Home Bias in Open Economy Financial Macroeconomics

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Home Bias in Open Economy Financial Macroeconomics

Lecture based on JEL survey by Coeurdacier and Rey (2013)

Objectives

- Integrates theories of international portfolio choices in standard DSGE models of open economies

Standard open economies models (complete markets or incomplete markets with non-state contingent bonds) silent about gross foreign asset/liability positions.

Micro-fundations to early portfolio balance model (Branson and Henderson (1985))

Open Economy Financial Macroeconomics

Non-trivial portfolio decisions in open economy general equilibrium models.

(i) Methodological developments

(ii) Mostly aiming at explaining the lack of international diversification

- Challenges ahead

(i) Theoretical challenges

(ii) New portfolio facts

Roadmap

1. Introduction and motivation

2. Baseline models of risk-sharing and international portfolios

- Equities only

- Multiple assets

3. Limits and challenges ahead

Motivation: Financial globalization

Decrease in barriers to international trade in assets

1) Large increase in foreign asset and liability positions

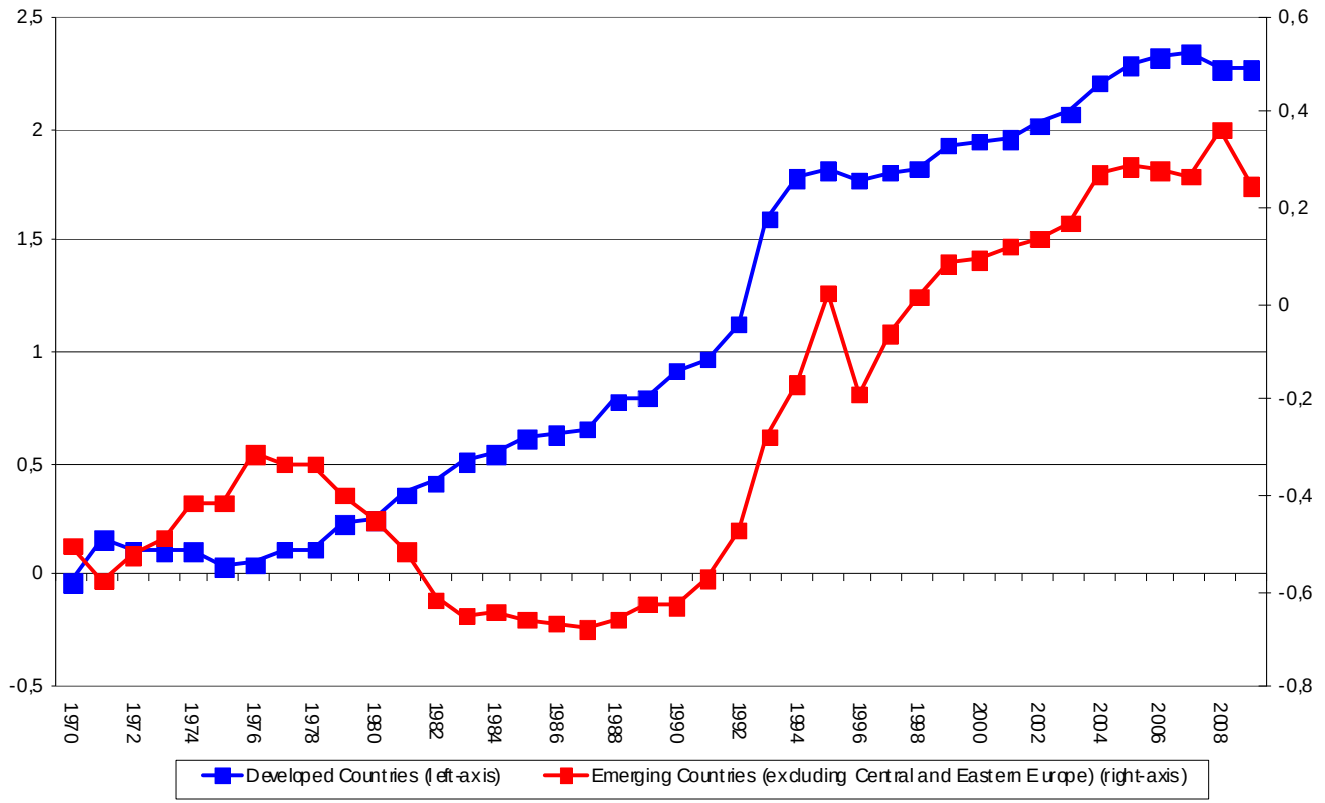
Increase in cross-border asset trade: gross foreign asset positions exceed 100% of GDP for industrialized countries (only 20% of GDP at the beginning of 80s; Lane and Milesi-Feretti.(2007)). Even though retrenchment away from foreign assets since the financial crisis (Milesi-Feretti and Tille (2010)).

Not the first wave of financial globalization (remind the end of the 19th century) but since the 90's the level of cross-border asset trade has reached unprecedented levels.

2) Convergence of prices of "identical" assets

Financial openness (De Jure)

Chinn-Ito index based on IMF information on restrictions to capital movements



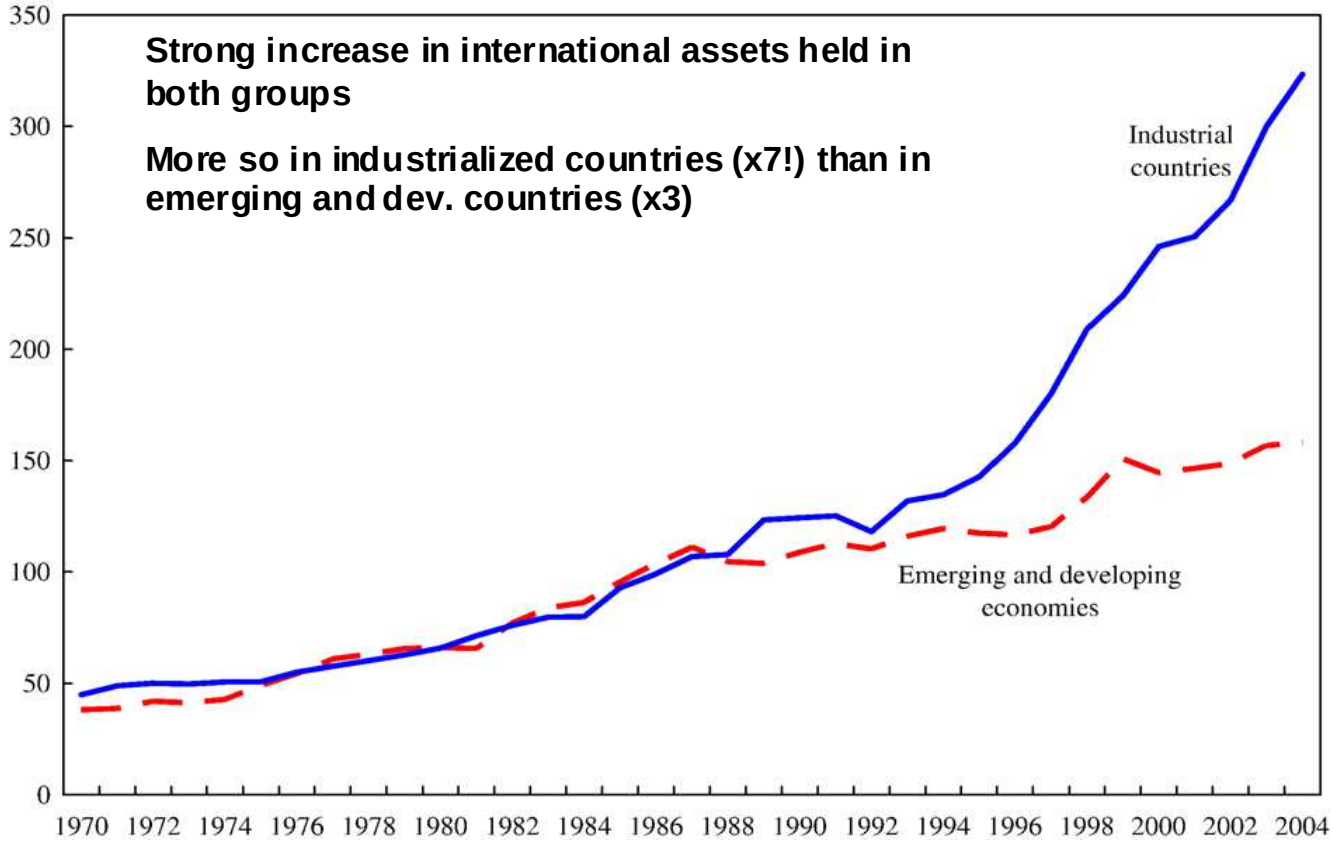
Note: Index between -2.5 and 2.5. -2.5=Closed capital market; 2.5=Fully opened

Source: Chinn and Ito, 2008

International financial openness, 1970–2004

(Domestic assets held by foreigners + Foreign assets held by domestic agents)/ GDP

source Lane and Milesi-Ferreti (2007)



Financial globalization: why do we care?

(i) Welfare gains of international risk sharing

(ii) Transmission of shocks across countries

(iii) Design of monetary and fiscal policies

(iv) Adjustment of external imbalances (valuation effects, see Gourinchas and Rey (2013) for a recent survey)

Lack of international risk sharing?

1. The consumption correlation and quantity puzzle

Lack of consumption correlation across countries, lower than output correlation.

2. The International Diversification Puzzle - Home bias in equity puzzle

Investors tend to hold a disproportionate share of their local assets. $\neq$ Financial globalization?

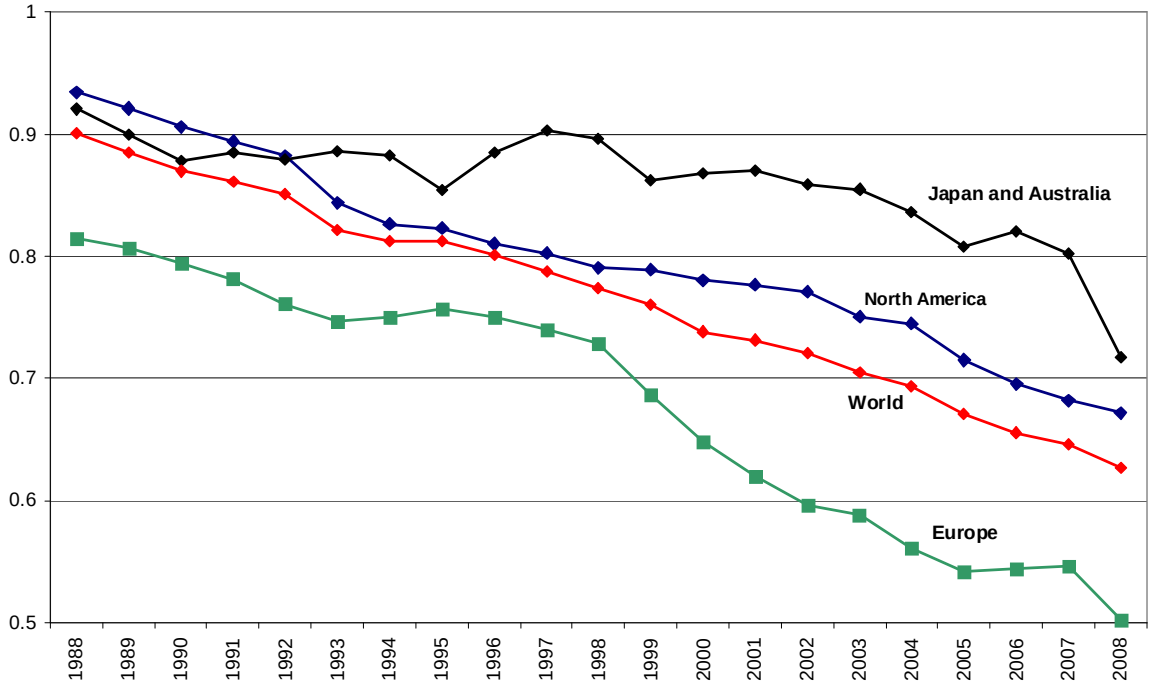
Note: Useful measure of Home Bias:

$HB = 1 - \frac{\text{Share of Foreign of Equity Holdings}}{\text{Share of Foreign Stocks in World Market Capitalization}}$. Why?

