Online Appendix

A Theory of the Global Financial Cycle

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This Online Appendix has 4 sections. In the first, we first present some additional information and robustness tests related to the empirical section. Second, we discuss the period 2 equilibrium, and show that the period 2 asset prices that we present in the text of the paper are an equilibrium, regardless of the value of the shock in period 1. Third, we present some of the additional details related to the numerical model in the paper, including a more complete discussion of the calibration of the within-country heterogeneity parameters Γ and κ. Finally, we discuss the extension in Section 7.5 of the paper where we assume $N+1$ safe assets that are imperfect substitutes.

A Additional Empirical Results

We begin with the results from some robustness tests. We first report the results when using quarterly rather than annual data. We then report the results from using the Miranda-Agrippino and Rey (MAR) asset price factor as our GFC factor. After that we present the loadings on the GFC factor for each country in our sample. We finally discuss some data to justify our classification of international debt flows as safe asset flows and international equity flows as risky asset flows.

A.1 Robustness

In Tables 1-2 we repeat all regressions using the Miranda-Agrippino and Rey (MAR) asset price factor as our GFC factor.

In Tables 3-4 we present the results when estimating the GFC factor, and running regressions, with quarterly data instead of annual data. The first factor based on quarterly data is shown in Figure 1, together with the MAR factor at the quarterly frequency. When using quarterly data, we follow Forbes and Warnock (2012) by using the year-over-year difference in the 4 quarter moving sum for both dependent and independent variables in the regression.

A.2 Factor Loadings

The factor loadings for individual countries are reported in Table 5 for annual data and Table 6 for quarterly data. The tables show the loadings on the first factor for risky and safe outflows and inflows ($\lambda^{out,risky}, \lambda^{out,safe}, \lambda^{in,risky}, \lambda^{in,safe}$). It also reports the net flow loadings $\lambda^{net,safe} = \lambda^{out,safe} - \lambda^{in,safe}$, $\lambda^{net,risky} = \lambda^{out,risky} - \lambda^{in,risky}$, $\lambda^{net} = \lambda^{net,safe} + \lambda^{net,risky}$.

A.3 Classification of Debt as Safe and Equity as Risky

Assets of course exist on a continuum of riskiness, from a 3M T-bill at one end of the spectrum to equity of start-up companies on the other. For the empirical analysis we have to decide where to draw the line dividing safe and risky. Because of the way the inflows and outflows data is arranged into the broad categories of FDI, portfolio equity, portfolio debt, and "other" (where other includes currency and deposits, bank lending, trade credit, and other account receivable/payable), it makes it natural to draw the line between risky and safe as the line between debt and equity.

The fact that we classify equity (FDI and portfolio equity) as risky is not controversial. However debt, which we are calling safe, includes not only government bonds but also high-yield corporate debt. So with this image of a continuum from T-bills on the left and risky equity on the right, should the line dividing safe and risky in the data be moved a little to the left? What share of the variance of international debt flows is due to safe debt flows (government bonds, central banks, and high grade corporate) and what share is due to risky debt flows (high yield corporate)?

The problem is that we can't observe this with the available data. The only further disaggregation that we have is the domestic counterparty to an inflow or outflow transaction, as in Avdjiev, Hardy, Kalemli-Ozcan, and Severn (2017). We can observe the party that is selling the asset in the case of a capital inflow or the party that is buying the asset in the case of a capital outflow. As far as determining the riskiness of the security being bought or sold, the outflow data is not much use to us (when we see that a US bank buys a foreign bond, we don't know if that is a safe German bund or risky high yield Italian corporate debt). But the inflows data can be useful. We can observe the sector that sold the asset, where the sectors are Central bank, Deposit Corporations, General Government, and Other. Other includes "other financial corporations", non-financial corporates, and households and non-profits. If we choose to draw the risky/safe line within the debt category, then one option is to group debt issued by the Central Bank, Deposit Corporations and the General Government sector into the safe category and debt of the Other sector into the risky category.

Since we can only do this for inflows, and not outflows, we can't get an idea of net flows. Moreover, the sector level data coverage is poor. But we can at least get some idea of relative magnitudes. If the "other" sector debt is classified as a risky asset, what share of the variance of total debt inflows does it represent? Of course the corporate debt from the "other" sector includes everything from AAA rated nonfinancial sector debt to high yield junk bonds, and the household debt in this category includes both prime and subprime mortgages, but this exercise will establish an upper bound on the share of the variance of debt flows that is due to this risky debt.

We observe Portfolio debt and Other inflows broken into these 4 sectors, government (g), central bank (c), deposit corporations (b), and other (o) for our 20 countries over the 1996-2020 period. Write total portfolio debt and other inflows as Pd_t and Ot_t, where $Pd_t = Pd_t^g + Pd_t^c + Pd_t^b + Pd_t^o$ and $Ot_t = Ot_t^g + Ot_t^c + Ot_t^b + Ot_t^o$. Then the share of the variance of Pd_t or Ot_t explained by each of these subcomponents is $S^i_{Pd} = \frac{cov\left(Pd_t, Pd_t^i\right)}{var(Pd_t)}$ and $S^i_{Ot} = \frac{cov\left(Ot_t, Ot_t^i\right)}{var(Ot_t)}$ for $i = g, c, b, o$. These results are presented in Table 7. There are some holes in the data, but we do see that on average, inflows to the "Other" sector only account for about 12% of the variance of portfolio debt inflows and about 20% of the variance of Other Debt inflows. A less risky sector like Deposit Corporations accounts for a larger share of the variance of both portfolio debt and other debt inflows, while Government also accounts for a larger share of the variance of portfolio debt inflows.

