comes to a similar conclusion. Under the assumptions of complete markets, isoelastic

utilities and the availability of international Arrow-Debreu securities, the ex post marginal rates of substitution in consumption should be equal for residents in different countries. This means that individuals in each country should share risk from their country specific production processes by holding securities that pay out claims against each other's profits. In a world economy with complete markets, these claims represent Arrow-Debreu securities that will pay out under all possible states of production outcomes. In equilibrium, agents from different countries will equalise their marginal utilities for each state of production outcomes. Risk sharing implies that the growth rates of consumption should be equalised across production states and countries. Backus, Kehoe and Kydland (1992) found that while the standard general equilibrium theory predicts a highly, if not perfect, correlated consumption growth across countries, the growth rates of consumption across countries are not highly correlated in data. In fact, they are even less correlated than the growth rates of output across countries. This implies that if investors do not hold enough claims on foreign assets, they will be unsuccessful in sharing risk with foreigners.

Lewis (1999) claims that although international portfolio diversification and international risk-sharing are closely related they are not necessarily equivalent phenomena. Deviations from the market portfolio as studied in the finance literature is known as the "equity home bias", while departures from income and consumption smoothing are known in the international macroeconomic literature as the "international risk-sharing puzzle". Although these two concepts are closely related, one does not necessarily imply the other. For example, home bias may not lead to a lack of international risk sharing if consumption and income smoothing is

done through international borrowing and lending rather than through a fully diversified portfolio. This implies that the intertemporal efficiency condition as shown by the consumption Euler equation can still hold even without a fully diversified portfolio. Conversely, Baxter and Jermann (1997) show that even if investors hold completely diversified portfolios, it will not directly imply that income and consumption streams are smooth. This could be because global equity holdings may be too small relative to global GDP or because equities may be poor at providing a hedge for returns of human capital. The strong link between these two puzzles is heavily reliant on assumptions about the economy including complete markets, equity is traded on all output and that countries can be viewed as populated by representative agents. Because the association is weak, this thesis will focus on examining international portfolio diversification and the equity home bias puzzle.

II.1 DIRECT BARRIERS TO INVESTMENT

The earlier literature on international investment and equity home bias focused on the role of barriers to international investment. Black (1974) developed a two-country model of capital market equilibrium where there are explicit barriers to cross border investment. Barriers are measured in the form of a tax where this tax could represent various kinds of barriers such as direct controls on the movement of capital, possibility of expropriation by foreigners, reserve requirements on bank deposits and restrictions on the fraction of a business that can be foreign-owned. However, Tesar and Werner (1995) propose that if transaction costs are important, investors should be observed to follow buy-and-hold

strategies. On the contrary, they found a high turnover rate on foreign investments, suggesting that investors frequently adjust the size of their international portfolios. This rules out nominal transaction costs of international trading as the cause of the failure of investors to diversify their portfolios.

II.2 INFORMATION ASYMMETRIES

However, transaction costs may be in the more subtle form of information asymmetries. Investors are likely to invest in firms that are familiar to them thus providing a rational explanation for home bias. French and Poterba (1991) use a simple model of investor preference and behaviour to demonstrate that information asymmetry could explain the same observed magnitude of home bias as if the investors expect returns in the domestic market to be several hundred basis points higher than returns on other markets. Gehrig (1993) employs a simple noisy rational expectations model where investors are imperfectly informed and information asymmetries exist between domestic and foreign investors. Investors observe noisy signals with different degrees of precision and domestic investors receive signals about future returns that are more precise. He shows that the domestic bias arises quite naturally when investors have better information about domestic stocks and thus foreign stocks appear, on average, more risky. Hasan and Simaan (2000) calculate the premium that uninformed investors are willing to pay for the full information set. They show that rational investors will prefer the home country portfolio over the diversified portfolio when the cross-market variability in the estimation errors of international markets' means far

exceeds the cross-market variability in the means themselves. Lane (2000) finds that trade and the market size are strongly correlated with gross international investment positions. It seems probable that those factors that influence trade in goods also stimulate trade in assets. Hence trade could be used as a proxy for information asymmetries. Portes, Rey and Oh (2001) show that a gravity model, where distance is used as a proxy for information, explains the international asset trade of US investment just as well as trade in goods does. Countries which are near each other tend to have better knowledge about each other, either because of better media coverage or better tourist and business links. However, at the time of writing, their paper did not have access to the comprehensive Coordinated Portfolio Investment Survey (CPIS) dataset, which measures the stock of cross border equity holdings.[4] Instead, it had to use inferior bilateral flow data from the US treasury TIC data. These studies suggest that asymmetric information between local and non-local investors may play an important role in investment decision making.

II.3 CULTURAL LINKS AND INSTITUTIONS

Several authors examined cultural proximity of countries and equity investment. In Finland, Grinblatt and Keloharju (2001) show that language is relevant for an investor's portfolio allocation. Finnish investors whose native language is Swedish are more likely to own stocks of companies in Finland that have annual reports in Swedish and whose CEOs speak Swedish than those investors whose native language is Finnish. Choe, Kho and Stulz (2001) find that, in Korea, foreign investors

[4] A full explanation on the benefits of the CPIS dataset is discussed in Chapter IV.

buy at higher prices than residents and sell at lower prices. Hau (2001) finds that proprietary trades on the German stock market do better when they are geographically closer to Frankfurt. Dahlquist et al (2003) show that differences in corporate governance across countries can help explain home bias through their impact on share ownership. They construct an estimate of the world float portfolio, which is the market portfolio excluding shares held by investors who are controlling shareholders. This is because these shares cannot easily be bought by portfolio investors and therefore should not be included in the world market portfolio. They find evidence to suggest that United States investors underweight those foreign countries in their portfolios which have closely held firms.

II.4 COUNTRY SPECIFIC STUDIES

Several papers investigate the home bias puzzle related to individual countries. Kang and Stulz (1997) investigate the foreign portfolio equity ownership in Japan. They find that foreign investors overweight shares in firms in manufacturing industries, large firms, firms with good accounting performance, firms with low unsystematic risk and firms with low levels of debt. A study into the determinants of the geographic location of United States equity investment was conducted by Ahearne et al (2004). They found evidence to suggest that an indirect barrier to investment, information costs, plays an important role in the home bias phenomenon. The percentage of a country's market capitalisation that was listed on a US exchange was used as a proxy for information costs. This is because, in order to list, firms have to comply with the SEC disclosure requirements and

subject themselves to the strict regulatory environment. Those countries that had a larger share of firms listed on a United States stock exchange were found to be less severely underweighted in US equity portfolios. They also found results to suggest that when direct barriers to investment, such as capital controls and transaction costs, are statistically significant their economic importance is small. Furthermore, they highlighted that firms from countries with low accounting standards or high trading costs can improve their prospects with US investors by listing on a US exchange. Mishra & Daly (2006) empirically examine Australia's international investment patterns. They use the IMF's CPIS for the years 1997 and 2001 and examine which bilateral factors are responsible for explaining the geography of Australia's equity investment patterns over the sample period. They find that the trade position and size of the market are both highly significant in explaining portfolio allocation. Additional variables that are proxies for information quality and the regulatory environment also possess substantial explanatory power. These variables include telephone costs, language dummy, efficiency of the judicial system and accounting standards.

This thesis extends the work of Mishra & Daly (2006) by employing the latest CPIS figures from the IMF in order to provide an explanation of Australian international investment patterns for the period 2001-2005. A further contribution of this thesis is that it investigates the empirical determinants of the degree of home bias found in Australian equity portfolios.

CHAPTER III: THEORETICAL MODELS

III.1 THE INTERNATIONAL CAPITAL ASSET PRICING MODEL

Pioneered by Harry Markowitz (1952) and extended to an international framework by Sharpe (1964) and Lintner (1965), the international CAPM provides a basic benchmark model for investment and portfolio theory. It introduced the concept that a portfolio of risky assets must be broadly diversified in order to be efficient. The underlying behavioural assumptions and main conclusions are presented below.

The theory assumes the following; agents are risk averse, utility maximising investors care only about mean return and variance of return of their portfolios. In addition, they have homogenous expectations about returns and variance of returns. This means that all investors agree on the joint distribution of asset returns between time periods and that this distribution is the true one. Furthermore, capital markets are complete which implies that taxes and transaction costs do not exist and investors can borrow and lend infinitely at the risk free rate.

Figure 1 describes the portfolio opportunities under the assumptions of the international CAPM. The diagram plots expected return of the portfolio against portfolio risk, measured by the standard deviation of portfolio return. The curve '*abc*' is the minimum variance frontier. This traces combinations of expected return and risk, as measured by its variance, for portfolios of risky assets that minimise the variance of returns for given levels of expected return. If there is no risk free asset, only

portfolios on the '*ab*' segment are mean-variance-efficient. That is, they provide maximum expected returns for a given level of risk.

The efficient set is turned into a straight line upon the inclusion of a risk-free asset. Imagine a portfolio that invests a proportion x of funds in the risk free security and 1-x in some portfolio g. All possible combinations of g and risk-free lending plot on the straight line between R_f and g. Points to the right of g correspond to risk-free borrowing where proceeds are used to invest further in portfolio g. In short, portfolios that combine risk-free lending or borrowing with a risky portfolio g, plot along a straight line from R_f through g in Figure 1.

So, to obtain the mean-variance-efficient frontier incorporating a risk free asset one plots a line through R_f tangential to the minimum variance frontier for risky assets. Therefore, all efficient portfolios are combinations of the risk-free asset (either borrowing or lending) and a single tangency portfolio T. Under complete agreement between investors about portfolio returns and risk, all investors see the same opportunity set and combine the same portfolio T with the risk-free asset. Since all investors hold the same portfolio, it must be the market portfolio. That is, each asset in the market portfolio is weighted by the total market value of all outstanding units of the asset, divided by the total market value of all risky assets.