Source Country	Domestic Market in % of World Market Capitalization (1)	Share of Portfolio in Domestic Equity in % (2)	Degree of Equity Home Bias $= EHB_i$ (3)
Australia	1.8	76	0.76
Brazil	1.6	99	0.98
China	7.8	99	0.99
Canada	2.7	80	0.80
Euro Area	13.5	57	0.50
Japan	8.9	74	0.71
South Africa	1.4	88	0.88
South Korea	1.4	89	0.88
Sweden	0.7	44	0.43
Switzerland	2.3	51	0.50
United Kingdom	5.1	54	0.52
United States	32.6	77	0.66
South Africa	32.6	88	0.88

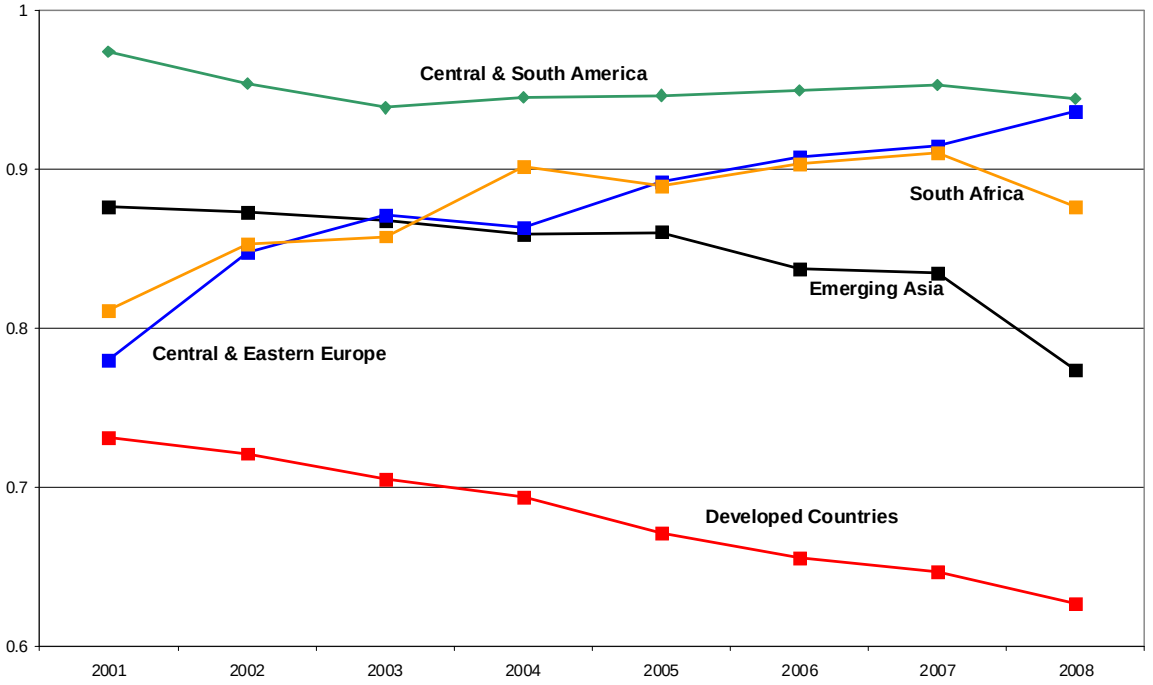
Table (1): Home Bias in Equities in 2008 for selected countries (source IMF and FIBV)

Note: For Euro Area countries, within Euro Area cross-border equity holdings are considered as Foreign Equity Holdings.



Home Bias in Equities measures across developed countries

(the country measure EHB_i is Market Capitalization-weighted for each region; source: IFS and FIBV)



Home Bias in Equities measures across emerging countries

(the country measure EHB_i is Market Capitalization-weighted for each region; source: IFS and FIBV)

The international diversification puzzle

Why do investors hold different portfolios (here equity)? Because they are different!

To have interesting predictions need to solve for optimal portfolios in presence of heterogenous investors. Reason why the problem becomes complex. Remind that with homogenous investors, the equity portfolio held is the market portfolio; countries of equal size hold equity claims over half of the production in each country (Lucas (1982)); replicates the efficient consumption allocation.

3 main sources of heterogeneity have been explored in the literature:

1) transaction and information costs (coupled potentially with *low gains from international risk sharing;* see Lewis (2000) for a survey on the gains from international risk sharing);

See Heathcote and Perri (2004), Coeurdacier and Guibaud (2008), Martin and Rey (2004) for theoretical work. See Veldkamp and Van Nieuwerburgh (2008) among others for costs of information.

Not completely satisfactory. Tesar and Werner (1995) critique.

2) Real exchange rate fluctuations

People in different countries face different consumption price indices (because they consume different basket of goods -trade costs and non-traded goods- or because of local currency pricing...). Might be a reason to hold different portfolios.

see Coeurdacier (2009), Kollmann (2006), Obstfeld (2007), Baxter, Jermann and King (1998), Collard, Dellas, Diba and Stockman (2007) among others.

3) Non diversificable labor income

Investors have some labor income that cannot be diversified away. Might interact with portfolio choice.

see Baxter and Jermann (1997), Botazzi, Pesenti and Van Wincoop (1996), Heathcote and Perri (2007), Engel and Matsumoto (2009), Coeurdacier, Kollmann and Martin (2010), Coeurdacier and Gourinchas (2012).

A baseline model of international risk sharing with equities only

Two countries, Home H and Foreign F. Symmetric ex-ante. Each country producing one differentiated good. All markets are perfectly competitive.

Key ingredients

(i) Two goods and preference towards locally produced goods $\Rightarrow$ real exchange rate hedging

(ii) Non diversifiable labour income $\Rightarrow$ hedging of human wealth

(iii) Fixed capital - relaxed later

Preferences

$$E_0 \sum_{t=0}^{\infty} \beta^t \left(\frac{C_{i,t}^{1-\sigma}}{1-\sigma} - \frac{l_{i,t}^{1+\omega}}{1+\omega} \right),$$

where ω is the Frish-elasticity of labor supply ($\omega > 0$) and σ the relative risk aversion parameter ($\sigma > 0$).

$$C_{i,t} = \left[a^{1/\phi} \left(c_{i,t}^{i} \right)^{(\phi-1)/\phi} + (1-a)^{1/\phi} \left(c_{j,t}^{i} \right)^{(\phi-1)/\phi} \right]^{\phi/(\phi-1)}, \text{ with } j \neq i,$$

where $c_{j,t}^{i}$ is country i's consumption of the good produced by country j at date t. $\phi > 0$ is the elasticity of substitution between the two goods. Preference bias for local goods, $\frac{1}{2} < a < 1$.

$$P_{i,t} = \left[a \left(p_{i,t} \right)^{1-\phi} + (1-a) \left(p_{j,t} \right)^{1-\phi} \right]^{1/(1-\phi)}, \quad j \neq i,$$

where $p_{i,t}$ is the price of good i.

Technologies and firms' decisions

Country i produces $y_{i,t}$ units of good i according to the production function $(0 < \alpha < 1)$

$$y_{i,t} = \theta_{i,t} \left(k_0\right)^{\alpha} \left(l_{i,t}\right)^{1-\alpha},$$

k_0 is the country's initial stock of capital. It is fixed. Stochastic Total factor productivity (TFP) $\theta_{i,t} > 0$

Share $1 - \alpha$ of output at market prices is paid to workers.:

$$w_{i,t} l_{i,t} = (1 - \alpha) p_{i,t} y_{i,t}$$

where $w_{i,t}$ is the country i wage rate.

Share α of country i output at market prices paid as a dividend $d_{i,t}$ to shareholders:

$$d_{i,t} = \alpha p_{i,t} y_{i,t}$$

Financial markets and instantaneous budget constraint

Frictionless financial markets. International trade in stocks. The country i firm issues a stock that represents a claim to its stream of dividends $\{d_{i,t}\}$. Supply of shares is normalized at unity. Each household fully owns the local stock, at birth, and has zero initial foreign assets. $S^i_{j,t+1}$ = the number of shares of stock j held by country i at the end of period t; $p^S_{i,t}$ = the price of stock i.

Budget constraint ($j \neq i$):

$$P_{i,t}C_{i,t}+p^S_{i,t}S^i_{i,t+1}+p^S_{j,t}S^i_{j,t+1} = w_{i,t}l_{i,t}+(d_{i,t}+p^S_{i,t})S^i_{i,t}+(d_{j,t}+p^S_{j,t})S^i_{j,t}$$

Household decisions and market clearing conditions

Each household selects portfolios, consumptions and labor supplies that maximize her life-time utility subject to her budget constraint for $t \geq 0$:

$$c^i_{i,t} = a\left(\frac{p_{i,t}}{P_{i,t}}\right)^{-\phi} C_{i,t};\ c^i_{j,t} = (1-a)\left(\frac{p_{j,t}}{P_{i,t}}\right)^{-\phi} C_{i,t};\ \chi l^{\omega}_{i,t} = \left(\frac{w_{i,t}}{P_{i,t}}\right) {C_{i,t}}^{-\sigma}$$

$$1 = E_t \beta \left(\frac{C_{i,t+1}}{C_{i,t}}\right)^{-\sigma} \frac{P_{i,t}}{P_{i,t+1}} \frac{p^S_{j,t+1} + d_{j,t+1}}{p^S_{j,t}},\ \text{for } j = H, F\ .$$

Market-clearing in goods and asset markets requires:

$$c^H_{H,t} + c^F_{H,t} = y_{H,t}\ , \quad c^F_{F,t} + c^H_{F,t} = y_{F,t}\ ,$$

$$S^H_{H,t} + S^F_{H,t} = S^F_{F,t} + S^H_{F,t} = 1$$

Zero order portfolios: definition

Equilibrium portfolio holdings at date t $(S^i_{i,t+1}, S^i_{j,t+1})$ are functions of state variables at date t.

Closed form solutions for 'zero-order portfolios' S^i_i, S^i_j, i.e. portfolio decision rules evaluated at steady state values of state variables.

Ex-ante symmetry: $S \equiv S^H_H = S^F_F = 1 - S^F_H = 1 - S^H_F$; S describes the (zero-order) equilibrium equity portfolio

Zero order portfolios: solution methods

Two alternative methods:

1. Devereux and Sutherland (2008) (see also Tille and van Wincoop (2008)): compute Taylor expansion of the portfolio decision rules, in the neighborhood of the deterministic steady state $\Rightarrow$ for zero-order portfolios, use 1st order approx. of non-portfolio equations and 2nd order approx. of portfolio equation

2. With "locally-complete" markets (as here with two assets and two exogenous shocks): derive the portfolio that replicates the efficient allocation up to a first-order approx. Less general than Devereux and Sutherland (2008) which can be applied in models with incomplete financial markets.

Log-linearization of the model

$z_t \equiv \frac{z_{H,t}}{z_{F,t}}$ denotes the ratio of Home over Foreign variables; $\widehat{z_t} \equiv (z_t - z)/z$ denotes the relative deviation of a variable z_t from its steady state value z.

Real exchange rate:

$$\widehat{RER_t} = \widehat{P_{H,t}} - \widehat{P_{F,t}} = (2a - 1)\,\widehat{q_t} \text{ where } q_t \equiv p_{H,t}/p_{F,t}$$

Locally-complete markets (Backus and Smith (1993), Kollmann (1995)):

$$-\sigma(\widehat{C_{H,t}} - \widehat{C_{F,t}}) = \widehat{RER_t} = (2a - 1)\,\widehat{q_t}.$$

Equalizes relative marginal utilities of consumption to relative prices = efficiency condition

Log-linearization of the model

Intratemporal first-order condition for consumption and market-clearing condition under locally complete markets:

$$\widehat{y_t} = -\left[\phi\left(1-(2a-1)^2\right)+(2a-1)^2\frac{1}{\sigma}\right]\widehat{q_t} \equiv -\lambda\widehat{q_t}$$

where $\lambda \equiv \phi(1-(2a-1)^2)+\frac{(2a-1)^2}{\sigma} > 0$. Home terms of trade worsen when the relative supply of Home goods increases as Foreign goods are scarcer.