B Period 2 Equilibrium

The paper focuses on the period 1 equilibrium, taken as given that the period 2 risky asset prices are equal to $Q_{n,2} = (a/(1+a))D_n$. This affects returns of risky assets from period 1 to 2, which affects portfolios. We will show that this indeed holds, even after a shock to G.

We will show that $Q_{n,t} = (a/(1+a))D_n$ and $R_t = (1+a)/a$ is an equilibrium for all $t \geq 2$. We need to check two things. First, since there is no uncertainty from time 2 onwards, all assets need to have the same deterministic return. Second, the aggregate asset market clearing condition needs to hold from time 2 onwards. Regarding the first, the return on "risky" assets is

$$\frac{Q_{n,t+1} + D_{n,2}}{Q_{n,2}} \tag{1}$$

Here $D_{n,2}$ is the period 2 dividend that is constant from then on. Recall that $D_n = D_{n,2}/(1-\beta) = (1+a)D_{n,2}$. Substituting $Q_{n,t} = (a/(1+a))D_n$ for all $t \geq 2$ and $D_{n,2} = D_n/(1+a)$, (1) becomes $(1+a)/a$, which is R_t from time 2 onwards. So the first part checks out.

For the second part we need to check that

$$(N+1)B_t^h + \frac{a}{1+a}\sum_{n=1}^{N+1}\int_0^1 W_{n,t}^i di = \sum_{n=1}^{N+1} Q_{n,t}K_n \tag{2}$$

for $t \geq 2$.

First consider safe asset holdings by households. Assuming that our conjecture that the interest rate is $(1+a)/a$ from time 2 onward is correct, we have

$$B_2^h = R_1 B_1^h + Y - C_2^h \tag{3}$$

$$B_t^h = \frac{1+a}{a}B_{t-1}^h + Y - C_t^h \quad t \geq 3 \tag{4}$$

We also know from the first-order condition for consumption that consumption will be constant from time 2 onwards. The solution is

$$B_t^h = B_2^h = \frac{a}{1+a}R_1 B_1^h \tag{5}$$

$$C_t^h = Y + \frac{1}{a}B_2^h \tag{6}$$

for $t \geq 2$.

Now return to (2). Start with $t = 2$. The term $\sum_{n=1}^{N+1}\int_0^1 W_{n,2}^i di$ is the value of the wealth of all investors at the start of period 2, before consumption. This includes all investors within and across countries. We know that in the aggregate they hold the following quantities of assets in period 1. They hold K_n of country n risky assets. Since the global supply of safe assets is zero, their safe asset holdings in period 1 are opposite to those of households, so $-(N+1)B_1^h$. Each safe asset earns a return of R_1 in period 2. Each country n risky asset earns $Q_{n,2} + D_{n,2}$ in period 2. Therefore we have

$$\sum_{n=1}^{N+1} \int_0^1 W_{n,2}^i di = -(N+1)B_1^h R_1 + \sum_{n=1}^{N+1} K_n (Q_{n,2} + D_{n,2}) \tag{7}$$

Substitute this back into (2) for $t = 2$. Also substitute $B_2^h = (a/(1+a))R_1 B_1^h$, $Q_{n,2} = (a/(1+a))D_n$ and $D_{n,2} = D_n/(1+a)$. This gives

$$(N+1)\frac{a}{1+a}R_1 B_1^h - \frac{a}{1+a}(N+1)B_1^h R_1 + \frac{a}{1+a}\sum_{n=1}^{N+1} K_n D_n = \sum_{n=1}^{N+1} K_n \frac{a}{1+a} D_n \tag{8}$$

This is clearly satisfied.

Finally consider (2) for $t \geq 3$. At time $t-1$ investors hold K_n risky assets of country n. Their holdings of safe assets is the opposite of households, so $-(N+1)B_2^h$. Therefore we have

$$\sum_{n=1}^{N+1} \int_0^1 W_{n,t}^i di = -(N+1)\frac{1+a}{a}B_2^h + \sum_{n=1}^{N+1} K_n (Q_{n,t} + D_{n,2}) \tag{9}$$

for $t \geq 3$. Substitute this back into (2) for $t \geq 3$. Also substitute $B_t^h = B_2^h$, $Q_{n,t} = (a/(1+a))D_n$ and $D_{n,2} = D_n/(1+a)$. This gives

$$(N+1)B_2^h - (N+1)B_2^h + \frac{a}{1+a}\sum_{n=1}^{N+1} K_n D_n = \sum_{n=1}^{N+1} K_n \frac{a}{1+a} D_n \tag{10}$$

This is clearly satisfied.

C Additional details for the numerical model

In this section we present some additional detail for the model in the quantitative section of the paper. First we discuss the two changes we made to the model in the text to make it more realistic. Then we go into greater detail about the calibration of the key model parameters, particularly the parameters that determine within-country heterogeneity.