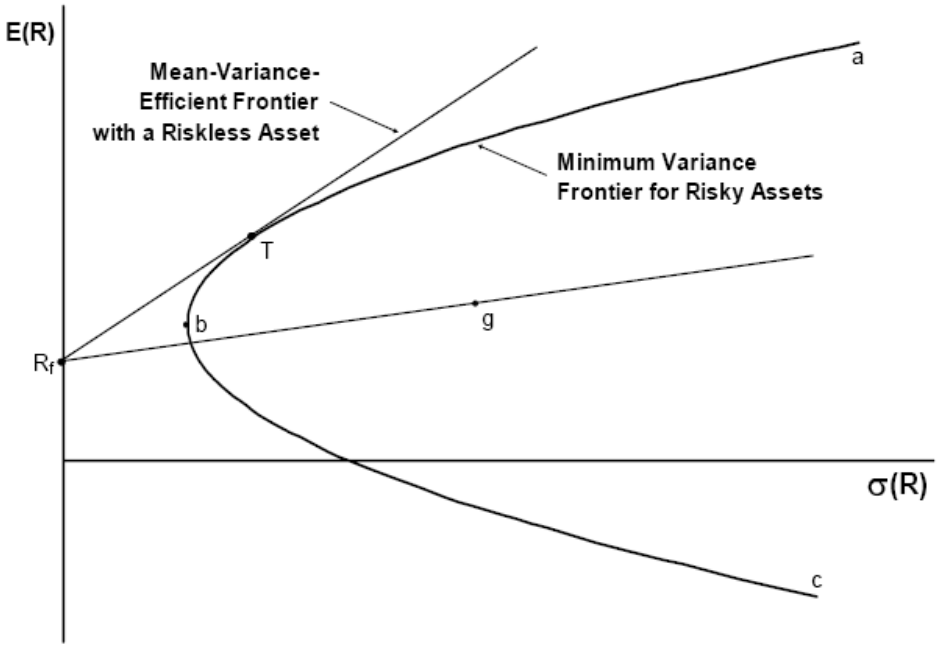
The international CAPM can be applied to the Australian perspective quite simply. Consider Figure 2 which illustrates the efficient frontier facing Australian investors. This figure plots the mean and standard deviations of annualised monthly returns from January 1990 to December 2000 for different combination portfolios of Australian and foreign equities. The

Australian portfolio is represented by the S&P/ASX All Ordinaries Index and the foreign portfolio by the Australian dollar value of the MSCI World Index excluding Australia. Although this highly simplified efficient frontier fails to take into account how different compositions of the components of the two indices would change the risk return combination of the portfolio, basic conclusions regarding the optimal portfolio can be drawn. In particular, if investors prefer higher returns to lower returns, point C is strictly preferred to the portfolio comprising 100% Australian stocks. Also, if investors prefer lower risk to higher risk, the minimum variance portfolio at B is strictly preferred to the Australian portfolio alone. This implies that all points between B and C also strictly dominate the 100 per cent Australian Portfolio. However, if we assume an 80 percent holding in domestic equities, as calculated from CPIS data (Table 1 and Table 2) this would imply that Australian investors currently face the risk-return profile of portfolio A. Clearly, this portfolio is suboptimal for any set of preferences.

However, what the basic international CAPM fails to consider is the effect of high transaction costs. In particular, the effect that they have on expected returns and on the perceived riskiness of the stocks when the full information set is not made available to all investors.

Figure 1: Optimal Portfolio under

Standard Portfolio Theory

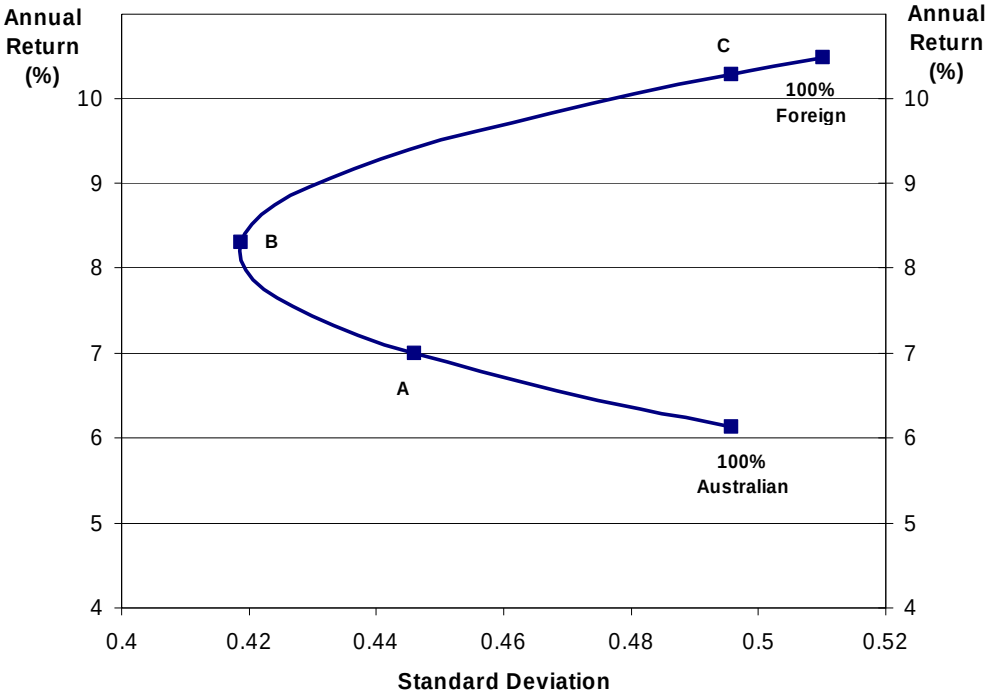


Note:

Figure 1 plots the expected returns of a portfolio against the standard deviation of those returns. Segment 'abc': the minimum variance frontier, Segment 'ab': mean-variance efficient frontier, Point b: the minimum variance portfolio, Rf: the risk free asset, Point T: the tangency portfolio or market portfolio. The mean-variance efficient frontier incorporating a risk free asset is the line through R_f and T.

Figure 2: Risk-Return Trade-off Portfolios

of Australian and Foreign Equities, 1990-2000



Note:

The risk-return profile of the 100 per cent Australian portfolio was calculated from the S&P/ASX All Ordinaries Index. The Foreign portfolio was calculated from the MSCI World Index excluding Australia. Data was taken from January 1990 to December 2000. Point A represents the risk-return profile of the portfolio that is 80 per cent Australian and 20 per cent foreign. Point B is the minimum variance portfolio. Point C is the portfolio with the same risk as the 100 per cent Australian portfolio but higher average returns.

III.2 THE GRAVITY MODEL OF INTERNATIONAL PORTFOLIO HOLDINGS

To address the issue of transaction costs, the thesis follows the theoretical framework of Martin and Rey (2004), extended from two countries to N countries by Faruqee, Li and Yan (2004). In this model international financial asset holdings follow a gravity equation, augmented by transaction costs. They find that a gravity type equation emerges quite naturally from a model for international trade provided that the following assumptions hold. First, assets insure against different risks and are thus imperfect substitutes. Secondly, engaging in cross border asset trade entails some type of transaction cost. This transaction cost could potentially exist in the form of information asymmetries.

The theoretical model takes the following general framework. N countries are each populated with n_i risk averse, immobile identical agents. In the first period, each agent $h_i \in \{1,...,n_i\}$ in country i is endowed with a risky project x_{h_i} and y units of a freely traded good which they can choose to consume, invest in risky projects or use to buy shares on the stock market. In the second period there are S exogenously determined and equally likely states of nature. The risky project is an Arrow-Debreu security which pays dividends of $\delta_{ij} d_{h_i}$ in state j, $j \in \{1,...,S\}$ where $\delta_{ij}=1$ *if* $i=j$ and $\delta_{ij}=0$ *if* $i \neq j$. This assumption captures the feature that the risky projects and assets are different and imperfectly correlated so assets are imperfect substitutes and diversification improves safety. These dividends are the only source of consumption in the second period.

In the first period shares in these projects are traded on the stock market. This implies that investing in one of these projects is equivalent to buying an Arrow-Debreu asset that yields a dividend payoff in only one state of nature. This generates strong incentives to diversify. However, it is assumed that the total number of projects in the world, *T*, is less than the number of states, *S*, so markets are incomplete and agents cannot completely eliminate all risk by holding a portfolio of all traded assets (the market portfolio).

Transaction costs

In the first period, agents raise capital by selling shares of their projects and buying shares of other projects. This transaction cost is paid in units of the share itself and can represent banking commissions and variable fees, exchange rate transaction costs and information costs.

Transaction costs are modelled so that buyers of the assets bear the transaction cost (the results are the same regardless of whether the buyer or seller bears the cost). In this case, the amount paid by an agent h_i, located in country *i*, in period 1 to buy $x_{h_i}^{h_j}$ asset sold in country *j* is $p_j x_{h_i}^{h_j}(1+\tau_i^j)$ where p_j is the price of a share of the risky project developed by agent h_j and τ_i^j is the transaction cost in asset markets between countries *i* and *j*. In period 2, a transportation cost ψ_j^i is applied to the dividend payment. If an agent in country *i* holds an asset in country *j* which pays a dividend of d_j in period 2, the shareholder in country *i* will only receive $(1-\psi_j^i)d_j$ per share.

Budget Constraint

An agent h_i in country i has the following budget constraint:

$$c_{1,h_i} + \sum_{j=1}^{N}(1+\tau_i^j)n_j p_j x_{h_i}^j = y + p_{h_i}$$

where $\tau_i^j > 0$ if $j \neq i$ and $\tau_i^j = 0$ if j=i. Each agent maximises the following utility function:

$$\underset{x_{h_i}^{h_1},\ldots,x_{h_i}^{h_N}}{Max}\ U_{h_i} = c_{1,h_i} + \beta E[c_{2,h_i}^{1-1/\sigma}/(1-1/\sigma)]$$

σ is the inverse of the degree of risk aversion and also the elasticity of substitution between assets.