Log-linearized 'static' budget constraint (difference across countries):

$$(\widehat{P_{H,t}C_{H,t}} - \widehat{P_{F,t}C_{F,t}}) = (1-\frac{1}{\sigma})\underbrace{(2a-1)\,\widehat{q_t}}_{\widehat{RER_t}} = (1-\alpha)\widehat{w_t l_t} + (2S-1)\,\alpha\widehat{d_t}$$

where $\widehat{w_t l_t} \equiv \widehat{w_{H,t}l_{H,t}} - \widehat{w_{F,t}l_{F,t}}$ = relative labor income; $\widehat{d_t} \equiv \widehat{d_{H,t}} - \widehat{d_{F,t}}$ = relative dividend.

Partial equilibrium zero-order portfolios

$$S = \frac{1}{2} - \frac{1}{2}\frac{1-\alpha}{\alpha}\frac{cov(\widehat{w_t l_t}, \widehat{d_t})}{var(\widehat{d_t})} + \frac{1}{2}\frac{(1-\frac{1}{\sigma})}{\alpha}\frac{cov(\widehat{RER}, \widehat{d_t})}{var(\widehat{d_t})}$$

Expression holds in many class of models (with equity only) - only need the budget constraints and generic first order conditions. Departure of many empirical studies (same expression also holds in terms of returns instead of income flows).

Departure from the fully diversified one with weights $1/2$ in both equities (Lucas (1982)) in presence of labor income risk and/or real exchange rate risk.

Partial equilibrium zero-order portfolios

$$S = \frac{1}{2} - \frac{1}{2}\frac{1-\alpha}{\alpha}\frac{cov(\widehat{w_t l_t}, \widehat{d_t})}{var(\widehat{d_t})} + \frac{1}{2}\frac{(1-\frac{1}{\sigma})}{\alpha}\frac{cov(\widehat{RER}, \widehat{d_t})}{var(\widehat{d_t})}$$

Investors would favor local equity if:

(i) Relative dividends covary negatively with (relative) labor income (term $\frac{cov(\widehat{w_t l_t}, \widehat{d_t})}{var(\widehat{d_t})}$) = **hedging of non-tradable income risk**.

(ii) Relative dividends covary positively with the real exchange rate if $\sigma > 1$ (term $\frac{cov(\widehat{RER}, \widehat{d_t})}{var(\widehat{d_t})}$) = **hedging of real exchange rate risk.**

General equilibrium zero-order portfolios

Rewrite budget constraint by substituting equilibrium in goods markets:

$$\begin{aligned}(1-\frac{1}{\sigma})\,(2a-1)\,\widehat{q_t} &= \{(1-\alpha)+\alpha\,(2S-1)\}\,(\widehat{q_t}+\widehat{y_t}) \\ &= \{(1-\alpha)+\alpha\,(2S-1)\}\,(1-\lambda)\widehat{q_t}\end{aligned}$$

Asset structure supports full risk sharing, up to first-order, if this holds for all realizations of the (relative) exogenous productivity shocks $(\widehat{\theta_t})$ (or equivalently all realizations of the terms-of-trade $\widehat{q_t}$). This pins down a unique S

$$S=\frac{1}{2}-\frac{1}{2}\frac{1-\alpha}{\alpha}-\frac{1}{2}(1-\frac{1}{\sigma})\frac{(2a-1)}{\alpha\,(\lambda-1)}$$

General equilibrium zero-order portfolios

1. term $\frac{1}{2}$ is a pure diversification term. Prevail if homogenous investors, when $\alpha \longrightarrow 1$ (no human capital risk) and $a = 1/2$ (no RER risk).

2. term $-\frac{1}{2}\frac{1-\alpha}{\alpha}$ = hedging of *non-tradable income* risk (Baxter and Jermann (1997)): changes in output driven by productivity shocks are shared in constant proportion $\Rightarrow$ perfect correlation between labor incomes and capital incomes: households should short the local stock to hedge human capital risk. International diversification puzzle worse than you think!

3. term $-\frac{1}{2}(1-\frac{1}{\sigma})\frac{(2a-1)}{\alpha(\lambda-1)}$ = hedging of *real exchange rate* risk (Coeurdacier (2009) without human capital risk $\alpha \longrightarrow 1$). Cancels out for a log-investor ($\sigma = 1$). Depends on the value of λ (i.e on the elasticity of substitution ϕ)

Comments - Hedging of non-tradable income risk

This simple neoclassical model implies no variations in factor shares. In the data, factor shares are pretty volatile.

Key empirical question: is it true that returns to human capital and returns to physical capital covary positively within a country? B&J (1997) compute returns to human capital and to physical capital for G4 countries and their answer is that equity portfolios should exhibit a substantial foreign bias. The long-run relationship between capital and labor returns outweights short term fluctuations in the labor share. Bottazi, Pesenti and van Wincoop (1996) and Juillard (2002) challenged their results. Still an open question.

Wage and profit rates in selected OECD countries [a]

	Correlations					Standard deviation labor share
	Wage rate, GDP	Profit rate, GDP	Wage rate, domestic profit rate	Wage rate, ROW profit rate	Labor share, ROW labor share	
Australia	−0.09	0.69	−0.28	−0.56	0.54	2.51
Austria	0.78	0.27	0.21	−0.38	0.87	2.76
Belgium	0.84	−0.07	−0.45	−0.41	0.72	3.16
Canada	0.54	0.52	−0.34	−0.29	−0.05	1.92
Denmark	−0.09	0.32	−0.19	−0.30	0.64	2.12
Finland	0.41	0.50	−0.49	−0.04	0.65	4.00
France	0.57	0.32	−0.16	−0.38	0.85	3.74
Germany	0.84	0.34	0.27	−0.26	0.80	2.18
Italy	0.47	0.37	−0.32	−0.28	0.07	2.00
Japan	0.54	−0.04	−0.82	0.12	0.53	4.46
Netherlands	0.86	−0.33	−0.49	−0.35	0.19	2.78
Norway	0.06	0.02	0.39	−0.31	−0.30	5.00
Sweden	−0.15	0.26	−0.75	−0.19	0.46	2.95
Switzerland	0.30	0.60	−0.31	−0.10	0.80	2.36
UK	0.27	0.40	−0.52	−0.32	0.30	2.46
US	0.71	0.82	0.87	0.29	0.52	1.05
Average	0.43	0.31	−0.21	−0.23	0.47	2.84

[a] The moments in this table are based on annual data from 1970 to 1992. The wage rate is real wage per worker, computed as total employee compensation (OECD National Accounts), divided by the private consumption price deflator (OECD National Accounts) and employment (Yearbook of Labour Statistics). The profit rate is the rate of return on business income from the OECD Economic Outlook. It is equal to operating surplus divided by the gross non-residential capital stock. GDP is gross domestic product at constant prices. The labor share is total employee compensation divided by net domestic product at factor cost (the sum of employee compensation and net operating surplus). The ROW profit rate and labor share refer to the 'rest of the world', using 1990 GDP as weights. A quadratic trend has been extracted from the profit rate and the logs of the wage rate and GDP. The wage rate and profit rate in the table are both in levels, while GDP is in logs. The labor share is in levels and not detrended.

Bottazi, Pesenti and van Wincoop (1996)

Comments - Hedging of real exchange rate risk

Are equities a good hedge for RER risk?

Warnock and van Wincoop (2011) look at the empirical implications of Coeurdacier (2009).

Key moment for portfolio bias is the covariance-variance ratio, where $\widehat{R} =$ Home equity excess returns :

$$\frac{cov(\widehat{RER}, \widehat{R})}{var(\widehat{R})}$$

They compute this ratio for the US and find it quite small and rgue that RER hedging cannot be a reasonable explanation for equity biases.

Table 1. Covariance-Variance Ratios: Monthly Data, 1988-2005

	(1) $\frac{\text{cov}(er, \Delta q)}{\text{var}(er)}$	(2) $\frac{\text{cov}_{\Delta s}(er, \Delta q)}{\text{var}_{\Delta s}(er)}$	(3) $\frac{\text{cov}_{\Delta s, r_2}(er, \Delta q)}{\text{var}_{\Delta s, r_2}(er)}$	(4) $\frac{\text{cov}_{\Delta s, r_1}(er, \Delta q)}{\text{var}_{\Delta s, r_1}(er)}$
cov(*er*,*q*)	1.7084	0.0193	-0.0023	0.0263
var(*er*)	5.3863	3.7224	2.5832	3.4661
Ratio	0.3172	0.0052	-0.0009	0.0076

Notes. The covariance-variance ratios correspond to those in equations (9), (12), and (17). Specifically, in column (1), corresponding to the expression below equation (9), straight excess returns and real exchange rate changes are used; in column (2), corresponding to the expression in equation (12), *er* and Δq are orthogonal to changes in the nominal exchange rate; in column (3), corresponding to the first term in equation (17), *er* and Δq are orthogonal to changes in the nominal exchange rate and r^{ROW}; and in column (4), corresponding to the second term in equation (17), *er* and Δq are orthogonal to changes in the nominal exchange rate and r^{US}. There are 216 monthly observations underlying each calculation.

from Van Wincoop and Warnock (2010)

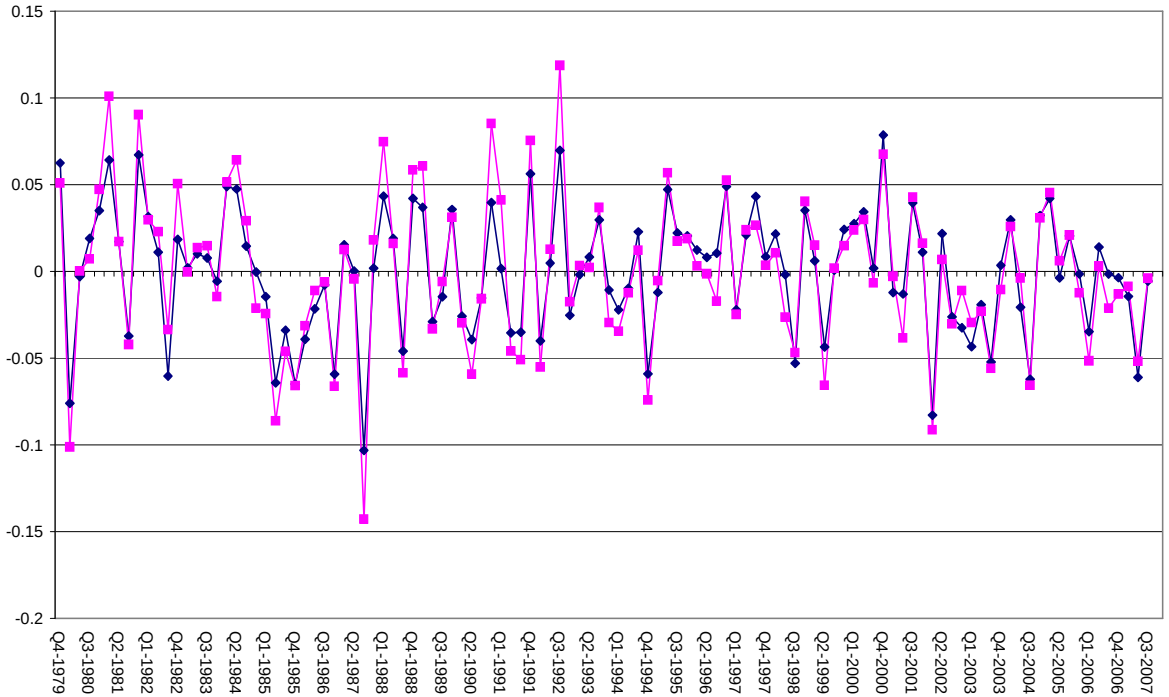
Comments - Hedging of real exchange rate risk

The Role of Bond Trading - Intuition

Bond returns offer a **much better** hedge against RER risk than equities! (Coeurdacier and Gourinchas (2012), Warnock and van Wincoop (2010))

- relative real bond return IS the real exchange rate;
- relative nominal bond return is empirically highly correlated with the real exchange rate;

The Role of Bond Trading



Quarterly Changes in US RER and Relative Portfolio Bond Returns (short 3 months Foreign Bond and Long 3 month US Bond)

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from Van Wincoop and Warnock (2010)

The Role of Bond Trading

Bonds ignored in previous model because efficient allocation (up to the first-order) is implemented with equities only (one source of risk) but this a knife-edge case

Adding an additional source of risk pins down both *equity* and *bond* portfolios. Intuitively bonds will be used to hedge real exchange rate fluctuations. Equities for any remaining source of risk uncorrelated with bond returns.