C.1 New features added to the quantitative model

In Section 7 we add two features to the model: a positive cross-country correlation of dividends and investment in new capital after the shock.

C.1.1 Cross-country correlation of dividends

For analytical tractability, until Section 7 the paper assumes that dividends are uncorrelated across countries. For the numerical exercise in Section 7 we relax this assumption in order to make the model and calibration more realistic.

Assume that

$$D_m = D + F_m \tag{11}$$

where D is a common component and F_m is an idiosyncratic component. The expectation of D_m is $\bar{D}_m$. Assume that D and F_m are uncorrelated and that F_m is uncorrelated across countries. Assume that for country n investors the variance of F_n is σ^2, while for investor i in country n the variance of F_m, with $m \neq n$, is σ^2/κ_i. Also let σ_d^2 be the variance of D. In what follows we will take the perspective of investor i in country 1. Once we derive an expression for the optimal portfolio of investor i in country 1, it is then straightforward to generalize this to investor i in any country n.

Let Σ^i be the covariance of the vector $[D_1, ..., D_{N+1}]'$ for investor i in country 1. It follows that

$$\Sigma^i = A^i + \sigma_d^2 \iota\iota' \tag{12}$$

where ι is a $(N+1)$ by 1 vector of ones and A^i is a diagonal matrix with $A^i_{1,1} = \sigma^2$ and the other diagonal elements equal to σ^2/κ_i. We have

$$[\Sigma^i]^{-1} = [A^i]^{-1} - \frac{\sigma_d^2}{1 + \sigma_d^2 \iota'[A^i]^{-1}\iota}[A^i]^{-1}\iota\iota'[A^i]^{-1} \tag{13}$$

$[A_i]^{-1}$ is a diagonal matrix with $1/\sigma^2$ in element (1,1) and κ_i/σ^2 in the other diagonal elements.

We have

$$[A^i]^{-1}\iota = \frac{1}{\sigma^2}\begin{pmatrix} 1 \\ \kappa_i \\ ... \\ \kappa_i \end{pmatrix} \tag{14}$$

and

$$\iota'[A^i]^{-1}\iota = \frac{1 + N\kappa_i}{\sigma^2} \tag{15}$$

and

$$[A^i]^{-1}\iota\iota'[A^i]^{-1} = \frac{1}{\sigma^4}\begin{pmatrix} 1 & \kappa_i & ... & \kappa_i \\ \kappa_i & \kappa_i^2 & ... & \kappa_i^2 \\ ... & ... & ... & ... \\ \kappa_i & \kappa_i^2 & ... & \kappa_i^2 \end{pmatrix} \tag{16}$$

Define

$$\eta_i = \frac{\sigma_d^2}{\sigma^2 + \sigma_d^2(1 + N\kappa_i)} \tag{17}$$

and define $\nu = \frac{\sigma_d^2}{\sigma_d^2+\sigma^2}$. This is the cross-country correlation of dividends. Then

$$\eta_i = \frac{\nu}{1 - \nu + \nu(1 + N\kappa_i)} \tag{18}$$

Then

$$[\Sigma^i]^{-1} = \frac{1}{\sigma^2}\begin{pmatrix} 1-\eta_i & -\eta_i\kappa_i & -\eta_i\kappa_i & ... & -\eta_i\kappa_i & -\eta_i\kappa_i \\ -\eta_i\kappa_i & \kappa_i - \eta_i\kappa_i^2 & -\eta_i\kappa_i^2 & ... & -\eta_i\kappa_i^2 & -\eta_i\kappa_i^2 \\ ... & ... & ... & ... & ... & ... \\ -\eta_i\kappa_i & -\eta_i\kappa_i^2 & -\eta_i\kappa_i^2 & ... & -\eta_i\kappa_i^2 & \kappa_i - \eta_i\kappa_i^2 \end{pmatrix} \tag{19}$$

Next consider the portfolio problem for agent i in country 1. The agent maximizes

$$E\left(R^{p,i,1}\right) - 0.5\gamma_{i,1}var\left(R^{p,i,1}\right) \tag{20}$$

where

$$R^{p,i,1} = R + \sum_{m=1}^{N+1} z_{1,m}^i\left(\frac{D_m - RQ_m}{Q_m}\right) \tag{21}$$

Define the portfolio vector of agent i in country 1 as

$$z_1^i = \begin{pmatrix} z_{1,1}^i \\ ... \\ z_{1,N+1}^i \end{pmatrix} \tag{22}$$

The vector of expected excess returns is

$$\mu = \begin{pmatrix} \frac{\bar{D}_1 - RQ_1}{Q_1} \\ ... \\ \frac{\bar{D}_{N+1} - RQ_{N+1}}{Q_{N+1}} \end{pmatrix} \tag{23}$$

The variance of the vector of excess returns is $\tilde{Q}\Sigma^i\tilde{Q}$, where $\tilde{Q}$ is a diagonal matrix with $1/Q_m$ in element (m, m) of the diagonal.