Solving the first order conditions and market clearing conditions yields cross-border equity holdings EQ_i^j from *i* to *j*.

$$EQ_i^j = n_i n_j p_j \left(\frac{\beta}{T}\right)^{\sigma} \frac{d_j^{\sigma-1}}{p_j^{\sigma}} \frac{(1-\psi_i^j)^{\sigma-1}}{(1+\tau_i^j)^{\sigma}}$$

$$EQ_i^j = \left(\frac{\beta}{T}\right)^{\sigma} (MCP_i)(MCP_j)(TC_i^j)(RET_j^{\sigma-1})\frac{1}{p_i p_j} \qquad (1)$$

where $TC_i^j = (1-\psi_i^j)^{\sigma-1}/(1+\tau_i^j)^{\sigma}$ is the international transaction cost and $RET_j = d_j / p_j$ is the rate of return. MCP_i and MCP_j are the market capitalisation of country *i* and *j* respectively and p_i, p_j measure the prices of assets in countries *i* and *j* respectively. This model generates the basic gravity model of cross-border portfolio holdings. International equity

holdings should be positively related with the size of the markets in both countries, negatively correlated with transaction costs and there is return chasing behaviour. Through some simple algebraic manipulation it is possible to obtain the following equations, which are equivalent to equation (1).

$$EQ_i^j = \left(\frac{\beta}{T}\right)^{\sigma} n_i n_j (TC_i^j)(RET_j^{\sigma-1}) \tag{2}$$

$$\frac{s_i^j}{s_j^j} = \frac{p_j}{p_i}\frac{TC_i^j}{TC_j^j} \tag{3}$$

$$\frac{s_i^j}{s_j^j} = \frac{RET_j}{RET_i}\frac{TC_i^j}{TC_j^j}\frac{d_j}{d_i} \tag{4}$$

where s_i^j is the share of country *i*'s portfolio consisting in country *j's* equity, which is equal to $EQ_i^j/(MCP_i)$. Because this study takes an Australian perspective the subscript *i* will be dropped as it will denote Australia, and country *j* will denote the destination country of investment.

A Measure of Home Bias

Home bias is taken from Ahearne et al (2004) to be a measure of the deviation of equity holdings from the international CAPM benchmark. It is defined as one minus the ratio of the shares of country *j* equities in the Australian and world portfolios. This measure varies from zero (if the weight on foreign equities is the same as their benchmark) to one (if no foreign equities are held)

$$Home\ Bias^j = 1 - \frac{share\ of\ country\ \ j\ equities\ at\ domestic\ level}{share\ of\ country\ \ j\ equities\ in\ world\ \ portfolio}$$

By substituting this measure into equation (4) and rearranging, then according to the gravity model of Martin and Rey (1999), the measure of home bias should be negatively related to returns and dividends and positively related to transaction costs.

$$1 - \frac{s_i^j}{s_w^j} = 1 - \frac{RET_j}{RET_i} \frac{TC_i^j}{TC_j^j} \frac{d_j}{d_i} \tag{5}$$

The empirical section of the thesis investigates the geographical pattern of equity the Australian foreign equity portfolio in order to explain the distribution of the measure of Australian investors' home bias across countries. In particular, this thesis will study the extent to which transaction costs and information flows can account for Australian investment behaviour.

CHAPTER IV: DATA DESCRIPTION

IV.1 HOLDINGS DATA

Only recently has high quality data on cross border investment holdings been available. Previously, models on investor behaviour employed accumulated capital flows data to measure holdings of assets between countries. This data was unsuitable as an estimate of bilateral equity holdings as shown by Tesar and Werner (1995) and Warnock and Cleaver (2003). The problem is that capital flows data are designed to track the flow of money between countries for balance of payments objectives. The foreign country identified in this data is quite frequently an intermediary body and not the issuer of the security. Accumulated capital flow data can thus deliver distorted estimates of bilateral equity holdings and is inappropriate for use in models on international investor behaviour.

In response, the International Monetary Fund (IMF) conducted the first Coordinated Portfolio Investment Survey (CPIS) on 29 countries in 1997. The CPIS collects information on portfolio investment holdings by domestic residents of securities issued by unrelated non-residents. This was done to allow cross country comparisons and improve the coverage of cross border portfolio investment assets and liabilities. The second survey was conducted in 2001 with 69 economies and has since been performed annually, the most recent in 2005 with 72 countries.

Figure 3 demonstrates how the total value of Australian foreign investment has increased from AUD 120 billion to AUD 170 billion between 2001 and 2005. Table 1 and Table 2 present summary statistics

for the distribution of Australian portfolio holdings from the CPIS database for 2001 and 2005 respectively. The composition of a typical Australian equity portfolio is displayed in Column 1. What is clear is the strong preference of investors for domestic equities; over 80 per cent of the typical Australian portfolio is invested in local equities for both years.

Column 2 provides the composition of a typical Australian investor's foreign equity portfolio, that is, the portfolio excluding domestic stocks. The United States was the country of choice for Australian investors with US stocks comprising 58 per cent of the Australian foreign equity portfolio in 2001 and 54 per cent in 2005. Next for 2001, by a large margin, are UK equities, contributing 9 per cent, followed by Japan at 5.8 per cent and surprisingly, the Netherlands. However by 2005 Australian Japanese equities comprised a larger proportion than UK equities, 9.4 per cent and 8.1 per cent respectively. The Netherlands was stable at the fourth largest share. Also making minor contributions are Germany, Hong Kong and Korea. These seven countries account for over 85 percent of the Australian foreign equity portfolio in 2001.

The third column provides the share of each country's market capitalisation in the world portfolio which corresponds to the share predicted by standard portfolio theory. This benchmark is calculated under the assumptions that global capital markets are complete, investors in all countries have identical preferences and choose their portfolios optimally based on the international CAPM of Sharpe (1964) and Lintner (1965).

Column 4 provides a measure of the extent to which Australian investors underweight their holdings in specific foreign countries. It is calculated as each country's weight in the Australian portfolio relative to its weight in the world portfolio. If, as predicted by the ICAPM, the size of the market was the only determinant of the geographic distribution of international equity holdings, then we would expect very little variation in this measure across countries. Interestingly, the variation across countries is significant; Australian investors drastically underweight all equities except New Zealand and domestic equities.

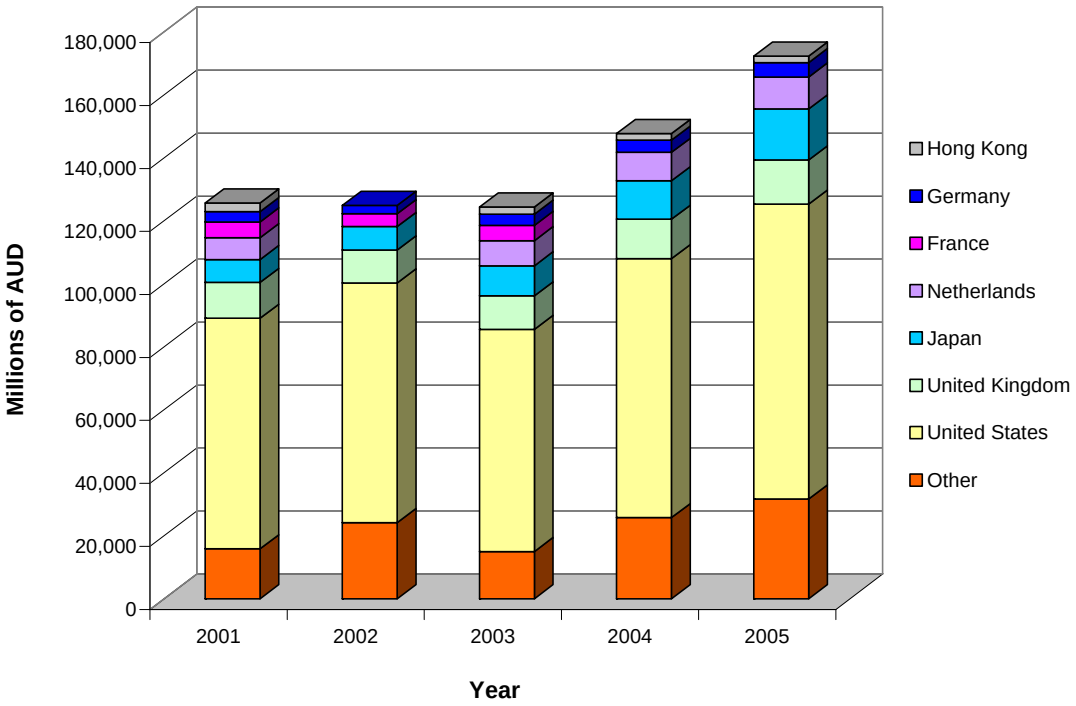
For example, the relative weight in Australian portfolio for the United States in 2005 is almost 0.25, indicating that Australian holdings of US stocks at the end of 2001 were 25 per cent of what traditional portfolio theory would have predicted. On the other hand, Australians invested only 5 per cent of the ICAPM levels in countries such as Austria and India.

Our measure against each country of Australian investors' home bias, (as used in Ahearne et al (2004), shown in column 5, is calculated as 1 minus the ratio of the share in Australian to world portfolios. A greater value of this measure corresponds to a lower relative weight in the Australian portfolio and hence, a greater degree of bias. In 2005, bias varies from 0.997 for Poland, where Australian holdings are less than 1 per cent of the benchmark, to 0.11 for New Zealand, where Australian holdings are 111 per cent of benchmark.

The two goals of this thesis are to explain the geographic pattern of the Australian equity holdings and to investigate the distribution of the measure of Australian investors' home bias across countries.

Because most economic data is available in US dollars and this study takes an Australian perspective, all values are transformed into Australian dollars. This is done to ensure that exchange rate risk is fully taken into account and all returns are realised in Australian dollars to represent the realised nominal returns of a typical Australian investor.