In the model below where real bonds are introduced $\Rightarrow$ perfect hedge for real exchange rate fluctuations.

In practice, this is not completely accurate and it is possible that inflation risks matter in some cases.

A baseline model of international risk sharing with multiple asset classes (bonds and equities)

Use the same two country-two good model with two symmetric countries

But:

(i) add one additional source of uncertainty not perfectly correlated with TFP shocks

(ii) add an additional asset (real bond of each country)

(iii) capital is not fixed

Preferences

$$E_0 \sum_{t=0}^{\infty} \beta^t \left(\frac{C_{i,t}^{1-\sigma}}{1-\sigma} - \chi_{i,t} \frac{l_{i,t}^{1+\omega}}{1+\omega} \right),$$

where $\chi_{i,t}$ is an exogenous shock to the disutility of labor = additional source of risk. Results hold for various types of supply shocks (not tied to preferences).

Technology and firms' decisions

Production

$$y_{i,t} = \theta_{i,t} \left(k_{i,t} \right)^{\alpha} (l_{i,t})^{1-\alpha},$$

Capital accumulation

$$k_{i,t+1} = (1-\delta) k_{i,t} + I_{i,t}$$

Investment bundle

$$I_{i,t} = \left[a^{1/\phi} \left(i^i_{i,t} \right)^{(\phi-1)/\phi} + (1-a)^{1/\phi} \left(i^i_{j,t} \right)^{(\phi-1)/\phi} \right]^{\phi/(\phi-1)}$$

$i^i_{j,t}$ is the amount of good j used for investment in country i. Local bias for investment spending, $\frac{1}{2} < a < 1$. Investment price index is the same as for consumption $P_{i,t}$

The firm chose $I_{i,t}$ to equate the expected future marginal gain of investment to the marginal cost:

$$P_{i,t} = E_t \beta (C_{i,t+1}/C_{i,t})^{-\sigma} (P_{i,t}/P_{i,t+1}) [p_{i,t+1} \theta_{i,t+1} \alpha k^{\alpha-1}_{i,t+1} l^{1-\alpha}_{i,t+1}$$

$$+ (1-\delta) P_{i,t+1}]$$

The firm chooses the Home and Foreign investment inputs $i^i_{i,t}, i^i_{j,t}$ that minimize the cost of generating $I_{i,t}$:

$$i^i_{i,t} = a\left(\frac{p_{i,t}}{P^I_{i,t}}\right)^{-\phi} I_{i,t}, \quad i^i_{j,t} = (1-a)\left(\frac{p_{j,t}}{P_{i,t}}\right)^{-\phi} I_{i,t},\ j \neq i.$$

Factor payments

A share $1-\alpha$ of output at market prices is paid to workers. A share α of country i output, net of physical investment spending is paid as a dividend $d_{i,t}$ to shareholders:

$$d_{i,t} = \alpha p_{i,t} y_{i,t} - P_{i,t} I_{i,t}$$

Financial markets and instantaneous budget constraint:

International trade in stocks **and (real) bonds**. Stocks = claim to its stream of dividends $\{d_{i,t}\}$. Bond in country i denominated in the good i. Buying one unit of the bond i in period t gives one unit of the good i in all future periods. Bonds in zero net supply. $S^i_{j,t+1}$ = shares of stock j held by country i at the end of period t; $B^i_{j,t+1}$ = claims held by country i (at the end of t) to future unconditional payments of good j; $p^S_{i,t}$ is the price of stock i and $p^B_{i,t}$ is the price of bond i.

Budget constraint ($j \neq i$):

$$P_{i,t}C_{i,t}+p^S_{i,t}S^i_{i,t+1}+p^S_{j,t}S^i_{j,t+1}+p^B_{j,t}B^i_{j,t+1}+p^B_{i,t}B^i_{i,t+1}=$$

$$w_{i,t}l_{i,t}+(d_{i,t}+p^S_{i,t})S^i_{i,t}+(d_{j,t}+p^S_{i,t})S^i_{j,t}+(p_{i,t}+p^B_{i,t})B^i_{i,t}+(p_{j,t}+p^B_{j,t})B^i_{j,t}$$

Household decisions and market clearing conditions

Same households' FOC + Euler equations for the two bonds:

$$1 = E_t \beta \left(\frac{C_{i,t+1}}{C_{i,t}} \right)^{-\sigma} \frac{P_{i,t}}{P_{i,t+1}} \frac{p^B_{j,t+1} + p_{j,t+1}}{p^B_{j,t}} \quad \text{for } j = H, F \ .$$

Market-clearing in goods and asset markets now requires:

$$c^H_{H,t} + c^F_{H,t} + i^H_{H,t} + i^F_{H,t} = y_{H,t} \ , \quad c^F_{F,t} + c^H_{F,t} + i^F_{F,t} + i^H_{F,t} = y_{F,t} \ ,$$

$$\begin{aligned} S^H_{H,t} + S^F_{H,t} &= S^F_{F,t} + S^H_{F,t} = 1, \\ B^H_{H,t} + B^F_{H,t} &= B^F_{F,t} + B^H_{F,t} = 0. \end{aligned}$$

Zero order portfolios

Equilibrium portfolio holdings $(S^i_{i,t+1}, S^i_{j,t+1}, B^i_{i,t+1}, B^i_{j,t+1})$ can be determined by linearizing the model around its deterministic steady state. With the asset structure here (four assets with four exogenous shocks), efficient risk sharing can be replicated up to a first-order.

Ex-ante symmetry implies that the zero-order portfolios have to satisfy the following conditions: $S \equiv S^H_H = S^F_F = 1 - S^F_H = 1 - S^H_F$; $\quad B \equiv B^H_H = B^F_F = -B^F_H = -B^H_F$.

The pair $(S; B)$ thus describes the (zero-order) equilibrium portfolio.

Linearization of the model

Relative demand for goods for investment and consumption (assuming "locally-complete" markets)

$$\begin{aligned}\widehat{y_{I,t}} &= -\phi\left(1-(2a_I-1)^2\right)\widehat{q}_t + (2a-1)\widehat{I}_t \\ \widehat{y_{C,t}} &= -\left[\phi\left(1-(2a-1)^2\right) + (2a-1)^2\frac{1}{\sigma}\right]\widehat{q}_t \equiv -\lambda\widehat{q}_t\end{aligned}$$

Market clearing condition for goods implies:

$$(1-s_I)\widehat{y_{C,t}} + s_I\widehat{y_{I,t}} = -\mu\widehat{q}_t + s_I(2a_I-1)\widehat{I}_t = \widehat{y_t},$$

where $\mu = \phi(1-(2a-1)^2) + (1-s_I)\frac{(2a-1)^2}{\sigma} > 0$ and $s_I \equiv$ steady state investment/GDP ratio.

Linearization of the model

$$\widehat{y_t} = -\mu \widehat{q_t} + s_I(2a_I - 1)\widehat{I}_t$$

Home terms of trade worsen when the relative supply of Home goods increases, for a given amount of relative Home country investment.

Home terms of trade improve when Home investment rises (due to home bias in investment spending), for a given value of the relative Home/Foreign output.

Relative 'static' budget constraint:

$$(1 - s_I)(\widehat{P_{H,t}C_{H,t}} - \widehat{P_{F,t}C_{F,t}}) = (1 - s_I)(1 - \tfrac{1}{\sigma})\underbrace{(2a - 1)\,\widehat{q_t}}_{\widehat{RER_t}}$$

$$= (1 - \alpha)\widehat{w_t l_t} + (2S - 1)\,(\alpha - s_I)\widehat{d_t} + 2b\widehat{q_t}, \quad b \equiv B/y,$$

Partial equilibrium zero-order portfolios

Partial equilibrium portfolio sheds light on the hedging terms in terms of covariance-variance ratios. Projection on $\widehat{d_t}$ and $\widehat{q_t}$ gives the following expression for the portfolio of bonds and equities (S, b):

$$
\begin{aligned}
S &= \frac{1}{2}\left[1 - \frac{1-\alpha}{\alpha - s_I}\frac{Cov_{\widehat{q}}(\widehat{w_t l_t}, \widehat{d_t})}{Var_{\widehat{q}}(\widehat{d_t})} + \frac{(1-s_I)(1-\frac{1}{\sigma})}{\alpha - s_I}\frac{Cov_{\widehat{q}}(\widehat{RER}, \widehat{d_t})}{Var_{\widehat{q}}(\widehat{d_t})}\right] \\
b &= \frac{1}{2}\left[(1-s_I)(1-\frac{1}{\sigma})\frac{Cov_{\widehat{d}}(\widehat{RER}, \widehat{q_t})}{Var_{\widehat{d}}(\widehat{q_t})} - (1-\alpha)\frac{Cov_{\widehat{d}}(\widehat{w_t l_t}, \widehat{q_t})}{Var_{\widehat{d}}(\widehat{q_t})}\right]
\end{aligned}
$$

where $Cov_{\widehat{z_t}}(\widehat{x_t}, \widehat{y_t})$ is the covariance between $\widehat{x_t}$ and $\widehat{y_t}$ **conditional** on the pay-off $\widehat{z_t}$.

Partial equilibrium zero-order portfolios

Portfolio (S and b) is structured such that investors exploit covariances of the assets payoffs with the two sources of risk: RER risk and non-tradable income risk. The covariance of asset payments with the real exchange rate risk and labor income risk **conditional** on payments of the other assets matters for the portfolio

$\Rightarrow$ Real exchange rate hedging should be taken care of by the bond position since bond return differentials across countries are almost perfectly correlated with the real exchange rate (perfectly in the present model where $\left(Cov_{\widehat{q}}(\widehat{RER}, \widehat{d_t})/Var_{\widehat{q}}(\widehat{d_t})\right)$ will be exactly zero).

$\Rightarrow$ the covariance of local equity returns with returns on non-tradable wealth can be positive, this has no implication for the equity portfolio, only the covariance **conditional** on bond returns matters.

General equilibrium zero-order portfolios

Relative labor income $\widehat{w_t l_t} = \widehat{q_t} + \widehat{y_t}$. Due to endogenous investment, relative dividends $\widehat{d_t} = \frac{\alpha}{\alpha - s_I}(\widehat{q_t} + \widehat{y_t}) - \frac{s_I}{\alpha - s_I}((2a-1)\,\widehat{q_t} + \widehat{I_t})$

Relative 'static' budget constraint:

$$[(1-\alpha) + \alpha\,(2S-1)\,]((1-\mu)\widehat{q_t} + s_I(2a-1)\widehat{I_t})$$

$$-s_I\,(2S-1)\,[\,(2a-1)\,\widehat{q_t} + \widehat{I_t}] + 2b\widehat{q_t} = (1-s_I)(1-\tfrac{1}{\sigma})\,(2a-1)\,\widehat{q_t}$$

Asset structure supports full risk sharing, up to first-order, if this holds for all realizations of the two (relative) exogenous shocks $(\widehat{\theta_t}, \widehat{\chi_t})$. Do not have to solve for output and investment, as a unique pair of terms of trade and relative real investment $(\widehat{q_t}, \widehat{I_t})$ is associated with each realizations of $(\widehat{\theta_t}, \widehat{\chi_t})$.