Investor i from country 1 then maximizes

$$\mu' z_1^i - 0.5\gamma_{i,1} \left(z_1^i\right)' \tilde{Q}\Sigma^i\tilde{Q} \left(z_1^i\right) \tag{24}$$

The optimal portfolio is

$$z_1^i = \frac{1}{\gamma_{i,1}} \left(\tilde{Q}\Sigma^i\tilde{Q}\right)^{-1} \mu \tag{25}$$

We can also write this as

$$z_1^i = \frac{1}{\gamma_{i,1}} \tilde{Q}^{-1}[\Sigma^i]^{-1}\tilde{Q}^{-1}\mu \tag{26}$$

$\tilde{Q}^{-1}$ is a diagonal matrix with Q_m in element (m, m). We then have

$$\tilde{Q}^{-1}[\Sigma^i]^{-1}\tilde{Q}^{-1} = \tag{27}$$

$$\frac{1}{\sigma^2}\begin{pmatrix} (1-\eta_i)Q_1^2 & -\eta_i\kappa_i Q_1 Q_2 & -\eta_i\kappa_i Q_1 Q_3 & ... & -\eta_i\kappa_i Q_1 Q_N & -\eta_i\kappa_i Q_1 Q_{N+1} \\ -\eta_i\kappa_i Q_1 Q_2 & \left(\kappa_i - \eta_i\kappa_i^2\right) Q_2^2 & -\eta_i\kappa_i^2 Q_2 Q_3 & ... & -\eta_i\kappa_i^2 Q_2 Q_N & -\eta_i\kappa_i^2 Q_2 Q_{N+1} \\ ... & ... & ... & ... & ... & ... \\ -\eta_i\kappa_i Q_1 Q_{N+1} & -\eta_i\kappa_i^2 Q_2 Q_{N+1} & -\eta_i\kappa_i^2 Q_3 Q_{N+1} & ... & -\eta_i\kappa_i^2 Q_N Q_{N+1} & \left(\kappa_i - \eta_i\kappa_i^2\right) Q_{N+1}^2 \end{pmatrix}$$

Using that

$$\gamma_{i,1} = \frac{1}{\Gamma_i \left(1 + \epsilon_1^G\right) G} \tag{28}$$

the portfolio expressions become

$$z_{1,1}^i = \frac{Q_1\Gamma_i \left(1 + \epsilon_1^G\right) G}{\sigma^2} \left((1-\eta_i)(\bar{D}_1 - RQ_1) - \eta_i\kappa_i \sum_{m\neq 1}(\bar{D}_m - RQ_m)\right) \tag{29}$$

and for $m \neq 1$

$$z_{1,m}^i = \frac{Q_m\Gamma_i \left(1 + \epsilon_1^G\right) G}{\sigma^2} \left(-\eta_i\kappa_i(\bar{D}_1 - RQ_1) + (\kappa_i - \eta_i\kappa_i^2)(\bar{D}_m - RQ_m) - \eta_i\kappa_i^2 \sum_{k\neq 1,m}(\bar{D}_k - RQ_k)\right) \tag{30}$$

For investor i from country n, these portfolio expressions become

$$z_{n,n}^i = \frac{Q_n\Gamma_i \left(1 + \epsilon_n^G\right) G}{\sigma^2} \left((1-\eta_i)(\bar{D}_n - RQ_n) - \eta_i\kappa_i \sum_{m\neq n}(\bar{D}_m - RQ_m)\right) \tag{31}$$

and for $m \neq n$

$$z_{n,m}^i = \frac{Q_m\Gamma_i \left(1 + \epsilon_n^G\right) G}{\sigma^2} \left(-\eta_i\kappa_i(\bar{D}_n - RQ_n) + (\kappa_i - \eta_i\kappa_i^2)(\bar{D}_m - RQ_m) - \eta_i\kappa_i^2 \sum_{k\neq n,m}(\bar{D}_k - RQ_k)\right) \tag{32}$$

Notice that the portfolio expressions (17) and (18) in the paper correspond to $\sigma_d^2 = 0$, so that $\eta_i = 0$.

Next consider the portfolio expressions in the pre-shock equilibrium, which generalize (24) and (25) in the paper. In the pre-shock equilibrium we still have $Q_n = a$ for all n and $R = (1+a)/a$. We also have

$$\bar{D}_n = 1 + a + \frac{\sigma^2 \bar{z}}{a\bar{\psi}}(1 + \epsilon_n^D) \tag{33}$$

This remains the same as in equation (11) of the paper. The definition of ψ_i, and therefore $\bar{\psi}$, has changed. Define

$$\psi_i = \Gamma_i(1 + N\kappa_i)(1 - \eta_i(1 + N\kappa_i)) \tag{34}$$

with $\bar{\psi}$ defined as the mean across i of ψ_i. In the case where returns are uncorrelated, so that $\eta_i = 0$, this corresponds exactly to the ψ_i in the paper.