Figure 3: Distribution of Australian International Equity Holdings 2001-2005



Note:

Data is from the Co-ordinated Portfolio Investment Survey, IMF (2001-2005)

Table 1: Australian Portfolio Holdings 2001

Country	Share in Australian equity portfolio (1)	Share in Australian foreign equity portfolio (2)	Share in world market capitalisation (3)	Relative weight in portfolio (1)÷(3) (4)	Bias 1-(4) (5)
Major Industrial Countries					
United States	10.63%	58.26%	54.49%	0.195	0.805
United Kingdom	1.65%	9.05%	9.96%	0.166	0.834
Japan	1.06%	5.80%	13.85%	0.076	0.924
Germany	0.47%	2.60%	4.06%	0.117	0.883
Other Advanced Countries					
Australia	81.76%		1.49%		
Netherlands	1.01%	5.53%	2.56%	0.395	0.605
Hong Kong	0.40%	2.17%	2.24%	0.177	0.823
Finland	0.10%	0.54%	0.93%	0.106	0.894
Norway	0.03%	0.17%	0.23%	0.134	0.866
New Zealand	0.02%	0.09%	0.08%	0.193	0.807
Austria	0.00%	0.02%	0.10%	0.032	0.968
Poland	0.00%	0.01%	0.11%	0.023	0.977
Emerging Asia					
Korea	0.11%	0.63%	0.62%	0.184	0.816
India	0.02%	0.12%	0.46%	0.049	0.951
China	0.02%	0.11%	0.72%	0.027	0.973
Other	2.45%	13.41%	8.09%	0.302	0.698

Note:

Data on foreign equity holdings by Australian is from the Co-ordinated Portfolio Investment Survey (CPIS), IMF 2001. Share in world market capitalisation was taken from market capitalisation data from DataStream. The per cent of domestic holdings for Australians was implied using CPIS data and data on market capitalisation of Australia for year end 2001 from DataStream.

Table 2: Australian Portfolio Holdings 2005

Country	Share in Australian equity portfolio (1)	Share in Australian foreign equity portfolio (2)	Share in world market capitalisation (3)	Relative weight in portfolio (1)÷(3) (4)	Bias 1-(4) (5)
Major Industrial Countries					
United States	8.94%	54.34%	36.16%	0.247	0.753
Japan	1.55%	9.40%	9.49%	0.163	0.837
United Kingdom	1.34%	8.14%	7.50%	0.178	0.822
Germany	0.44%	2.65%	3.01%	0.145	0.855
Other Advanced Countries					
Australia	83.55%		1.84%		
Netherlands	0.97%	5.88%	1.66%	0.582	0.418
Hong Kong	0.20%	1.21%	1.98%	0.101	0.899
New Zealand	0.13%	0.76%	0.11%	1.119	-0.119
Finland	0.05%	0.30%	0.47%	0.105	0.895
Norway	0.04%	0.27%	0.39%	0.115	0.885
Austria	0.02%	0.11%	0.27%	0.066	0.934
Poland	0.00%	0.00%	0.16%	0.003	0.997
Emerging Asia					
Korea	0.23%	1.38%	1.05%	0.216	0.784
India	0.08%	0.48%	1.56%	0.051	0.949
China	0.02%	0.15%	0.85%	0.028	0.972
Other	2.45%	14.87%	33.49%	0.073	0.927

Note:

Data on foreign equity holdings by Australian is from the Co-ordinated Portfolio Investment Survey (CPIS), IMF 2005. Share in world market capitalisation was taken from market capitalisation data from DataStream. The per cent of domestic holdings for Australians was implied using CPIS data and data on market capitalisation of Australia for year end 2005 from DataStream.

IV.2 DIVERSIFICATION INCENTIVES AND RISK

Under very strict assumptions of perfect markets, the international CAPM predicts that in order to optimise the risk-return profile of their portfolio, investors should hold equities in the proportions that they exist in the market. This allows for maximum gains from diversification and instructs investors to hold the market portfolio. This introduces three factors into the investor's portfolio decision; they are the size of the relevant market, the risk return profile and the correlation between foreign returns and Australian returns.

Market Size

Market capitalisation data is taken from DataStream. The total value of all public equity for each market is the Australian dollar value as of the 31st of December for each year in millions of dollars.

Historical Reward to Risk Ratio

Assuming that investors care about returns and base their expectations about future returns on past returns then Australian investors may underweight countries whose stock markets have performed poorly. This momentum or return-chasing effect is captured by a reward-to-risk ratio, the mean daily return over its standard deviation. This measure is in accordance with Ahearne et al (2004). Data is based on the chief stock market indices for the countries studied (see Table 3 for specific indices) for the returns of the previous year. This variable is expected to have a positive effect on investment location and a negative impact on the measure of bias.

Correlation

Investing in countries whose equity returns are negatively correlated with the returns of the home country generates substantial gains from diversification. Calculations of correlations between Australia and other countries are calculated as the correlation of daily returns over the previous year. Data is taken from the indices listed in Table 3 Correlations are expected to have a negative effect on international investment and positive impact on the measure of bias.

Table 3: Stock Market Indices

Country	Index name
Australia	S&P ASX All ordinaries
Austria	Austrian Traded Index
Belgium	Belgian All Shares Index
Brazil	Ibovespa
Canada	S&P TSX-60
China	Shanghai Composite
Denmark	OMX Copenhagen All Share
Finland	OMX Helsinki All-Share
France	CAC-40 Index
Germany	CDAX
Greece	Athex Composite Share Price Index
Hong Kong	HSI Hang Seng Index
India	BSE-200
Italy	Milan SE MIB-30
Japan	Nikkei 500 Stock Average
Korea	KSE KOSPI
Mexico	IPC
Netherlands	AEX Index
New Zealand	NZX All Index
Norway	Oslo Exchange All Share
Poland	Warsaw SE Index WIG
Spain	Madrid Stock Market General Index
Sweden	OMX Stockholm 30
Switzerland	UB-100 Index
UK	FTSE-100
USA	Dow Jones Industrial Average
World	MSCI World Index

IV.3 DIRECT BARRIERS TO INTERNATIONAL INVESTMENT

One of the crucial assumptions of the international CAPM is that global financial markets are free from barriers to international investment. In practice, barriers do exist and may influence the geographic pattern of Australian investment decisions.

Capital Controls

Direct barriers to international investment such as capital controls and transaction costs have been dismissed by the literature because, even when statistically significant, they have little economic relevance (see Ahearne et al 2004). The role of transaction costs have been downplayed by French and Poterba (1991) because they would have to be implausibly high to explain the observed home bias and because they do not appear to deter investors from turning over their international holdings more frequently than their domestic ones (see Tesar and Wernar 1995). However, capital controls can still affect the decisions of international investors and lead to home bias. This thesis employs the Miniane (2004) capital control measures. This measure is based in the IMF's Annual report on Exchange Arrangements and Exchange Restrictions (AREAER) for the year 2000, it is expected to have a negative impact on equity holdings and a positive impact on the measure of home bias.

IV. 4 INDIRECT BARRIERS TO INTERNATIONAL INVESTMENT

Indirect costs, such as those that arise from lack of legal protection or from informational disadvantages against local residences, may play a vital role in the determination of investment patterns.

Legal protection and the quality of the enforcement matter for corporate ownership patterns around the world. If managers are not held legally accountable to their shareholders then investors may not be protected from expropriation by insiders. This could shape their willingness to participate in the equity markets of certain countries. Legal protection is measured by the efficiency of the judicial system and the rule of law as used in La Porta et al (1998) and by country of legal origin used in La Porta et al (2002).

Efficiency of the Judicial System

Efficiency of the judicial system index is developed by the country risk rating agency Business International Corporation (BIC). This index may be taken to represent investors' assessments of the efficiency and integrity of the legal environment as it affects business. This variable ranges from 0 to 10, where lower values denote lower levels of efficiency, and is the average between 1980 and 1983.

Rule of Law

Rule of law index, also developed by BIC, provides an assessment of the law and order tradition in the country. It also ranges from 0 to 10 with lower values representing less law and order and is the average of the months of April and October of the monthly index between 1982 and 1995.

Country of Legal Origin

La Porta (2002) stresses the importance of country of legal origin as a determinant of financial development. Countries that have adopted the British based common law are considered to give two advantages over

countries whose legal systems are based on the civil law systems of France, Germany and Scandinavia. First, common law offers greater priority to the rights of individual investors compared with the state. Second, due to the presence of jurisprudence in English common law, where law evolves and is created by judges instead of relying on statutory law, common law is far more flexible at being able to adapt to changes in commercial circumstances'. Legal systems that adapt quickly will foster financial development more effectively than would more rigid legal traditions. La Porta (2002) find that countries that have inherited legal systems of UK origin in general offer investors a greater degree of protection. They also conclude that countries with French civil law legal origin provide the worst investor protection, and that Scandinavian and German legal systems are somewhere in the middle.

When considering which stocks to purchase investors need to collect information about the profitability of the firm in order to differentiate between them. If information asymmetries in certain countries make differentiation difficult, then foreign investors may find that they are less able to select the top performing stocks than local investors, who have better information.

Accounting Standards

Information asymmetries could be owing to a variety of sources. One possible source may be the quality of accounting standards. Generally, investors gather information about foreign firms by analysing their accounting statements and historical stock market data. Low levels of transparency and poor disclosure requirements regarding the accounts will

make it harder for investors to distinguish between firms from different countries. Those firms from countries where disclosure requirements are lacking will be perceived as more risky than firms that portray a high degree of transparency in their balance sheets. Foreign investors have to interpret and compare this information in light of the relevant legal and business environment and this leads to costs. An index of accounting standards, used in La Porta et al (1998) is created by the International Accounting and Auditing Trends. This variable provides a measure of the quality of accounting standards and ranges from 0 to 100. However, the usefulness of this measure may be dubious as it is only available for 1990 and accounting standards have improved in many countries since then.

Gravity Variables

Traditional gravity models find that when estimating trade in goods, distance serves as an excellent proxy for transaction costs and trade barriers. However, when considering trade in financial assets there are two possible approaches. First, it might be that those variables that influence trade in goods also influence trade in assets. In which case, the value of traded goods should be included in the regression. However, this provides little intuition behind what these variables might be and how they affect investment decisions. The alternate approach would be to use distance as a proxy for barriers to investment.

This approach was successfully applied by Portes, Rey & Oh (2001) where trade in financial assets was estimated using a gravity model. In their study they found that distance has a negative impact on asset trade. This seems counterintuitive because, unlike goods, assets are weightless and thus any

direct barriers to investment (such as transaction costs) associated with them should not be correlated with distance. Therefore, distance initially seems like an improbable variable to be including in a regression analysis.

One reason for including distance is because of the implications for diversification benefits. Countries that are further away from each other have lower correlations between their business cycles. Thus in order to maximise potential benefits form diversification, investors should purchase assets in countries which are further away. This implies that distance should have a positive impact of asset trade and a negative impact on home bias.