General equilibrium zero-order portfolios

Unique portfolio (S, b) such that efficient risk-sharing for arbitrary realizations of $(\widehat{\theta_t}, \widehat{\chi_t})$ or equivalently $(\widehat{q_t}, \widehat{I_t})$

Projection on $(\widehat{q_t}, \widehat{I_t})$ pins down the unique portfolio (S, b):

$$
\begin{aligned}
S &= \frac{1}{2}\left[1 + \frac{(2a-1)(1-\alpha)}{1-(2a-1)\alpha}\right] > \frac{1}{2}, \\
b &= \frac{1}{2}\left[(1-s_I)(1-\frac{1}{\sigma})\,(2a-1) + \frac{(1-\alpha)\left[\mu - 1 + s_I(2a_I-1)^2\right]}{1-(2a-1)\alpha}\right]
\end{aligned}
$$

General equilibrium equity zero-order portfolios

Equity portfolio features *equity home bias*. Sum of two terms only, as hedging-term for the RER is zero (relative price movements fully hedged by the appropriate (real) bond position).

(i) term $\frac{1}{2}$ is still the Lucas (1982) term in the absence of non-tradable income risk ($\alpha \longrightarrow 1$)

(ii) term $\frac{(2a-1)(1-\alpha)}{1-(2a-1)\alpha}$ = hedging of non-tradable income risk **conditionally** on bond payments: unambiguously positive $\Rightarrow$ equity home bias

General equilibrium equity zero-order portfolios

Intuition: assume a combination of shocks $(\widehat{\theta_t}, \widehat{\chi_t})$ such that relative investment $\widehat{I}_t$ increases but leaves the terms-of-trade (bond payments differential) $\widehat{q}_t$ unchanged. Such a combination of shocks will increase labor demand and labor incomes since investment spending is using more intensively local goods ($a > 1/2$). In the mean time, dividends net of investment spending are falling $\Rightarrow$ negative comovements between labor income and dividends holding relative prices constant (or equivalently conditional on bond payments differentials).

Remark: same portfolio as in Heathcote and Perri (2008) but for any values of the preference parameters

General equilibrium bond zero-order portfolios

The bond portfolio b is also the sum of two terms:

(i) first term $\frac{1}{2}(1-s_I)(1-\frac{1}{\sigma})\,(2a-1)$ is the hedging of real exchange rate risk. Desired exposure to real exchange rate in the absence of non-tradable income risk ($\alpha \to 1$). Term unambiguously positive for $\sigma > 1$ since local bonds have higher payoffs when local goods are more expensive.

(ii) second term $\frac{(1-\alpha)[\mu-1+s_I(2a_I-1)^2]}{1-(2a-1)\alpha}$ is the hedging of non-tradable income risk **conditionally** on relative dividend payments: can be positive or negative. Roughly speaking, it is negative if relative wages are positively correlated with the terms-of-trade, which happens for low values of μ, i.e. low values of ϕ.

Empirical evidence on the (un-)conditional correlation between relative wage income and relative dividends

Data for each G7 country: quarterly time series on nominal wage incomes and profits (in local currency) from OECD National Accounts. Estimate counterpart to the model's country i dividend variable d_i by subtracting gross investment from profits. We divided each G7 country's nominal wage income (dividends) series by an aggregate wage income (dividend) series for the remaining countries in the sample (nominal exchange rates were used to express all series in a common currency). Compute the resulting relative labor income (dividends) series to obtain estimates of the variable $\widehat{wl}$ $(\widehat{d})$ in the model (detrended or in growth rates).

		CA	FR	GE	IT	JP	UK	US
(1)	$\frac{Cov(\widehat{w_t l_t}, \widehat{d_t})}{Var(\widehat{d_t})}$	0.16 (0.041)	0.28 (0.064)	0.32 (0.067)	0.58 (0.065)	0.42 (0.052)	0.49 (0.057)	0.37 (0.065)
(2)	$\frac{Cov_{\widehat{q}}(\widehat{w_t l_t}, \widehat{d_t})}{Var_{\widehat{q}}(\widehat{d_t})}$	−0.015 (0.014)	−0.128 (0.015)	−0.095 (0.025)	−0.076 (0.030)	−0.080 (0.019)	−0.122 (0.026)	−0.051 (0.020)
(3)	$\frac{Cov(\widehat{w_t l_t}, \widehat{d_t})}{Var(\widehat{d_t})}$	0.08 (0.035)	0.47 (0.085)	0.33 (0.073)	0.33 (0.031)	0.46 (0.045)	0.39 (0.043)	0.55 (0.075)
(4)	$\frac{Cov_{\widehat{q}}(\widehat{w_t l_t}, \widehat{d_t})}{Var_{\widehat{q}}(\widehat{d_t})}$	−0.032 (0.009)	−0.139 (0.023)	−0.135 (0.031)	−0.011 (0.015)	−0.097 (0.015)	−0.084 (0.018)	−0.070 (0.022)

(1) and (2): in first-difference; (3) and (4): HP filter

Table (2): The hedging of non-tradable risk: conditional and unconditional covariance-variance ratios (source: OECD National Accounts Data and IFS)

Estimating hedging motives using asset prices

Coeurdacier and Gourinchas (2012) show the following expression for (S, b) (for a country i of relative size ω_i w.r.t rest of the world):

$$\begin{cases} b_i &= (1-\omega_i)\left(1-\frac{1}{\sigma}\right)\beta^i_{rer,b} - (1-\omega_i)(1-\alpha)\beta^i_{n,b} \\ S_i &= \omega_i + (1-\omega_i)\left(\frac{1-\frac{1}{\sigma}}{\alpha}\beta^i_{rer,f} - \frac{1-\alpha}{\alpha}\beta^i_{n,f}\right) \end{cases}$$

Holds in a large variety of context (even if markets not "locally complete").

Estimating hedging motives using asset prices

The loading factors βs can be directly estimating from the following regressions for a given country i (vis-a-vis the rest of the world)

$$\begin{aligned} \Delta rer_{i,t} - E_{t-1}\Delta rer_{i,t} &= \beta^i_{rer,0} + \beta^i_{rer,b}\hat{r}^b_{i,t} + \beta^i_{rer,f}\hat{r}^f_{i,t} + u_{i,t}. \\ \hat{r}^n_{i,t} &= \beta^i_{n,0} + \beta^i_{n,b}\hat{r}^b_{i,t} + \beta^i_{n,f}\hat{r}^f_{i,t} + v_{i,t} \end{aligned}$$

where $\hat{r}^b_{i,t}$ = relative bond returns (3-months T-bills); $\hat{r}^f_{i,t}$ = relative returns (innovations) on financial wealth/relative returns (innovations) to capital; $\hat{r}^n_{i,t}$ = relative returns (innovations) on non-financial wealth

Estimating hedging motives using asset prices

Across G7 countries, Coeurdacier and Gourinchas (2012) estimate the βs using financial and non-financial returns instead of income flows.

Difficulties: need to estimate returns to human wealth. Apply various techniques (Campbell and Shiller (1988), Lustig and Nieuwerburgh (2008)), various discounting hypothesis.

Need to proxy return to capital - returns to equity, weighted sum of corporate bond returns and returns to equity, returns to capital estimated from national accounts (Campbell and Shiller (1988))

Across specifications results hold.

Estimating hedging motives using asset prices

Main findings:

(i) Real exchange rate hedging is done through bond portfolios.

(ii) Conditionally on bond returns, (relative) returns to capital and (relative) returns to human wealth are negatively correlated. Unconditionally, the correlation is strongly positive.

International diversification is not worse than we think, both in theory and in the data!

(iii) Broadly consistent with average G7 country portfolios

	Canada	France	Germany	Italy	Japan	U.K.	U.S.	Pooled
	Panel A: Conditional Loadings							
$\beta_{Q,f}$	-0.036	-0.011	0.007	-0.017	-0.030	0.064***	-0.013	0.006
(s.e.)	(0.025)	(0.024)	(0.026)	(0.018)	(0.028)	(0.022)	(0.038)	(0.009)
$\beta_{Q,b}$	1.003***	0.944***	0.946***	0.969***	1.012***	0.821***	0.944***	0.942***
(s.e.)	(0.033)	(0.028)	(0.031)	(0.026)	(0.034)	(0.039)	(0.040)	(0.012)
R^2	0.941	0.947	0.940	0.944	0.947	0.863	0.918	0.929
	Panel B: Unconditional Loadings							
$\beta^{\text{unc}}_{Q,f}$	0.579***	0.591***	0.616***	0.447***	0.658***	0.376***	0.733***	0.554***
(s.e.)	(0.040)	(0.043)	(0.043)	(0.042)	(0.040)	(0.034)	(0.048)	(0.016)
R^2	0.579	0.557	0.573	0.424	0.641	0.453	0.611	0.535
Obs.	153	153	153	153	153	153	153	1071

Table 2: Loadings on **real exchange rate changes**: $\Delta \ln Q_{i,t} - E_0 \Delta \ln Q_{i,t} = \beta^i_{Q,b} \hat{r}^b_{i,t} + \beta^i_{Q,f} \hat{r}^f_{i,t} + u_{i,t}$. Standard errors are in parenthesis. (***) (resp (**)) indicates significance at the 1% level (resp. 5%). Unconditional loadings impose $\beta_{Q,b} = 0$. Last column reports pooled fixed effect estimates. Constants are not reported. Sample: 1970:2 to 2008:3.

	Canada	France	Germany	Italy	Japan	U.K.	U.S.	Pooled
	Panel A: Conditional Loadings							
$\beta_{n,f}$	-0.186***	-0.327***	-0.053	-0.551***	-0.171***	-0.081**	-0.252***	-0.227***
(s.e.)	(0.072)	(0.057)	(0.062)	(0.098)	(0.053)	(0.036)	(0.099)	(0.026)
$\beta_{n,b}$	1.262***	1.122***	1.073***	1.295***	0.970***	0.967***	1.073***	1.096***
(s.e)	(0.094)	(0.069)	(0.075)	(0.140)	(0.065)	(0.062)	(0.103)	(0.034)
R^2	0.709	0.719	0.759	0.366	0.769	0.706	0.595	0.600
	Panel B: Unconditional Loadings							
$\beta^{\text{unc}}_{n,f}$	0.588***	0.389***	0.637***	0.068	0.489***	0.286***	0.595***	0.411***
(s.e.)	(0.064)	(0.060)	(0.060)	(0.089)	(0.046)	(0.043)	(0.074)	(0.024)
R^2	0.362	0.219	0.429	0.004	0.428	0.223	0.300	0.213
Obs.	153	153	153	153	153	153	153	1071

Table 3: Loadings on **nonfinancial returns**: $\hat{r}^n_{i,t} = \beta^i_{n,b}\hat{r}^b_{i,t} + \beta^i_{n,f}\hat{r}^f_{i,t} + v_{i,t}$. Standard errors are in parenthesis. (***) (resp (**)) indicates significance at the 1% level (resp. 5%). Unconditional loadings impose $\beta_{n,b} = 0$. Last column reports pooled fixed effect estimates. Constants are not reported. Sample: 1970:2 to 2008:3.

	Canada	France	Germany	Italy	Japan	U.K.	U.S.
	Implied Equity (S) under alternative estimation methods						
Baseline (Market Cap Weights)	5.13	7.30	5.67	3.30	15.71	12.35	50.53
Benchmark estimates	70.73	132.95	28.71	224.93	70.08	57.18	101.66
National Accounts	45.54	27.57	44.34	-191.01	64.94	33.08	81.77
Projection of financial returns	51.19	137.32	32.70	79.24	86.95	58.09	91.05
Equity returns	48.26	28.93	1.99	57.33	39.62	31.96	70.30
Bond returns discounting	57.43	121.10	47.52	240.61	100.76	53.90	109.01
Method of Lustig et al (2008)	67.46	88.67	58.63	84.81	86.32	102.79	86.39
Data for (S) (2000-2008)	85.60	71.40	55.40	59.50	84.30	65.20	83.20
	Implied Bond (b) under alternative estimation methods						
Benchmark estimates	-49.27	-40.37	-37.26	-54.48	-23.49	-32.56	-19.57
National Accounts	-18.43	-29.79	-17.49	-50.01	-26.99	-20.56	-13.11
Projection of financial returns	-45.32	-40.56	-38.34	-29.40	-26.85	-33.84	-18.31
Equity returns	-52.67	-34.02	-44.87	-51.26	16.39	-32.07	-13.71
Bond returns discounting	-35.04	-28.27	-25.68	-37.27	-30.77	-35.86	-17.99
Method of Lustig et al (2008)	-36.71	-41.62	-31.52	-44.69	-37.10	-43.78	-21.61
Data for (b) (2000-2004)	9.30	9.90	8.90	-2.70	-12.70	-16.40	-10.90

Table 7: Implied Portfolio Equity (S) and bond (b) position for G7 countries under alternative methods to compute financial and non-financial returns. Calculations are done under the assumption that $\delta = 0.19$ and $\sigma = 2$. (S) refers to the percentage of domestic stocks held by domestic residents (data for (S) are averaged over the period 2000-2008). (b) refers to the net domestic currency exposure of bond portfolios (as a % of GDP). Data for (b) are computed from Lane and Shambaugh (2010) and refers to the average between net debt assets in domestic currency and net debt liabilities in foreign currency as a % of GDP (averaged over 2000-2004): $b = \frac{b_{HH} - b_{HF}}{2}$.