The portfolios in the pre-shock equilibrium are then

$$z_{n,n}^i = \bar{z}\frac{\Gamma_i(1 - \eta_i(1 + \kappa_i N)}{\bar{\psi}}(1 + \epsilon_n^G) + \bar{z}\frac{\Gamma_i(1 - \eta_i(1 - \kappa_i))}{\bar{\psi}}(1 + \epsilon_n^G)\epsilon_n^D \tag{35}$$

$$z_{n,m}^i = \bar{z}\frac{\Gamma_i\kappa_i(1 - \eta_i(1 + \kappa_i N)}{\bar{\psi}}(1 + \epsilon_n^G) + \bar{z}\frac{\Gamma_i}{\bar{\psi}}(1 + \epsilon_n^G)\left(-\eta_i\kappa_i(1 - \kappa_i)\epsilon_n^D + \kappa_i\epsilon_m^D\right) \tag{36}$$

When either there is no cross-sectional heterogeneity, or ϵ_n^D and ϵ_n^G are not cross-sectionally correlated, the mean portfolio share of investor i in all countries is

$$z^i = \bar{z}\frac{\Gamma_i(1 + N\kappa_i)(1 - \eta_i(1 + \kappa_i N)}{\bar{\psi}} = \bar{z}\frac{\psi_i}{\bar{\psi}} \tag{37}$$

The mean portfolio share across all investors in all countries is then $\bar{z}$. While in the calibration the cross-sectional correlation between ϵ_n^D and ϵ_n^G is not exactly zero, it very close to 0 and the values of z^i are very close to those in (37).

Next we need to check that market clearing conditions are satisfied in period 1. If we start with $W_{n,0}^i = (1+a)/\bar{z}$ in period 0, it is immediate that in period 1 we still have $W_n^i = (1+a)/\bar{z}$ in the pre-shock equilibrium as the portfolio return is $(1+a)/a$. The risky asset market clearing conditions then imply

$$K_n = E(\Gamma(1-\eta(1+\kappa N)))\frac{1}{\bar{\psi}}(1+\epsilon_n^G) + E(\Gamma(1-\eta(1-\kappa)))\frac{1}{\bar{\psi}}(1+\epsilon_n^G)\epsilon_n^D +$$
$$E(\Gamma\kappa)\frac{1}{\bar{\psi}}(N-\epsilon_n^G)(1+\epsilon_n^D) - E(\Gamma\kappa\eta(1+\kappa N))\frac{1}{\bar{\psi}}(N-\epsilon_n^G)$$
$$-E(\Gamma\kappa\eta(1-\kappa))\frac{1}{\bar{\psi}}\sum_{m\neq n}(1+\epsilon_m^G)\epsilon_m^D \tag{38}$$

Note that when the correlation of returns is zero across countries, so that $\eta_i = 0$, we have

$$K_n = E(\Gamma)\frac{1}{\bar{\psi}}(1+\epsilon_n^G)(1+\epsilon_n^D) + E(\Gamma\kappa)\frac{1}{\bar{\psi}}(N-\epsilon_n^G)(1+\epsilon_n^D) \tag{39}$$

This corresponds to the capital stock in the paper.

It is easy to check that from the aggregate asset market clearing condition, it remains the case that in the pre-shock equilibrium

$$B_0^h = a\left(\frac{\sum_{n=1}^{N+1} K_n}{N+1} - \frac{1}{\bar{z}}\right) \tag{40}$$

C.1.2 Investment

The second extension involves investment in period 1. Aggregate net capital outflows (the current account) is then saving minus investment instead of saving. Investment therefore affects net capital flows. It also affects gross capital flows of risky assets. A drop in investment leads to a decrease in asset supplies that leads to a drop in equilibrium asset purchases that lowers gross capital flows.

Consider firms in country n with output

$$Y_{n,t} = K_{n,t}D_{n,t} \tag{41}$$

where $K_{n,t}$ is the capital stock and $D_{n,t}$ is productivity. Risky assets are claims on the capital stocks. $D_{n,t}$ is therefore also the dividend per unit of the capital stock.

We introduce installment firms. They produce I_n new capital goods in period 1 in country n at the price of Q_n. These raise the capital stock at time 2. Production of capital goods requires a quadratic adjustment costs. Producing I_n units of the capital good requires

$$aI_n + \frac{\xi}{2}\frac{(aI_n)^2}{K_n} \tag{42}$$

units of the consumption good. Here K_n is the period 1 capital stock, which remains unchanged. The installment firms maximize the profit

$$Q_n I_n - a I_n - \frac{\xi}{2} \frac{(a I_n)^2}{K_n} \tag{43}$$

This implies

$$\frac{I_n}{K_n} = \frac{1}{a^2 \xi}(Q_n - a) \tag{44}$$

The period 2 capital stock is then

$$K_{n,2} = K_n + I_n \tag{45}$$

The period 1 risky asset market equilibrium for country n then becomes

$$\beta \sum_{m=1}^{N+1} \int_0^1 z_{m,n}^i W_m^i di = Q_n K_{n,2} \tag{46}$$

Before Section 7 of the paper we assumed that the period 1 asset supply remains K_n after the shock. Now it becomes $K_{n,2} = K_n + I_n$. The aggregate asset market equilibrium becomes

$$(N+1)B^h + \beta \sum_{n=1}^{N+1} \int_0^1 W_n^i di = \sum_{n=1}^{N+1} Q_n K_{n,2} \tag{47}$$

C.2 Calibration

In this section we discuss the calibration of the investment adjustment cost parameter ξ, the intertemporal elasticity of substitution ρ of households, the equity return correlation ν and the within-country heterogeneity parameters Γ_i and κ_i.