The alternative reason for including distance is that it could be a proxy for information asymmetries. Countries that are geographically near to each other have better information about each other due to trade, business and tourism linkages, common languages and media coverage. Geographical distance is a barrier to interaction among economic agents and cultural exchange. Therefore in order to take advantage of informational advantages investors should invest in neighbouring countries. This hypothesis seems consistent the findings of Portes, Rey & Oh (2001). However, because this study takes an Australian perspective, and because Australia is unique in its isolated location, the role of distance as a proxy for information may not be as robust as in other studies that take a European or American perspective.

Culture links

Because distance may be inappropriate as a proxy for information exchange; other variables need to be investigated. Home bias may be part of a phenomenon where investors demonstrate a preference for familiar stocks.

In which case, variables such as common language and short term visitors that describe cultural similarities might explain investors' preference for firms from certain countries.

Common language promotes a sense of cultural familiarity and is important for bilateral equity holdings. Language is the common language dummy variable which is equal to one if the destination country's official language is English, otherwise the value is zero. This variable is expected to have a positive impact on equity investment. Data on common languages comes from the CIA World Factbook 2007[5].

Cultural familiarity may also be related to the destination of Australians' overseas trips and to the geographic origins of short term visitors in Australia. By travelling to other countries and by interacting with international visitors, Australians may develop a better understanding of different customs and cultures. This could affect the geographic location of their equity investment decision. Data on short term travellers, disaggregated by country, is available from the ABS.

[5] https://www.cia.gov/library/publications/the-world-factbook/

CHAPTER V: ESTIMATION OF AUSTRALIAN INVESTMENT AND HOME BIAS

V.1 MODELLING EQUITY HOLDINGS AND EQUITY HOME BIAS

This thesis begins its investigation into Australia's foreign portfolio holdings by running a series of multivariate regressions. The first specification is derived by taking the natural logarithm of equation (1).[6]

$$ln(EQ_{jt}) = \alpha_0 +_1 \ln(MCP_{jt}) + \alpha_2 \ln(RET_{jt}) + \alpha_3 \ln(Transaction\,Cost\,Variables_{jt}) \quad (6)$$

Equation (6) is the estimable form of the theoretical equation (1). Equity holdings are regressed on financial market size, risk-adjusted returns and transaction cost variables.

The second part of the estimation considers explanations of equity home bias; that is, the deviation from international CAPM benchmark. Equation (7) is the empirical version of equation (5)[7] (as derived in section 3b) where home bias is regressed against a vector of explanatory variables that measure historical risk-adjusted returns, direct barriers and indirect barriers to investment.

$$EHB_{jt} = \alpha_0 + \alpha_1 RET_{jt} + \alpha_2 Transaction\,Cost\,Variables \quad (7)$$

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[6] $EQ_i^j = \left(\frac{\beta}{T}\right)^{\sigma} (MCP_i)(MCP_j)(TC_i^j)(RET_j^{\sigma-1})\frac{1}{p_i p_j}$ Equation (1)

[7] $1 - \frac{s_i^j}{s_w^j} = 1 - \frac{RET_j}{RET_i}\frac{TC_i^j}{TC_j^j}\frac{d_j}{d_i}$ Equation (5)

The dependent variable in equation (6); EQ_{jt} is the Australian dollar value of the stock of country j equity held by Australian residents at the end of year t. The dependent variable in equation (7); EHB_{jt} is the deviation from the international CAPM benchmark. The financial size of country j is taken as the Australian dollar value of the end of period t market capitalisation (MCP_{jt}). The return variable (RET_{jt}) is in accordance with Ahearne et al (2004) and is the ratio of average daily returns divided by the standard deviation of those returns. The transaction costs variables employed in these equations include correlation of financial markets ($CRLI_{jt}$), a measure of the extent of capital controls ($CAPC_{jt}$), efficiency of the judicial system (EFF_{jt}), rule of law (ROL_{jt}), rating of accounting standards (RA_{jt}), trade share ($TRADE_{jt}$), distance ($DIST_{jt}$), common language ($LANG_{jt}$), the number of short term visitors to and from Australia (STT_{jt}) and dummy variables for UK, France, Scandinavia or Germany as the country of legal origin ($UKLO_{jt}$, $FRLO_{jt}$, $SCLO_{jt}$ and $GELO_{jt}$). Both equations are estimated by allowing time fixed effects.

Table 4 presents the correlation matrix for the variables used in the estimation. The variable Equity Holdings (EQ_{jt}) is positively related to market size, efficiency of the judicial system, rule of law, accounting standards, trade, distance, short term travellers and UK legal origin. Equity home bias (EHB_{jt}) is negatively correlated with all variables except for French and German legal origin. The measure of capital controls is strongly negatively correlated with efficiency of the judicial system (-0.6687) and with rule of law

(-0.7684). There appears to be a high degree of correlation between the three variables from La Porta et al (1998), particularly between efficiency of the judicial system and rule of law (0.7609). Trade is highly correlated with both market size (0.6385) and with short term travellers (0.6129) and language is highly correlated with short term travellers (0.7259) and UK legal origin (0.7746). Short term travellers and UK legal origin have a correlation of 0.6170.

Table 4: Correlation Matrix (2001-2005)

	EQ jt	*EHB jt*	*MCP jt*	*RET jt*	*CRL jt*	*CC jt*	*EFF jt*	*ROL jt*	*RA jt*	*TRADE jt*	*DIST jt*	*LANG jt*	*STT jt*	*UKLO jt*	*FRLO jt*	*SCLO jt*	*GELO jt*
EQ jt		-0.1775	0.9497	-0.0946	-0.2232	-0.1265	0.2421	0.2133	0.2063	0.5869	0.1282	0.5297	0.3640	0.3986	-0.1641	-0.1560	-0.1012
EHB jt			-0.0864	-0.2409	-0.1516	0.3211	-0.3121	-0.3112	-0.2601	-0.1099	0.2233	-0.3188	-0.4740	-0.2139	0.0403	0.0734	0.1133
MCP jt				-0.1580	-0.1509	-0.1177	0.2279	0.1970	0.2177	0.6385	0.0954	0.4958	0.3697	0.3800	-0.1897	-0.1524	-0.0360
RET jt					0.0191	0.0428	-0.0130	0.0605	-0.0550	-0.1617	-0.0963	0.0627	0.0912	0.0357	-0.0245	0.0191	-0.0246
CRL jt						0.1343	0.0787	-0.0631	0.1696	0.0896	-0.5043	-0.1001	0.1973	0.0858	-0.2163	0.1374	0.0394
CC jt							-0.6687	-0.7684	-0.4145	-0.0889	-0.2495	-0.3505	-0.2760	-0.0672	0.2646	-0.1438	-0.1019
EFF jt								0.7609	0.5647	0.1579	0.0232	0.3184	0.3184	0.3103	-0.5938	0.3725	0.0155
ROL jt									0.5928	-0.0731	0.3545	0.2829	0.1335	0.0172	-0.2102	0.3667	-0.1040
RA jt										0.0782	0.0700	0.4087	0.2795	0.3293	-0.4451	0.4422	-0.2086
TRADE jt											-0.4390	0.3295	0.6129	0.2336	-0.3810	-0.2626	0.4200
DIST jt												-0.1251	-0.5780	-0.3516	0.3565	0.2063	-0.2262
LANG jt													0.7259	0.7766	-0.3273	-0.1905	-0.2453
STT jt														0.6036	-0.3797	-0.2520	0.0395
UKLO jt															-0.4215	-0.2453	-0.3158
FRLO jt																-0.3273	-0.4215
SCLO jt																	-0.2453
GELO jt																	

Note:

EQ_{jt}: Australian dollar value of equity holdings in country j at time t measured in millions of dollars, EHB_{jt}: Measure of home bias, MCP_{jt}: Australian dollar value of the end of period t market capitalisation measured in millions of dollars, RET_{jt}: Average daily returns divided by standard deviation of daily returns over the year t, CRL_{jt}: The correlation of the financial market in country j with the Australian financial market over the year t, CC_{jt}: The index for capital restrictions in the year 2000, EFF_{jt}: The efficiency of the judicial system, ROL_{jt}: Rule of Law, RA_{jt}: Rating on accounting standards, $TRADE_{jt}$: The share of Australia's total trade that is with country j over the year t as a percentage, $DIST_{jt}$: The distance in kilometres between Canberra and the Capital City of country j, $LANG_{jt}$: Dummy variable taking the value of 1 if the official language in country j is English, STT_{jt}: The sum of the total number of short term arrivals to Australia from country j and the total number of short term departures to country j, $UKLO_{jt}$: Dummy variable taking the value of one if country j's legal system is of UK origin, $FRLO_{jt}$: Dummy variable taking the value of one if country j's legal system is of French origin, $SCLO_{jt}$: Dummy variable taking the value of one if country j's legal system is of Scandinavian origin, $GELO_{jt}$: Dummy variable taking the value of one if country j's legal system is of German origin.