Open Financial Macroeconomics: Challenges ahead

Main caveats and challenges:

1. Too much risk sharing?

2. What about asset prices?

3. What about times-series (portfolio rebalancing) and cross section of portfolios?

4. What about delegated portfolio management

Too much risk sharing?

State-contingent assets together with one representative agent generate an allocation very close to complete markets. Lack of diversification internationally not necessarily inconsistent with efficient risk sharing. But consumption data still point out inefficient risk sharing - quantity puzzle/consumption real exchange rate anomaly.

Additional (non diversifiable) shocks?

Financial frictions? Limited participation and/or within-country incomplete markets; inefficiencies in the process of intermediation (delegated management); sovereign risk.

Wanted: A benchmark model with endogenous portfolios and incomplete financial markets in a meaningful way.

What about asset prices?

Open Economy Financial Macroeconomics focus on quantities (portfolios). Models performing not so well for asset prices (low risk premia, low asset/ exchange rates volatility)

Finance literature focus on asset prices but relatively silent on quantities.

Bridging these two strands of literature more than ever on the agenda.

Do mechanisms emphasized in Open Economy Financial Macroeconomics survive in more realistic environment with high risk premia/asset prices volatility?

Need methodological improvements to tackle these issues as *local* solution techniques valid in environment with low risk/low risk premia.

What about portfolio rebalancing?

Devereux and Sutherland (2008, 2009) (see also Tille and van Wincoop (2010)) extend solutions to investigate portfolio rebalancing.

Rely on 2nd-order approx. of non-portfolio equations and 3rd order approx. of portfolio (Euler) equations. Generate time-varying moments and time varying expected returns.

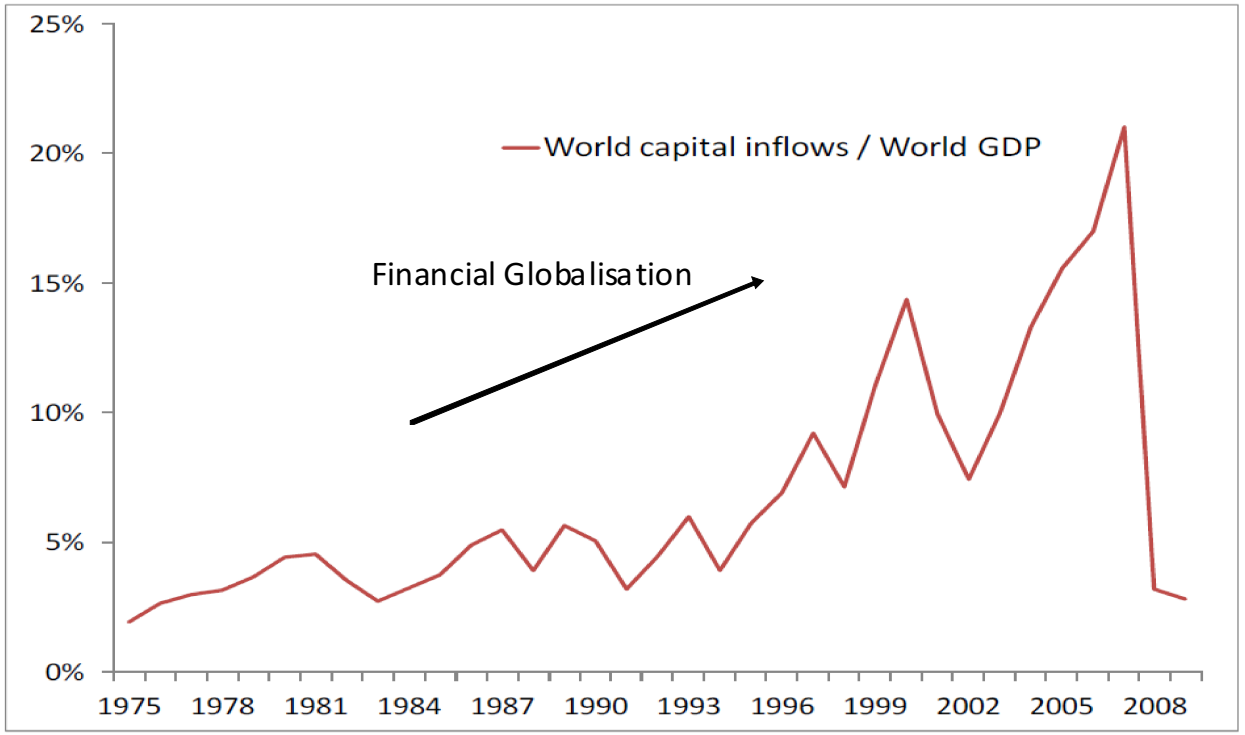
Lack of intuition compared to earlier portfolio balance model (e.g. Branson and Henderson (1985)).

Lack of (robust) portfolio facts in the time-series (notable recent exception Milesi-Feretti and Tille (2010))

Particularly relevant to analyze international transmission of shocks.

Flows are more volatile than stocks: in the 2008 crisis, collapse of international flows

Figure 1. Global Capital Flows, 1975-2009
Percent of world GDP



Note: sum of gross capital inflows across the world's countries, as a ratio of world GDP. Source: Lane and Milesi-Ferretti, EWN II database, and IMF, Balance of Payments Statistics.

What about cross-section of portfolios?

Countries portfolios heterogeneous across countries (and across time). Also true across individuals/funds within countries.

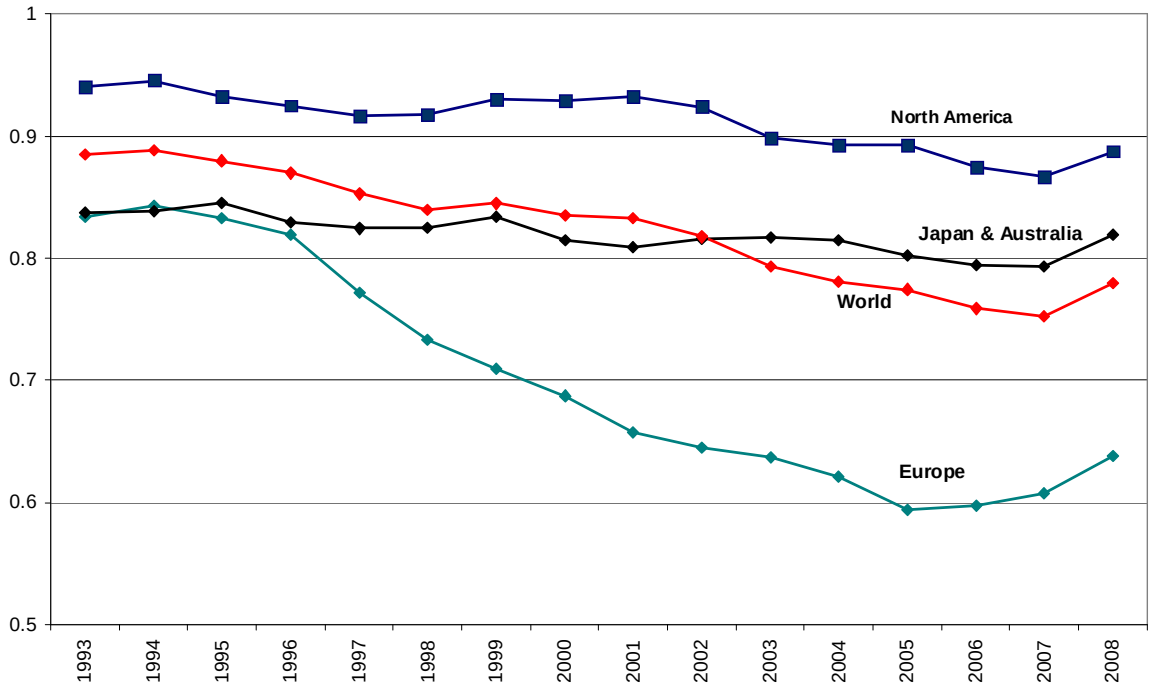
Data variation helpful to discriminate between alternative theories. To quantify the importance of financial frictions/hedging motives.

Need new portfolio facts (across time/across countries/across assets and if possible at a more disaggregated level). Important message from theory is the need to observe the whole portfolio due to substitutability across assets.

First step in this direction in the present paper: provide new evidence across countries and time and across assets (equities/bonds/banking assets) and across mutual funds (micro-data).

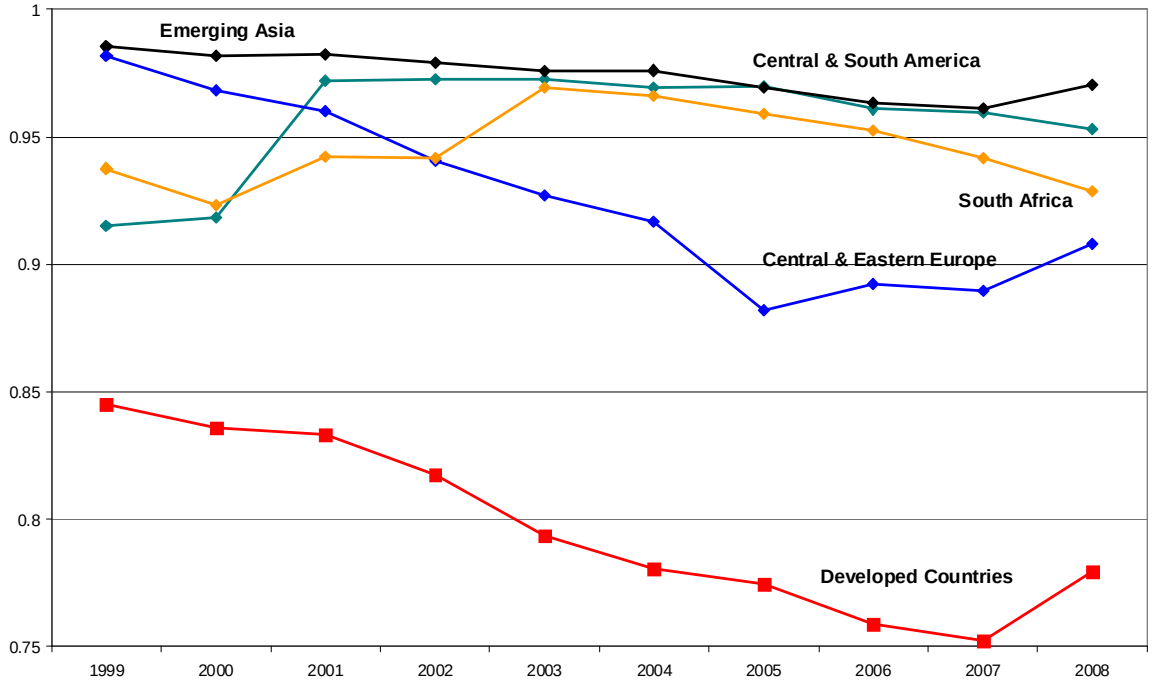
Much more needs to be done.

$$\text{BHB}_i = 1 - \frac{\text{Share of Foreign Bonds in Country i Bond Holdings}}{\text{Share of Foreign Bonds in the World Bond Market Portfolio}}$$