From equation 44 we can calibrate the investment adjustment cost parameter ξ from the fall in investment spending relative to the fall in risky asset prices following the GFC shock that we observed Section 2 of the paper. From Tables 1 and 2 we see that on average the investment/GDP ratio falls by about 0.5 percent and the savings/GDP ratio falls by about 0.7 percent for every 16.2 percent fall in the risky asset price. Since of course world savings has to equal world investment, we take the average of these two and calibrate the model to generate a 0.6 percent fall in the investment/GDP ratio for every 16.2 percent fall in the risky asset price. Define GDP as $\bar{Y} = Y + 1$. Nominal investment is $I^n = QI$. Using that the average capital stock across countries is very close to 1, and therefore setting $K_n = 1$, from (44) we can then derive

$$\xi = \frac{\frac{dQ}{a}}{d\frac{I^n}{\bar{Y}}} \frac{1}{\bar{Y}} \tag{48}$$

where $\frac{\frac{dQ}{a}}{d\frac{I^n}{\bar{Y}}} = \frac{16.2}{0.6}$. Using $\bar{Y} = 4$, we have $\xi = 6.75$.

Next consider the household's intertemporal elasticity of substitution parameter ρ. More generally, we consider this as a parameter that affects the saving response of all agents outside of investors, including households, governments, non-profits, etc. This parameter determines the slope of the S=0 schedule in Figure 4. Once we add investment to the model, the $S = 0$ schedule needs to be replaced by the $S = I$ schedule, where S and I refer to global saving and investment. The slope of the $S = I$ schedule determines the ratio dQ/dR.

We take the version of the model without any heterogeneity to compute analytically dQ/a relative to dR. We find that in the full model with heterogeneity this ratio is virtually identical when the risky asset price change is defined as the average across all $N + 1$ risky assets. As discussed in Section 4, in the model without heterogeneity the sum of household and investment savings is equal to $(R_0 - 1)B_0^h + Y - C_1^h - \frac{Q-a}{1+a}$. Equation (44) implies that nominal investment spending is equal to $\frac{1}{\xi}\left(Q^2 - aQ\right)/a^2$. The $S = I$ schedule is then given by:

$$(R_0 - 1)B_0^h + Y - C_1^h - \frac{Q-a}{1+a} = \frac{1}{\xi}\frac{Q^2 - aQ}{a^2} \tag{49}$$

In the text we derived

$$\frac{dC_1^h}{dR} = \left(-\rho Y - (\rho - 1)\left(1 - \frac{1}{\bar{z}}\right)\right)\frac{a^2}{(1+a)^2} \tag{50}$$

Differentiating (49) then gives

$$\rho = \frac{\frac{\left(\frac{a}{1+a} + \frac{1}{\xi}\right)\frac{\frac{dQ}{a}}{dR}}{\frac{a^2}{(1+a)^2}} + \left(1 - \frac{1}{\bar{z}}\right)}{Y + 1 - \frac{1}{\bar{z}}} \tag{51}$$

From the empirical results in Section 2 we observe that following a shock to the GFC, there is a 55 basis point fall in the real risk free rate for every 16.2 percent fall in the risky asset price. Therefore $[dQ/a]/dR = 16.2/0.55 = 29.45$. Substituting $\xi = 6.75$, $a = 25$, $Y = 3$, $\bar{z} = 0.5$, we have $\rho = 17.2$.

We next move on to the derivation of the within-country heterogeneity parameters Γ_i and κ_i. For this we rely on the three Calvet et al. papers cited in the text that use the Swedish administrative data to discuss the within country heterogeneity of wealth and portfolio shares. The Calvet et al. (2009) paper provides the motivation for the distribution of risky shares z_i. The Calvet et al. (2007) paper provides the motivation for the distribution of foreign shares z_i^F. The Calvet et al. (2009b) paper provides the correlation between these risky and foreign shares. With a distribution of risky and foreign shares z_i and z_i^F, it is then simple to back out distributions of Γ_i and κ_i.

We need to find the Γ_i and κ_i for I investors where I is a large number (we use 100,000). We start by generating two random $N(0,1)$ series, each with I elements, and a correlation of c. The value of c will be discussed below. Refer to these series as $\bar{x}_i$ and $\bar{y}_i$. We then convert these to two random $U(0,1)$ series $x_i = \Psi(\bar{x}_i)$ and $y_i = \Psi(\bar{y}_i)$, where $\Psi(.)$ is the cdf of the standard normal distribution. We set the risky asset share z_i equal to x_i. We set the relative Sharpe ratio loss, $RSRL_i$ for investor i, equal to y_i. This is a measure of portfolio diversification that we will discuss shortly.

Figure I of Calvet et al. (2009) plots a histogram with the distribution of the risky shares across households in the Swedish administrative data. This data is for 1999-2002, a period of rapid risky asset price appreciation followed by a fall in risky asset prices. The distribution is centered around 0.5. It is left-skewed during a boom in risky asset prices, with a large mass of households holding a risky share greater that 0.5, and right-skewed during a bust, with a large mass of households holding a risky share less that 0.5. But on average the risky shares are close to uniformly distributed uniformly between 0 and 1. Therefore we set $z_i = x_i$, which has a $U(0,1)$ distribution.