Table 5: Descriptive Statistics of Variables

	EQ	EHB	MCP	RET	CRL	EFF	ROL	RA	CC
Mean	6,400.87	0.82	1,518,579	0.02	0.17	8.71	8.44	64.12	0.36
Median	953.50	0.87	414,555	0.03	0.14	9.50	9.11	64.00	0.29
Maximum	93,631.10	1.00	25,383,608	0.23	0.52	10.00	10.00	83.00	0.86
Minimum	3.00	-0.12	30,087	-0.11	-0.06	5.75	4.17	36.00	0.14
Std. Dev.	17,429.13	0.18	3,715,807	0.07	0.12	1.56	1.91	9.79	0.24
Skewness	3.89	-3.03	5	0.38	0.74	-0.77	-0.93	-0.56	1.12
Kurtosis	17.10	13.82	24	2.55	3.33	1.99	2.41	3.95	2.94
Jarque-Bera	1,059.15	627.91	2,769	4.11	11.94	17.04	19.21	11.35	24.11
Probability	0.00	0.00	0	0.13	0.00	0.00	0.00	0.00	0.00
Observations	98	98	125	125	125	120	120	125	115
Cross sections	25	25	25	25	25	24	24	25	23

	DIST	LANG	STT	UKLO	FRLO	SCLO	GELO	TRADE
Mean	13,877	0.16	245,659	0.24	0.36	0.16	0.24	2.26
Median	15,809	0.00	68,200	0.00	0.00	0.00	0.00	0.82
Maximum	17,581	1.00	1,934,100	1.00	1.00	1.00	1.00	13.14
Minimum	2,322	0.00	6,600	0.00	0.00	0.00	0.00	0.00
Std. Dev.	3,895	0.37	390,013	0.43	0.48	0.37	0.43	3.18
Skewness	-1	1.85	2	1.22	0.58	1.85	1.22	1.98
Kurtosis	4	4.44	8	2.48	1.34	4.44	2.48	6.05
Jarque-Bera	50	82.48	256	32.28	21.44	82.48	32.28	130.17
Probability	0	0.00	0	0.00	0.00	0.00	0.00	0.00
Observations	125	125	125	125	125	125	125	125

Note:

EQ_{jt}: Australian dollar value of equity holdings in country j at time t measured in millions of dollars, EHB_{jt}: Measure of home bias, MCP_{jt}: Australian dollar value of the end of period t market capitalisation measured in millions of dollars, RET_{jt}: Average daily returns divided by standard deviation of daily returns over the year t, CRL_{jt}: The correlation of the financial market in country j with the Australian financial market over the year t, CC_{jt}: The index for capital restrictions in the year 2000, EFF_{jt}: The efficiency of the judicial system, ROL_{jt}: Rule of Law, RA_{jt}: Rating on accounting standards, $TRADE_{jt}$: The share of Australia's total trade that is with country j over the year t as a percentage, $DIST_{jt}$: The distance in kilometres between Canberra and the Capital City of country j, $LANG_{jt}$: Dummy variable taking the value of 1 if the official language in country j is English, STT_{jt}: The sum of the total number of short term arrivals to Australia from country j and the total number of short term departures to country j, $UKLO_{jt}$: Dummy variable taking the value of one if country j's legal system is of UK origin, $FRLO_{jt}$: Dummy variable taking the value of one if country j's legal system is of French origin, $SCLO_{jt}$: Dummy variable taking the value of one if country j's legal system is of Scandinavian origin, $GELO_{jt}$: Dummy variable taking the value of one if country j's legal system is of German origin.

V.2 EMPIRICAL RESULTS FOR FOREIGN INVESTMENT

The empirical results for equation (6) are based on years 2001 to 2005. The partner countries are Austria, Belgium, Brazil, Canada, China, Denmark, Finland, France, Germany, Greece, Hong Kong, India, Italy, Japan, Korea, Mexico, Netherlands, Norway, New Zealand, Poland, Spain, Sweden, Switzerland, United Kingdom and the United States.

Table 6 provides the estimation results for equation (6)[8] where the dependent variable is the natural logarithm of the stock of equity holdings. Column (1) represents international equity holdings in terms of the market capitalisation of the destination country. What is clear is that there is a broad correspondence between investment and financial market size. In particular, market size accounts for over eighty percent of the geographic pattern of Australia's foreign equity investment. This variable is both statistically and economically significant, where a one per cent increase in the market size of country j corresponds to a 1.2 per cent increase in the stock of country j equity holdings held by Australians.

Column (2) represents Australia's holdings of the destination country in terms of market size, return to risk ratio and correlation. Market size is robust in economic and statistical significance to including these two diversification variables. The coefficient on Reward to Risk (RET_{jt}) implies that a 1 unit increase in the ratio of average returns to standard deviation of returns for a destination country corresponds with a 4.19 per cent increase in

[8] $ln(EQ_{jt}) = \alpha_0 +_1 \ln(MCP_{jt}) + \alpha_2 \ln(RET_{jt}) + \alpha_3 \ln(Transaction\,Cost\,Variables_{jt})$
Equation (6)

the equity holdings of that country.[9] Although this sounds like a significant effect it is important to keep in the mind that the Reward to Risk variable ranges only from -0.11 to 0.23 (see Table 5). A better interpretation would be that for a given level of risk, a 1 per cent increase in the annual return of the equities of a country will correspond with a 0.0419 per cent increase in the Australian equity holdings of that country. Although statistically significant, the economic importance is quite small. The other diversification variable, correlation, is positive and significant at the one percent level. This is contrary to the hypothesis of the international CAPM that those countries whose financial markets are less correlated with the Australian financial market should offer greater gains to diversification to the Australian investor. However, it is possible that those developed countries that are more likely to exhibit a greater degree of correlation with Australia are also more likely to boast an environment that nurtures ease of information flow. Thus it is possible that correlation is acting as a proxy for information flow. The effect of direct barriers to investment is considered in column (3). As expected, Australian investors are less likely to invest in countries with restrictive capital controls.

Columns (4) to (12) introduce a number of variables that measure indirect transaction costs facing the Australian investor. Columns (4) to (7) provide the breakdown of the legal protection and transparency variables provided by La Porta et al (1998). A one unit change in the efficiency of the judicial system, rule of law and rating of accounting standards relates to a change in equity holdings by 0.36 per cent, 0.27 per cent and 0.12 per cent

[9] **Note:** The statistical interpretation for a log-linear relationship (where $\ln(Y) = \alpha(1)+\alpha(2)X$)is that a one unit increase in X corresponds with a $\alpha(2)$ per cent increase in Y.

respectively. Although all three are significant at the one per cent level, the variable that holds the most explanatory power is the rating on accounting standards, accounting for over 30 per cent of the geographic location of Australian equity investment. However, these variables are all highly correlated (see Table 4) and this becomes apparent when all three are regressed together in column (7); all lose economic significance and rule of law loses statistical significance. Due to the presence of collinearity, rule of law is dropped from the final regression in column (13).

Columns (8) and (9) look at the effect of trade share on the geographical location of equity holdings. A simple regression of trade share on the logarithm of equity holdings in column (8) supports the consideration that Australians are more likely to invest in countries that are major trading partners. However, when the logarithm of market capitalisation is included in the regression, the coefficient on trade share switches sign and becomes insignificant. Trade share is considerably correlated with market capitalisation (0.64) (see Table 4) which suggests that trade share is acting as a proxy for size. Once the full set of information flow variables have been included in the regression; trade share imparts some explanatory power (see column (13)) but is of the incorrect sign.

Column (10) addresses the importance of distance as a proxy for transaction costs and information flow. The theoretical intuition is that the greater the distance between two countries, the lower the flow of information between them. However distance might capture a size effect in the data. Specifically, those countries that are financially large, such as the United States and the United Kingdom, also happen to be far away from Australia. To account for

this, the logarithm of market cap is included in the regression. A one per cent increase in distance is associated with a 0.61 per cent decrease in the value of equity holdings. Once the size of the financial market is taken into account, distance is both economically and statistically significant. This is despite the unique geographic location of Australia.

Columns (11) and (12) investigate the impact of short term travellers and common language in determining equity holdings. Both are statistically significant at the one per cent level. An increase in the number of short term travellers between Australia and another country by one per cent corresponds with an increase in the value of Australian equity holdings in that country by 2.15 per cent. Similarly, English speaking countries are associated with higher equity holdings in the order of 0.78 per cent.

The final model is presented in column (13). Additional dummy variables are included representing the origin of the legal system and the variable for rule of law is eliminated due to the presence of collinearity. Market size is still significant and robust to including information variables. However, the ratio of reward to risk, correlation and capital controls are no longer significant when variables measuring information asymmetries are introduced into the regression. This suggests that investors are more likely to make decisions based on informational advantages or disadvantages than on historical returns, risks, correlations and direct costs to investment. Efficiency of the judicial system, common language and the logarithm of the number of short term travellers all have positive and significant effects on the value of foreign equity held by Australians. Distance as a proxy for transaction costs has a negative and significant effect on equity holdings. The effect of the rating on

accounting standards and the trade share is ambiguous. Intuitively, both should be positive, yet both are negative and significant at the one per cent level. However, the economic significance of these variables is rather small. Given that the maximum value of trade share is 13.14 per cent (see Table 5), an increase in the trade share of a particular country by one percentage point is associated with a decrease in equity holdings by 0.15 per cent. Similarly, the effect of a ten unit increase in the index of the rating of accounting standards (which ranges from zero to 100) only corresponds with 0.26 per cent decrease in the value of equity holdings. Also, given that the rating on accounting standards measure was calculated in 1990 and many countries have since improved the transparency of their balance sheets, the usefulness of this measure may be limited to the extent.

Dummy variables for the country of legal origin are also included in the regression in column (13). Because United Kingdom, French, German and Scandinavian legal origin variables are both mutually exclusive and collectively exhaustive, to avoid perfect multicollinearity French legal origin is excluded from the regression. The findings of La Porta et al (2002) would suggest that the coefficients on all of these three dummy variables should by positive with UK legal origin being of the largest magnitude. However, the results of the regression suggest that investors are more likely to invest in countries with a Scandinavian legal origin, followed by French, then German and least likely to invest in countries with British common law. However, there exists strong negative correlation between the French legal origin dummy and efficiency of the judicial system as well as strong positive correlation between the UK legal origin dummy and both common language and short term travellers. Nevertheless, all three dummies are significant at

the one per cent level of significance and are therefore included in the regression. We find that once Australian investors take into account other information variables they will invest an extra 0.42 per cent in countries of Scandinavian legal origin over countries of French legal origin, an extra 0.37 per cent in countries of French legal origin over countries of German legal origin and an extra 1.33 per cent in countries of French legal origin over countries of British legal origin.

The empirical results for equation (6) show that market size matters for asset trade which is consistent with the hypothesis of the traditional CAPM. The results also support the information asymmetry explanation of the home bias puzzle. In particular, variables that have high explanatory power for the geographic location of Australian equity holdings are market capitalisation, efficiency of the judicial system, common language and the number of short term travellers.