Measures of Home Bias in Bonds across developed countries

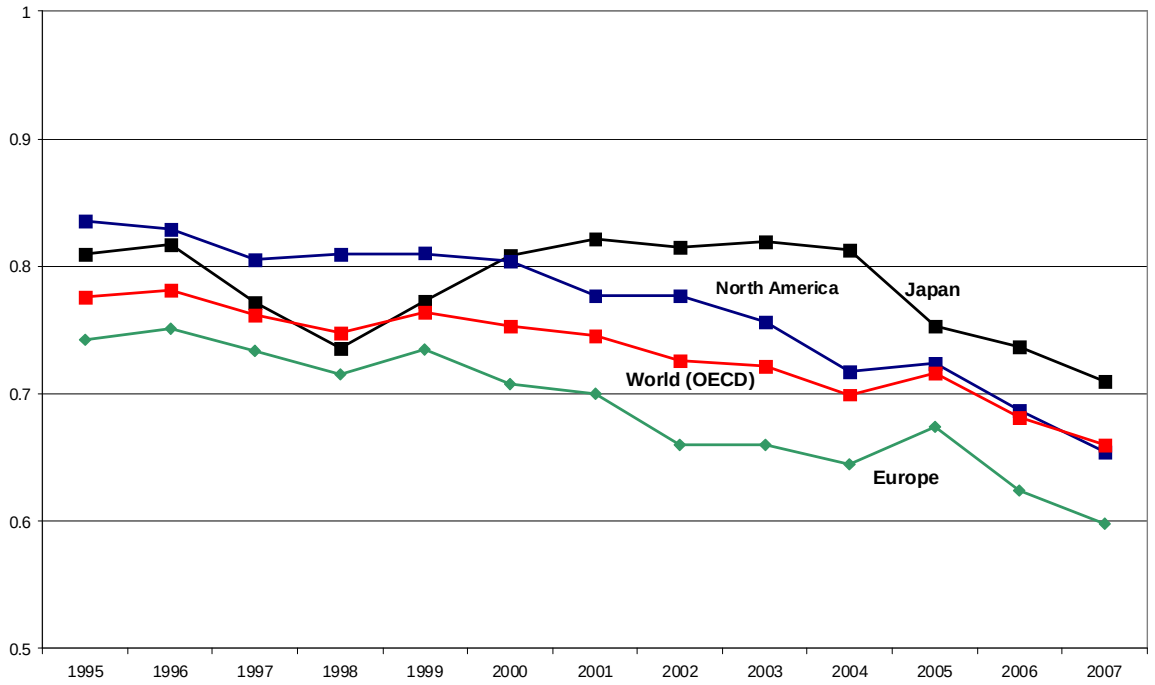
(the country measure BHB_i is Market Capitalization-weighted for each region; source: BIS and IFS. See appendix for the list of countries included)



Measures of Home Bias in Bonds across emerging countries

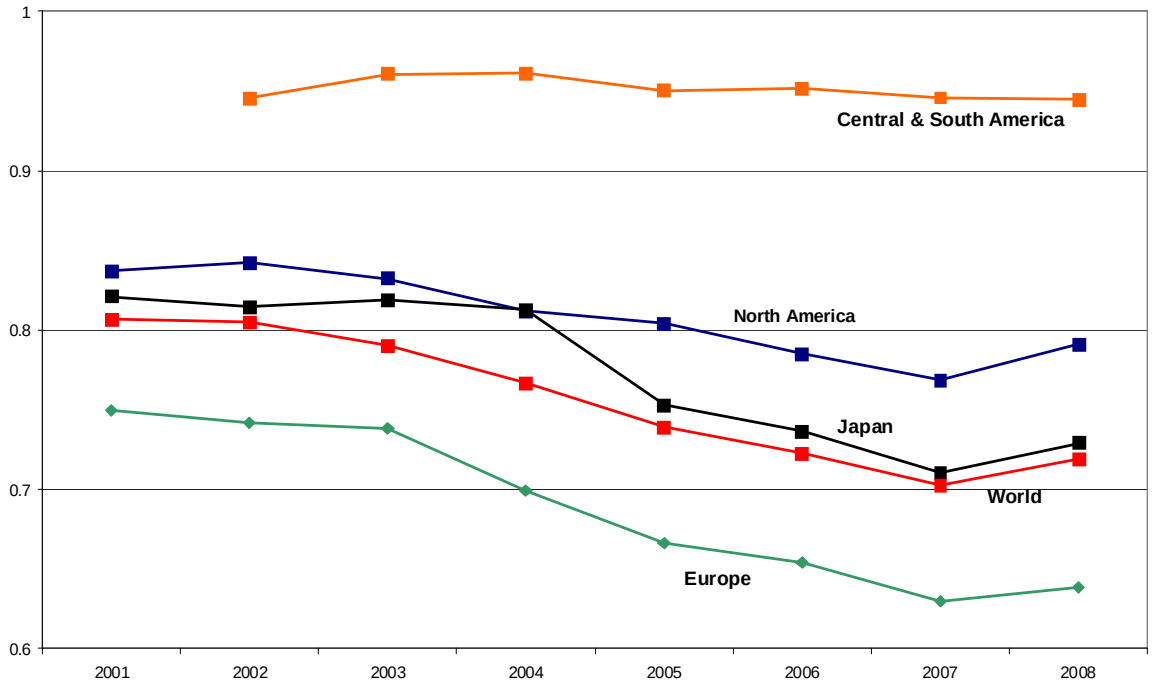
(the country measure BHB_i is Market Capitalization-weighted for each region; source: BIS and IFS.)

$$\text{LHB}_i = 1 - \frac{\text{Share of Foreign Banking Assets in Country i Banking Assets}}{\text{Foreign Banking Assets as a share of Total Foreign Outstanding Loans}}$$



Measures of Home Bias in Banking assets across OECD countries

(in each region, the country measure is weighted by the share of oustanding loans of the country in the region; source: OECD)



Measures of Home Bias in Banking assets across Regions

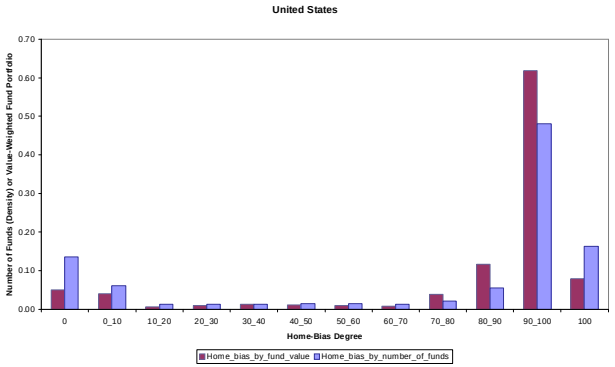
(in each region, the country measure LHB_i is weighted by the share of oustanding loans of the country in the region; source: BIS).

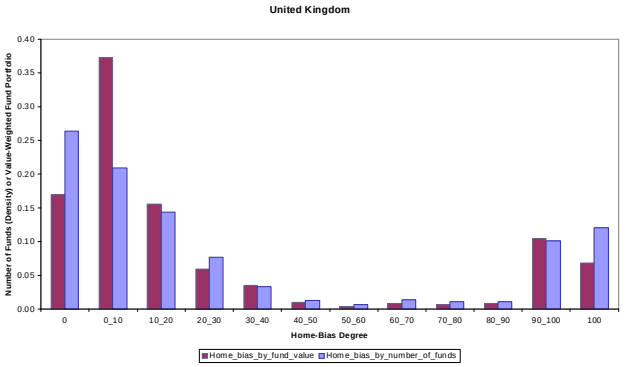
Home bias across individual funds

Use unique data at the fund level from Thomson Financial Securities for selected developed countries.

Compute the percentage of mutual funds based in a given country whose shares of domestic holdings in total asset holdings is 0%, strictly larger than 0% but $<$ 10%, between 10 and 20%, .., between 90 and 100% (but $<$ 100%) and equal to 100%. Averages for the 1997-2002 period = Degree of Home bias across funds for selected countries

Large degree of heterogeneity. Substantial specialization of funds into either (close to) fully domestic or (close to) fully international investment. But non negligible part of the distribution lying in between those two extremes.


United States
Number of Funds (Density) or Value-Weighted Fund Portfolio
0.70
0.60
0.50
0.40
0.30
0.20
0.10
0.00
0
0_10
10_20
20_30
30_40
40_50
50_60
60_70
70_80
80_90
90_100
100
Home-Bias Degree
Home_bias_by_fund_value
Home_bias_by_number_of_funds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0.25
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0.10
0.05
0.00
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0_10
10_20
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40_50
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90_100
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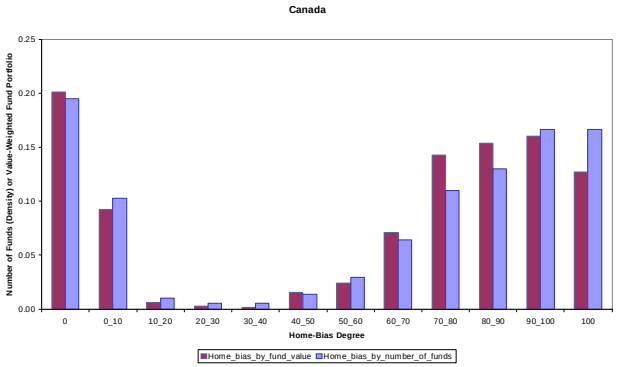
Home-Bias Degree
Home_bias_by_fund_value
Home_bias_by_number_of_funds


Canada
Number of Funds (Density) or Value-Weighted Fund Portfolio
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10_20
20_30
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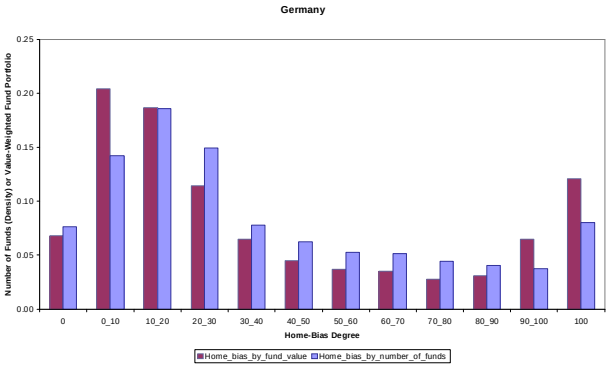
Home-Bias Degree
Home_bias_by_fund_value
Home_bias_by_number_of_funds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Number of Funds (Density) or Value-Weighted Fund Portfolio
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20_30
30_40
40_50
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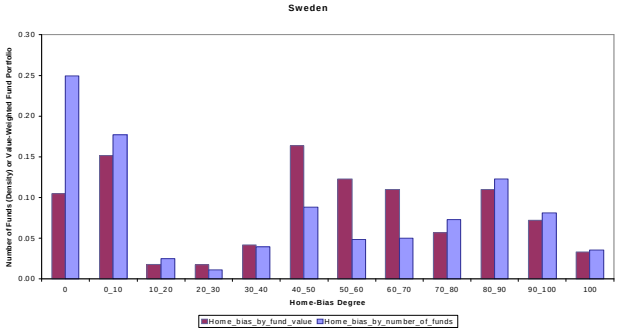
100
Home-Bias Degree
Home_bias_by_fund_value
Home_bias_by_number_of_funds


Sweden
Number of Funds (Density) or Value-Weighted Fund Portfolio
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10_20
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30_40
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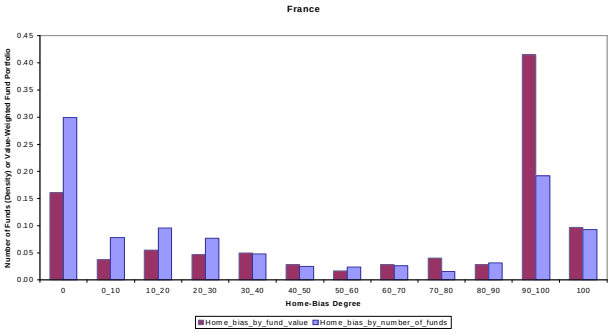
100
Home-Bias Degree
Home_bias_by_fund_value
Home_bias_by_number_of_funds