The Swedish data do not provide direct information on the share of risky assets invested abroad, z_i^F. To extract information about z_i^F, we use data on the Sharpe ratios for individual households from Calvet et al. (2007). We first discuss how these Sharpe ratios are computed in the model.

The excess return for the portfolio of investor i in country n is:

$$R^{p,i,n} - R = \sum_{m=1}^{N+1} z_{n,m}^i \left(\frac{D_m - RQ_m}{Q_m} \right) \tag{52}$$

We use the portfolio shares from the pre-shock equilibrium for an average country where $\epsilon_n^G = \epsilon_n^D = 0$, as well as the pre-shock asset prices $Q_m = a$ and $R = (1+a)/a$. (52) then becomes

$$
\begin{aligned}
R^{p,i,n} - R = {} & \Gamma_i \left(1 - \eta_i \left(1 + N\kappa_i\right)\right) \frac{1}{\bar{\psi}} \bar{z} \left(\frac{D_n - 1 - a}{a}\right) \\
& + \sum_{m \neq n} \Gamma_i \kappa_i \left(1 - \eta_i \left(1 + N\kappa_i\right)\right) \frac{1}{\bar{\psi}} \bar{z} \left(\frac{D_m - 1 - a}{a}\right)
\end{aligned} \tag{53}
$$

The Sharpe ratio is equal to the expected excess return divided by the standard deviation of the excess return:

$$
S_i = \frac{E\left(R^{p,i,n} - R\right)}{\left(var\left(R^{p,i,n} - R\right)\right)^{0.5}} \tag{54}
$$

We have $E\left(R^{p,i,n} - R\right) = z_i \left(\bar{z} \frac{\sigma^2}{a^2 \bar{\psi}}\right)$ and

$$
\begin{aligned}
var\left(R^{p,i,n} - R\right) &= Var \begin{pmatrix} \Gamma_i \left(1 - \eta_i \left(1 + N\kappa_i\right)\right) \frac{1}{\bar{\psi}} \bar{z} \left(\frac{D_n - 1 - a}{a}\right) \\ + \sum_{m \neq n} \Gamma_i \kappa_i \left(1 - \eta_i \left(1 + N\kappa_i\right)\right) \frac{1}{\bar{\psi}} \bar{z} \left(\frac{D_m - 1 - a}{a}\right) \end{pmatrix} \\
&= z_i^2 Var \left(\left(1 - z_i^F\right) \left(\frac{D_n - 1 - a}{a}\right) + \sum_{m \neq n} \frac{z_i^F}{N} \left(\frac{D_m - 1 - a}{a}\right) \right) \\
&= z_i^2 \begin{pmatrix} \left(\left(1 - z_i^F\right)^2 + N \left(\frac{z_i^F}{N}\right)^2 \right) \left(\frac{\sigma^2 + \sigma_d^2}{a^2}\right) \\ + \left((N)(N-1) \frac{z_i^F}{N} + 2N \left(1 - z_i^F\right) \right) \frac{z_i^F}{N} \left(\frac{\sigma_d^2}{a^2}\right) \end{pmatrix}
\end{aligned}
$$

From Calvet et al. (2007), the relative Sharpe ratio loss of the portfolio of investor i is:

$$
RSRL_i = 1 - \frac{S_i}{S_D} \tag{55}
$$

where S_D is the Sharpe ratio of the portfolio with the internationally diversified portfolio (in our model $z_i^F = N/(1+N)$). After some simplification:

$$
\frac{\left(\frac{1}{1+N}\right)\left(1 + N\nu\right)}{\left(1 - z_i^F\right)^2 + N\left(\frac{z_i^F}{N}\right) + \left(2N - (1+N) z_i^F\right) \frac{z_i^F}{N} \nu} = \left(1 - RSRL_i\right)^2 \tag{56}
$$

where $\nu = \frac{\sigma_d^2}{\sigma_d^2 + \sigma^2}$ is the cross-country correlation of dividends. We can back out the value of this parameter using the data in Calvet et al. (2007). They report that the Sharpe ratio for the currency-hedged international benchmark portfolio is 45.2. Furthermore they report that the Sharpe ratio for the benchmark Swedish portfolio is 27.4. Holding the benchmark Swedish portfolio then implies a Sharpe ratio loss of $RSRL = 1 - \frac{27.4}{45.2}$. In the model, holding only Swedish risky assets implies $z_i^F = 0$. It then follows from (56) that $\nu = \frac{(N+1)(1-RSRL)^2-1}{N} = 0.33$.

Table 4 of Calvet et al. (2007) presents the cumulative distribution of the Sharpe ratio loss of individual portfolios relative to the international benchmark. We assume that the cdf of the relative Sharpe ratio loss (RSRL) across the I investors in our model matches the cdf of the RSRL from this table. The table presents the 25th, 50th, 75th, 90th, 95th, and 99th percentiles of the RSRL. Define $\Psi_{RSRL}(.)$ as the cdf of the RSRL. The table implies $\Psi_{RSRL}(0.89) = 0.99$, $\Psi_{RSRL}(0.69) = 0.95$, $\Psi_{RSRL}(0.55) = 0.9$, $\Psi_{RSRL}(0.42) = 0.75$, $\Psi_{RSRL}(0.35) = 0.5$ and $\Psi_{RSRL}(0.29) = 0.25$. We assume that the investor with the lowest Sharpe ratio loss has a RSRL of 0, so $\Psi_{RSRL}(0) = 0$, and the investor with the highest Sharpe ratio loss has a RSRL of 1, so $\Psi_{RSRL}(1) = 1$. We then assume that the RSRL cdf is piecewise linear between these values.