Table 6: Australian International Equity Holdings Regression results

	(1)	(2)	(3)	(4)	(5)	(6)	(7)	(8)	(9)	(10)	(11)	(12)	(13)
Constant	-8.844 ***	-10.263 ***	7.837 ***	3.812 ***	4.701 ***	-0.849	0.533	6.071 ***	-9.024 ***	-3.601 ***	6.487 ***	-2.037 ***	-5.948 **
	0.482	*0.456*	*0.044*	*0.214*	*0.286*	*0.620*	*0.595*	*0.094*	*0.287*	*1.244*	*0.036*	*0.773*	*2.267*
log(Market Size)	1.199 ***	1.278 ***							1.215 ***	1.242 ***			1.334 ***
	0.037	*0.031*							*0.020*	*0.045*			*0.057*
Reward to Risk		4.190 **											0.746
		1.730											*1.535*
Correlation		1.857 ***											0.910
		0.360											*0.722*
Capital Controls			-2.098 ***										-0.235
			0.127										*0.186*
Efficiency of the Judicial System				0.365 ***			0.091 ***						0.167 ***
				0.024			*0.033*						*0.032*
Rule of Law					0.274 ***		0.022						
					0.033		*0.027*						
Accounting Standards						0.119 ***	0.084 ***						-0.026 ***
						0.010	*0.010*						*0.003*
Trade Share								0.326 ***	-0.011				-0.153 ***
								0.038	*0.013*				*0.017*
log(Distance)										-0.614 ***			-0.766 ***
										0.178			*0.164*
Common Language											2.149 ***		0.927 ***
											0.197		*0.189*
log(St Travellers)												0.782 ***	0.300 ***
												0.068	*0.054*
UK Legal Origin													-1.334 ***
													0.329
German Legal Origin													-0.368 **
													0.140
Scandinavian Legal Origin													0.422 ***
													0.157
R-squared	0.834	0.854	0.128	0.130	0.125	0.347	0.232	0.327	0.834	0.851	0.202	0.391	0.951
Adj R-squared	0.825	0.843	0.077	0.082	0.075	0.311	0.170	0.290	0.824	0.841	0.159	0.358	0.940
F-statistic	92.60	75.17	2.52	2.67	2.53	9.76	3.75	8.93	76.45	86.59	4.67	11.83	84.58
Observations	98	98	92	95	95	98	95	98	98	98	98	98	92

Note: The numbers in parenthesis are White adjusted standard errors. '***' means the t-statistic is 1% significant, '**' means the t-statistic is 5% significant, '*' means the t-statistic is 10% significant.

V.3 EMPIRICAL RESULTS FOR EQUITY HOME BIAS

The empirical results for equation (7)[10] are based on years 2001 to 2005 and presented in Table 7. The partner countries are the same as for equation (6). Column (1) addresses the contribution of return seeking behaviour to equity home bias. Risk-adjusted returns are expected to have a negative effect on the deviation from benchmark yet they are positive and significant. In column (2) the effect of the correlation is negative and significant at the five per cent level of significance indicating that Australian investors are less biased against countries whose financial markets are correlated with the Australian financial market. When regressed independently in column (3), capital control is positive, statistically significant at the one per cent level of significance and economically significant; a complete reduction of capital controls (from 1 to 0) will reduce the measure of bias by 0.19. This is equivalent to increasing actual equity holdings as a percentage of the international CAPM benchmark by 19 per cent.

The legal protection and transparency variables from La Porta et al (1998) are regressed in columns (4) to (6). When regressed independently all three are significant at the one per cent level and of the correct sign, negative. An increase in the efficiency of the judicial system by one unit will result in a decrease in equity home bias of 0.034. Similarly, an increase in the measure of rule of law will decrease equity home bias by 0.029, an increase in equity holdings as a percentage of CAPM benchmark by 2.9 per cent. The rating on accounting standards ranges from zero to

[10] $EHB_{jt} = \alpha_0 + \alpha_1 RET_{jt} + \alpha_2 Transaction\,Cost\,Variables$ Equation (7)

100 so an increase of 10 points corresponds with a decrease in home bias by 0.05. This is analogous to increasing equity holdings as a percentage of benchmark by five per cent. Trade share (column (7)) also has a negative effect on home bias and significant at the 10 per cent level. This supports the consideration that Australian investors choose to invest in countries with which they are familiar through trading relations. Column (8) shows the effect of common language on equity home bias. Australian investors invest an extra 14.3 per cent of equity holdings as a percentage of CAPM benchmark in countries where the official language is English. This result is significant at the one per cent level of significance. The effect of short term travellers is shown in column (9). An increase in the number of short term travellers by 100 000 people corresponds with an increase in equity holdings as a percentage of benchmark by two per cent. The result is statistically significant. For the legal origin dummy variables in column (10) UK legal origin is the only one that is significant, corresponding with a decrease in equity home bias of five percentage points. This is consistent with the results of La Porta (2002). The common law legal system found in the United Kingdom is considered to be more flexible and provides better protection for individuals than civil law legal systems found in France, Germany and Scandinavia.

Column (11) looks at the effect of these variables when included in a single multivariate regression. Risk-adjusted returns remain positive but gains significance. The coefficient on correlation remains negative but loses significance. The effect of capital controls switches sign and loses statistical significance when other information variables are included. Efficiency of the judicial system is significant at the one per cent level and

of the correct sign. Rule of law and rating on accounting standards were excluded due to high correlation with previously discussed variables (see Table 4). Trade share switches sign when other information flow variables are included. This could be due to the presence of colinearity as trade share is highly correlated with the number of short term travellers (0.613). Language is negative, supporting the reasoning that investors prefer investing in countries that have a similar language but is insignificant. The number of short term travellers remains negative and significant when other variables are included. An increase in the number of short term travellers by 100 000 people corresponds with a decrease in the measure of equity home bias by 0.026.

As previously discussed, the coefficients on the legal origin dummy variables should all be negative with UK being of the largest magnitude. The null hypothesis that the coefficients on UK, German and Scandinavian legal origin are identical cannot be rejected at the one per cent nor five per cent level upon the performance of a Wald test (see Table 8). Thus, the regression in column (12) ranks the origin of the legal system so that Australian investors are least biased against French legal origin countries and indifferent between countries of UK, German and Scandinavian countries are legal origin. These rankings are somewhat different to the rankings of La Porta et al (2002) which consider UK countries to offer the most legal protection, French countries the least and German and Scandinavian somewhere in the middle. One reason for the difference in order could be attributed to the existence of outliers. In particular, Australian investors display a relatively low degree of bias towards equities originating from the Netherlands which is of French legal origin

(see Table 1 and Table 2) The empirical results in Table 7 show that 41 per cent of the variation in equity home bias can be explained by the model in column (11). The results are supportive of the information asymmetry explanation of home bias. Variables that demonstrate explanatory power include the ratio of return to risk, efficiency of the judicial system, trade share, the number of short term travellers and legal origin dummy variables.

Table 7: Australian Equity Home Bias Regression Results

	(1)	(2)	(3)	(4)	(5)	(6)	(7)	(8)	(9)	(10)	(11)
Constant	0.824 ***	0.857 ***	0.730 ***	1.122 ***	1.070 ***	1.142 ***	0.837 ***	0.851 ***	0.879 ***	0.821 ***	1.181 ***
	0.007	*0.015*	*0.023*	*0.066*	*0.053*	*0.055*	*0.007*	*0.008*	*0.015*	*0.023*	*0.103*
Reward to Risk	0.035										0.378 **
	0.401										*0.182*
Correlation		-0.195 **									-0.192
		0.090									*0.117*
Capital Controls			0.186 ***								-0.024
			0.043								*0.050*
Efficiency of the Judicial System				-0.034 ***							-0.046 ***
				0.007							*0.014*
Rule of Law					-0.029 ***						
					0.006						
Accounting Standards						-0.005 ***					
						0.001					
Trade Share							-0.005 *				0.015 **
							0.003				*0.006*
Common Language								-0.143 ***			-0.044
								0.046			*0.042*
ST Visitors (100,000's)									-0.020 ***		-0.026 ***
									0.000		*0.000*
UK Legal Origin										-0.052 **	0.212 **
										0.026	*0.090*
German Legal Origin										0.043	0.124 ***
										0.043	*0.043*
Scandinavian Legal Origin										0.036	0.181 **
										0.037	*0.069*
R-squared	0.132	0.147	0.250	0.221	0.238	0.196	0.140	0.224	0.323	0.175	0.503
Adj R-squared	0.085	0.101	0.206	0.177	0.195	0.152	0.094	0.182	0.287	0.110	0.413
F-statistic	2.798	3.171	5.719	5.036	5.546	4.479	3.005	5.306	8.794	2.718	5.572
Observations	98	98	92	95	95	98	98	98	98	98	98

Note: The numbers in parenthesis are White adjusted standard errors. '***' means the t-statistic is 1% significant, '**' means the t-statistic is 5% significant, '*' means the t-statistic is 10% significant.

Table 8: Wald test for the Differential

Effect of Legal Origin

Wald Test: C(9) = C(10)

Test Statistic	Value	df	Probability
F-statistic	2.632979662	(1, 77)	0.108753
Chi-square	2.632979662	1	0.104665

Null Hypothesis Summary:		
Normalized Restriction (= 0)	Value	Std. Err.
C(9) - C(10)	0.087904	0.054173

Wald Test: C(9) = C(11)

Test Statistic	Value	df	Probability
F-statistic	0.37781746	(1, 77)	0.540586
Chi-square	0.37781746	1	0.538774

Null Hypothesis Summary:		
Normalized Restriction (= 0)	Value	Std. Err.
C(9) - C(11)	0.031357	0.051014

Wald Test: C(10) = C(11)

Test Statistic	Value	df	Probability
F-statistic	2.819983007	(1, 77)	0.097151
Chi-square	2.819983007	1	0.093097

Null Hypothesis Summary:		
Normalized Restriction (= 0)	Value	Std. Err.
C(10) - C(11)	-0.05655	0.033674

Note:

C(9) is the coefficient on UK legal origin; C(10) is the coefficient on German legal origin; C(11) is the coefficient on Scandinavian legal origin

CHAPTER VI: CONCLUSION

This thesis employs the IMF's high quality CPIS dataset to investigate investment behaviour from the perspective of an Australian investor. A series of regression tests were conducted to determine two things; i) which factors are important for the geography of Australian equity holdings, and ii) what determines the extent of equity home bias displayed by Australian investors? The results suggest that indirect barriers to international investment and information costs are important factors behind international investment and the home bias puzzle.