France
Number of Funds (Density) or Value-Weighted Fund Portfolio
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0_10
10_20
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30_40
40_50
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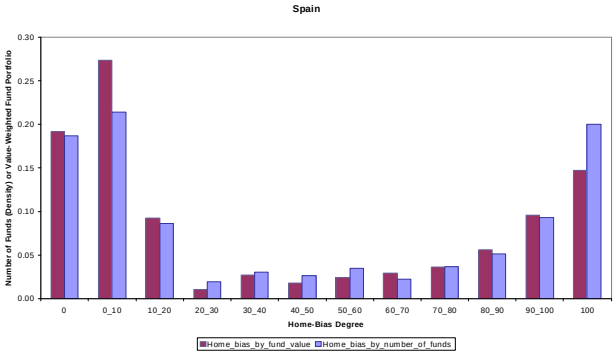
100
Home-Bias Degree
Home_bias_by_fund_value
Home_bias_by_number_of_funds


Spain
Number of Funds (Density) or Value-Weighted Fund Portfolio
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0.15
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0.05
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0_10
10_20
20_30
30_40
40_50
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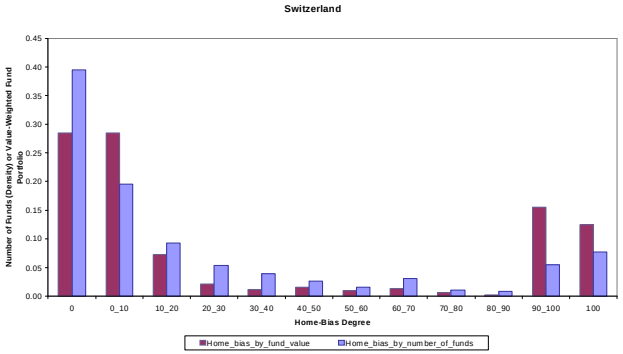
100
Home-Bias Degree
Home_bias_by_fund_value
Home_bias_by_number_of_funds


Switzerland
Number of Funds (Density) or Value-Weighted Fund Portfolio
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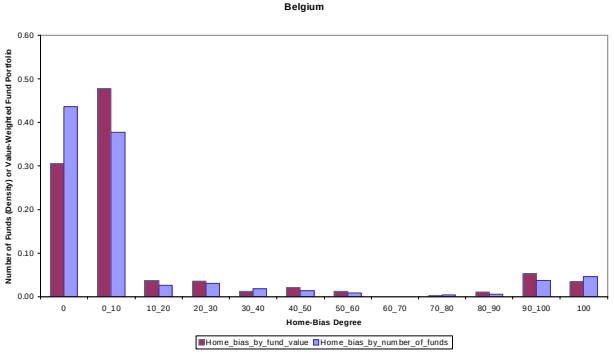
Home-Bias Degree
Home_bias_by_fund_value
Home_bias_by_number_of_funds


Belgium
Number of Funds (Density) or Value-Weighted Fund Portfolio
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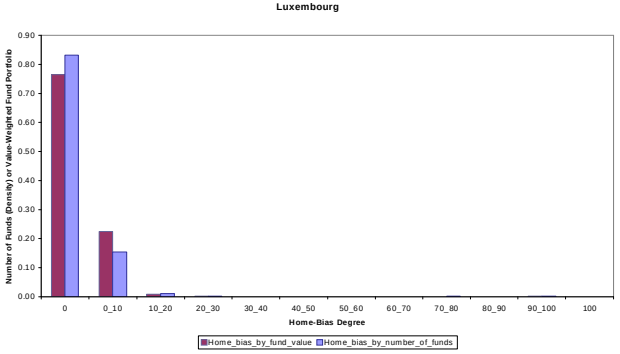
Home-Bias Degree
Home_bias_by_fund_value
Home_bias_by_number_of_funds


Luxembourg
Number of Funds (Density) or Value-Weighted Fund Portfolio
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0.00
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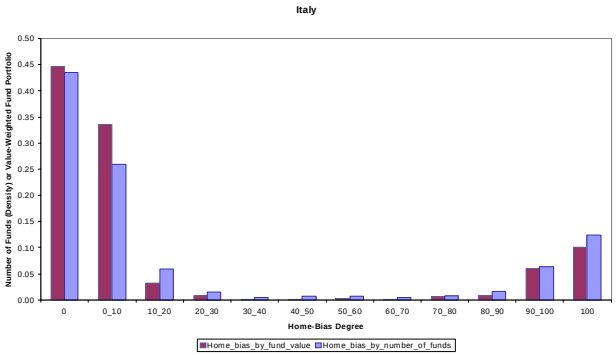
Home-Bias Degree
Home_bias_by_fund_value
Home_bias_by_number_of_funds


Italy
Number of Funds (Density) or Value-Weighted Fund Portfolio
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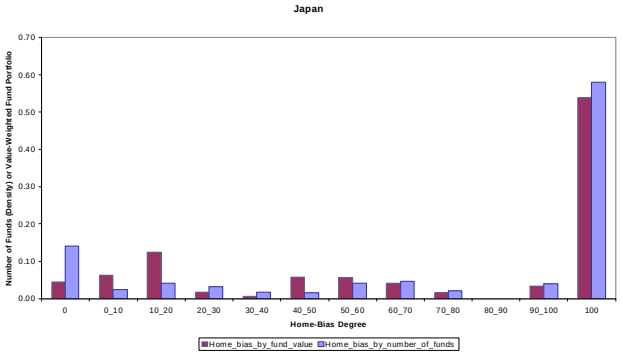
Home-Bias Degree
Home_bias_by_fund_value
Home_bias_by_number_of_funds


Japan
Number of Funds (Density) or Value-Weighted Fund Portfolio
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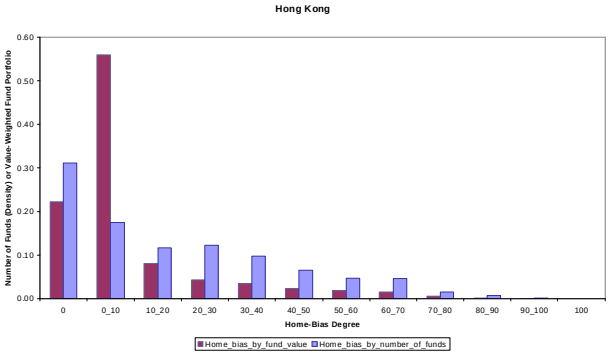
Home-Bias Degree
Home_bias_by_fund_value
Home_bias_by_number_of_funds


Hong Kong
Number of Funds (Density) or Value-Weighted Fund Portfolio
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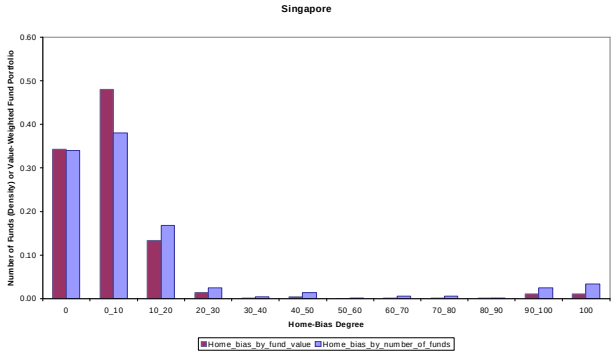
Home-Bias Degree
Home_bias_by_fund_value
Home_bias_by_number_of_funds


Singapore
Number of Funds (Density) or Value-Weighted Fund Portfolio
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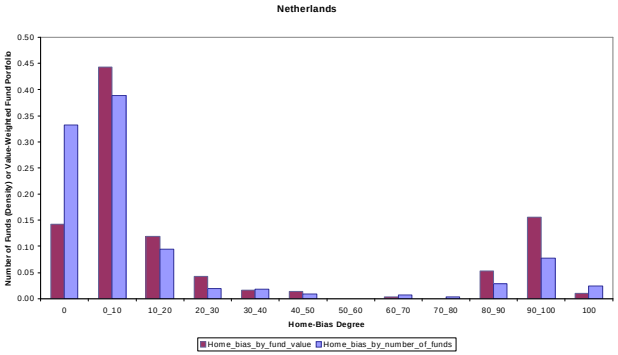
Home-Bias Degree
Home_bias_by_fund_value
Home_bias_by_number_of_funds


Netherlands
Number of Funds (Density) or Value-Weighted Fund Portfolio
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0.35
0.30
0.25
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0.10
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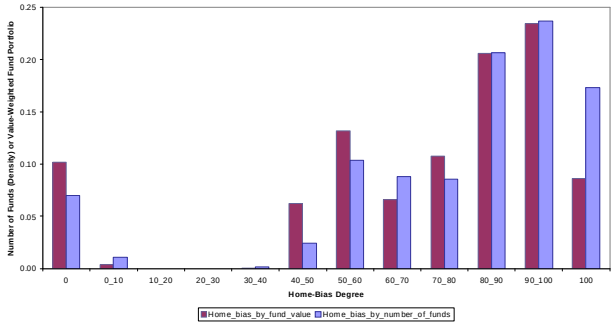
Home-Bias Degree
Home_bias_by_fund_value
Home_bias_by_number_of_funds


South Africa
Number of Funds (Density) or Value-Weighted Fund Portfolio
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10_20
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30_40
40_50
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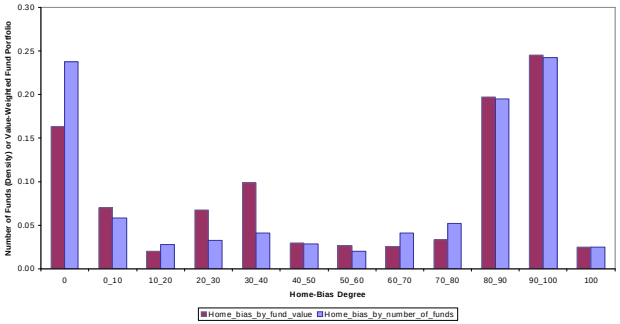
Home-Bias Degree
Home_bias_by_fund_value
Home_bias_by_number_of_funds


Norway
Number of Funds (Density) or Value-Weighted Fund Portfolio
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0.00
0
0_10
10_20
20_30
30_40
40_50
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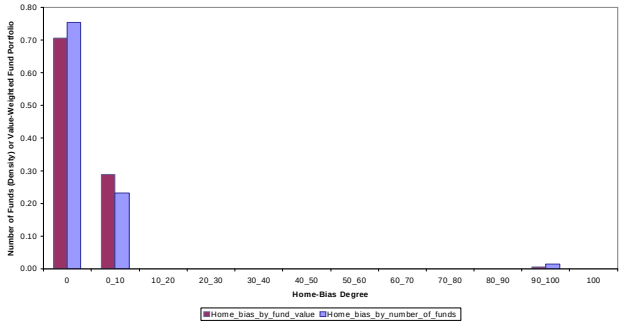
Home-Bias Degree
Home_bias_by_fund_value
Home_bias_by_number_of_funds


Ireland
Number of Funds (Density) or Value-Weighted Fund Portfolio
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100
Home-Bias Degree
Home_bias_by_fund_value
Home_bias_by_number_of_funds

What about delegated portfolio management?

Heterogeneity in fund behaviors points out the need for a theory of fund mandates.

Incorporating delegated management in Open Economy Financial Macroeconomics is a natural step forward.

Which inefficiencies does it bring? Context of asymmetric information/moral hazard. Implications for portfolios and asset prices?

Particularly relevant since financial intermediaries are most likely to be the relevant *marginal* investors.

Conclusion

Financial globalization points out the need to understand increasing cross-border asset positions and their various macro implications.

Open Economy Financial Macroeconomics first step in this direction; benefit from better solution technologies available.

Literature still at its infancy. Good area for further research.

1) consumption/portfolio discrepancies; 2) portfolio/asset prices discrepancies; 3) welfare implications? 4) portfolio positions across time and countries; 5) modelling heterogeneous investors/countries; 6) need more portfolio facts - observing the overall structure of portfolios.