For equity holdings, market size imparts the majority of the explanatory power in determining the allocation of the Australian foreign equity portfolio (Table 6 and Table 7). This is consistent with the international CAPM and the theoretical gravity models of Martin and Rey (2004) and Faruqee, Li and Yan (2004).[11]

In the results for both international equity holdings (Table 6) and equity home bias (Table 7) the variables for risk adjusted returns, diversification incentives and capital controls are found to be insignificant in influencing investment behaviour once information asymmetries are taken into account. In particular, this thesis documents that Australian investors exhibit a preference for countries where the number of short term bilateral travellers is high, the official language is English and that have a high a rating on the efficiency of the judicial system.

[11] See Chapter III

Language is important because it is not only a mechanism for the transmission of information but it also creates a sense of cultural familiarity between investors in two different countries. Australian investors will be more comfortable reading balance sheets and making investment decisions when the firm in question publicises annual reports in English. In addition, the ability to communicate verbally between Australian investors and foreign brokers, accountants, lawyers or other professionals permits greater flow of information than otherwise. This decreases indirect barriers to investment.

The number of short term travellers between countries is important for similar reasons. Although a proportion of bilateral short term travellers will be due to holiday makers, a significant amount would be businesspersons attending international meetings or conferences. Corresponding in person in relation to information regarding investment can also reduce information costs and indirect barriers to investment. Moreover travelling to another country can cultivate a sense of cultural familiarity.

Results also suggest that investors are willing to hold equity portfolios in and be less biased against countries where the judicial system is recognised as being efficient. The efficiency of the judicial system index is taken to represent investors' assessments of the efficiency and integrity of the legal environment as it affects business. A transparent and efficient court system that enforces contracts is likely to provide a better protection of investors' rights and enhance the country's investment climate.

Distance is found to be important for the determination of equity holdings. Despite the unique isolated location of Australia, the results suggest that Australian investors exhibit a preference for nearby countries once market size is taken into consideration. This supports the use of distance as a proxy for indirect transaction costs and information flow. Countries that are geographically near to each other have better information about each other due to trade, business and tourism linkages, common languages and media coverage. These findings are consistent with the findings of Portes, Rey & Oh (2001).

Overall the results indicate that the legal environment and information costs have an impact on cross border equity holdings. Investors do not appear to take into account diversification incentives and the presence of capital controls when making investment decisions. This thesis finds that the asymmetries in information between domestic and foreign investors are of primary importance.

APPENDIX: DESCRIPTION OF VARIABLES

Equity Holdings: Australian holdings in foreign equities measured in millions of US dollars are available from the IMF's Coordinated Portfolio Investment Survey at http://www.imf.org/external/np/sta/pi/datarsl.htm. Equity holdings were converted into Australian dollars using daily exchange rate data from the RBA available at http://www.rba.gov.au/Statistics/exchange_rates.html.

Equity Home Bias: The measure for equity home bias was calculated as 1 minus the ratio of the share of country j equities at the domestic level over the share of country j equities at the global level. The share of equities from the Australian portfolio was calculated using CPIS data. The share in the global portfolio was calculated from year end market capitalisation data available from DataStream.

Market Capitalisation: Market capitalisation was calculated as the value of outstanding stock in millions of Australian dollars at year end. Source: DataStream.

Reward to Risk: This measure is in accordance with Ahearne et al (2004) and is the mean daily return over the standard deviation of daily returns. Returns are measured as the daily changes in the country's stock market index over the previous 12 months. Country indices are specified in Table 3. Data was obtained from DataStream.

Correlation: Correlation between Australia and another country for a given year was calculated using the country indices specified in Table 3

and data was obtained from DataStream. It is measured as the correlation coefficient over the previous 12 months.

Capital Controls: This measure is based in the IMF's Annual report on Exchange Arrangements and Exchange Restrictions (AREAER) for the year 2000, as used by Miniane (2004). Values are missing for China and Poland. The dataset is freely available at http://www.imf.org/external/pubs/ft/staffp/2004/02/miniane.htm.

Trade Share: Trade share is taken as the sum of country specific bilateral exports and imports over the value of total trade for the previous 12 months multiplied by 100. Data is from the IMF's Direction of Trade Statisics and is available from DataStream.

Distance: Distance is measured as the number of kilometres between the capital city of country j and Canberra as calculated from http://www.indo.com/distance.

Language: Language is a dummy variable taking the value of one if the corresponding country's official language is English and zero otherwise. Language is taken from http://www.cia.gov/library/publications/the-world-factbook/. English speaking countries are United States, United Kingdom, New Zealand and Canada.

Short Term Travellers: Short term travellers is the sum of short term foreign arrivals and short term resident departures to a specific country over the previous 12 months. The data source is the Australian Bureau of

Statistics (ABS); Catalogue number 3401.0, Table's 5 and 9. Data is also available from DataStream.

Efficiency of the Judicial System: This variable is developed by the country risk rating agency Business International Corporation (BIC) and taken from La Porta et al (1998). This variable ranges from 0 to 10, where lower values denote lower levels of efficiency, and is the average between 1980 and 1983. Data is missing for Poland.

Rule of Law: This variable is developed by BIC and taken from La Porta wt al (1998). It ranges from 0 to 10 with lower values representing less law and order and is the average of the months of April and October of the monthly index between 1982 and 1995. Values for Poland are missing.

Accounting Standards: A rating on accounting standards, available from La Porta et al (1998) is created by the International Accounting and Auditing Trends. It is for 1990 and ranges from 0 to 100.

Legal Origin: A series of 4 dummy variables corresponding with UK, French, German and Scandinavian legal origin. Data is available from La Porta (2002)

REFERENCES

Ahearne, A.G., Griever, W.L. and Warnock, F.E. (2004) 'Information Costs and Home Bias: an analysis of US holdings of foreign equities', *Journal of International Economics*, Vol. 62, pp. 313-336.

Backus, D.K., Kehoe, P.J., Kydland, F.E. (1992) 'International Real Business Cycles', *Journal of Political Economy*, Vol. 100(4), pp. 745-775.

Baxter, M. and Jermann, U.J. (1997) 'The International Diversification Puzzle is worse than you think', *American Economic Review*, Vol. 87(1), pp. 170-180.

Black, F. (1974) 'International Capital Market Equilibrium with Investment Barriers', *Journal of Financial Economics*, Vol. 1(4), pp. 337-352.

Choe, H., Kho, B. and Stulz, R.M. (2001) 'Do Domestic Investors have more Valuable Information about Individual Stocks than Foreign Investors?', *NBER Working Paper* 8073, NBER, Cambridge MA.

Dahlquist, M., Pinkowitz, L., Stulz, R.M. and Williamson, R. (2003) 'Corporate Governance and the Home Bias', *Journal of Financial and Quantitative Analysis,* Vol. 38, pp. 87-110.

Faruqee, H., Li, S. and Yan, I.K. (2004) 'The Determinants of International Portfolio Holdings and Home Bias', IMF Working Paper 04/34, International Monetary Fund; Washington.

French, K.R. and Poterba, J.M. (1991) 'Investor Diversification and International Equity Markets', *American Economic Review*, Vol. 81(2), pp. 222-226.

Gehrig, T. (1993) 'An Information Based Explanation of the Domestic Bias in International Equity Investment', *Scandinavian Journal of Economics*, Vol. 95(1), pp. 97-109.

Grinblatt, M. and Keloharju, M. (2001) 'How Distance, Language and Culture Influence Stockholdings and Trades' *The Journal of Finance*, Vol. 56(3), pp. 1053-1073.

Hasan, I. and Simaan, Y. (2000) 'A Rational Explanation for Home Country Bias', *Journal of International Money and Finance,* Vol. 19(3), pp. 331-361.

Hau, H. (2001) 'Location Matters', *Journal of Finance*, Vol. 56, pp. 1959-1983.

Kang, J. and Stulz, R.M. (1997) 'Why is there a Home Bias? An Analysis of Foreign Portfolio Equity Ownership in Japan', *Journal of Financial Economics*, Vol. 46(1), pp. 3-28.

La Porta, R., Lopez-de-Silanes, F., Schleifer, A. and Vishny, R.W. (2002) 'Investor Protection and Corporate Valuation', *Journal of Finance*, Vol. 57(3), pp. 1147-1170.

La Porta, R., Lopez-de-Silanes, F., Shleifer, A. and Vishny, R.W. (1998) 'Law and Finance', *Journal of Political Economy*, Vol. 106(6), pp. 1113-1155.

Lane, P.R. (2000) 'International Investment Positions: a Cross-sectional Analysis', *Journal of International Money and Finance*, Vol. 19(4), pp. 513-534.

Lewis, K.K. (1999) 'Trying to Explain Home Bias in Equities and Consumption', *Journal of Economic Literature*, Vol. 37, pp. 571-608.

Lintner, J. (1965) 'The Valuation of Risky Assets and the Selection of Risky Investment in Stock Portfolio and Capital Budgets', *Review of Economics and Statistics*, Vol. 47, pp. 103-124.

Markowitz, H. (1952) 'Portfolio Selection', *Journal of Finance*, Vol. 7(1), pp. 77-91.

Martin, P. and Rey, H. (2004) 'Financial Super-Markets: Size matters for Asset Trade', *Journal of International Economics*, Vol. 64, pp. 335-361.

Miniane, J. (2004) 'A New set of Measures on Capital Account Restrictions', IMF Staff Papers 51(2), International Monetary Fund; Washington.

Mishra, A. and Daly, K. (2006) 'Where do Australians Invest?', *The Australian Economic Review*, Vol. 39(1), pp. 47-59.

Portes, R., Rey, H. and Oh, Y. (2001) 'Information and Capital Flows: The Determinants of Transactions in Financial Assets', *European Economic Review*, Vol. 45, pp. 783-796.

Sharpe, W. (1964) 'Capital asset prices: A Theory of Market Equilibrium under the condition of Risk', *Journal of Finance*, Vol. 19, pp. 425-442.

Tesar, L.L. and Werner, I.M. (1995) 'Home Bias and High Turnover', *Journal of International Money and Finance*, Vol. 14(4), pp. 467-492.

Warnock, F. and Cleaver, C. (2003) 'Financial Centres and the Geography of Capital Flows', International Finance Discussion Papers No. 722, Board of Governors of the Federal Reserve System.