We next use the values of the series y_i, which has a $U(0,1)$ distribution, to create a series $RSRL_i$ consistent with the cdf for $RSRL$: $RSRL_i = (\Psi_{RSRL})^{-1}(y_i)$. We can then use (56) to back out the series of z_i^F across our I investors. For a large set of investors this z_i^F will be negative. Recall that RSRL of the Swedish portfolio is around 0.4. Then under this piecewise mapping, about 35 percent of investors have a greater RSRL than the benchmark Swedish portfolio, the portfolio they would have in this model with $z_i^F = 0$. Since we are not concerned with domestic investment mistakes and only the lack of international diversification, we simply assume that these investors with a RSRL lower than the Swedish benchmark simply have a $z_i^F = 0$.[1]

Once we know both the risky portfolio share z_i as well as z_i^F for our I investors, we can back out Γ_i and κ_i. We can obtain κ_i from $z_i^F = N\kappa_i/(1 + N\kappa_i)$. Recall that the risky share is $z_i = \bar{z}\frac{\psi_i}{\bar{\psi}}$ where $\psi_i = \Gamma_i(1 + N\kappa_i)(1 - \eta_i(1 + N\kappa_i))$, $\bar{\psi}$ is the mean of ψ_i, and $\eta_i = \frac{\nu}{1-\nu+\nu(1+N\kappa_i)}$. We can use this to back out $\Gamma_i/\bar{\Gamma}$. As discussed

[1] Calvet et al. (2007) also report the RSRL of investors relative to the Swedish benchmark portfolio. They report that the 50th percentile investor has a RSRL relative to the domestic benchmark of -0.08 (meaning they have a higher Sharpe ratio than the domestic portfolio) and the 75th percentile investor has a RSRL relative to the domestic benchmark of 0.04. Extrapolating between these two, we would conclude that the 65th percentile investor has a relative Sharp ratio loss relative to the Swedish portfolio of 0, further evidence that investors in the 65th to 100th percentile have no international diversification

in the text, we assume that Γ_i has a mean $\bar{\Gamma}$ of 0.1.

Finally, we need to discuss the correlation c that we assume between the two random $N(0,1)$ series $\bar{x}_i$ and $\bar{y}_i$ we generate to construct the x_i and y_i series. This correlation c affects the correlation between z_i and $RSLR_i$. The latter correlation is important as it determines the correlation between the the risky asset share and the foreign share. Calvet et al. (2009b) report that the correlation between the risky share and the RSRL in the Swedish data is -0.49. That is, investors with a higher risky asset share tend to have a more diversified portfolio. Calvet et al. (2007) report that investor sophistication has a positive effect on both the risky portfolio share and portfolio diversification. We can set the correlation c in order to target a correlation of -0.49 between z_i and $RSLR_i$. This will be the case when $c = -0.51$. The correlation between the original random $N(0,1)$ series that we generate is therefore very close to the correlation between z_i and $RSLR_i$ that is created from these two series.

All of this results in a correlation between the risky share and the foreign share of about 0.43. The average risky share is 0.5 and the average foreign share is 0.24.

D Arbitrageurs

In the text we assumed that there was just one safe asset. Now assume that we have $N+1$ safe assets. There are investors, households and arbitrageurs. The investors are modelled as before but only hold the domestic safe asset. To keep households identical across countries, assume that households hold an equally weighted portfolio of domestic and foreign safe assets. Arbitrageurs are also identical in each country. They can hold positive and negative amounts of each country's safe asset. Arbitrageurs in each country hold B_n of the country n safe asset. Assume that they enter period 1 with zero wealth. Therefore it must be the case that

$$\sum_{n=1}^{N+1} B_n = 0 \tag{57}$$

Arbitrageurs maximize

$$\sum_{n=1}^{N+1} R_n B_n - \frac{1}{2} a_0 \sum_{n=1}^{N+1} \left(B_n - \bar{B}_n\right)^2 \tag{58}$$

The first term is the return on the safe asset holdings. The second term is a quadratic penalty for deviating from their the pre-shock safe asset holdings $\bar{B}_n$.

The market equilibrium condition for risky assets remains the same. The market equilibrium condition for country n safe assets is

$$B_n^h + (N+1)\, B_n + \beta \int_0^1 \left(1 - \sum_{m=1}^{N+1} z_{n,m}^i\right) W_n^i di = 0 \tag{59}$$

where $B_n^h = \frac{1+a}{a} B_0^h + Y - C_1^h$ is the sum of household holdings of the country n safe asset. Each household holds $\frac{1}{N+1}\left(\frac{1+a}{a} B_0^h + Y - C_1^h\right)$ of the safe asset in country n, and

$$C_1^h = \frac{1}{1 + a^\rho (1+a)^{1-\rho} R^{\rho-1}} \left(Y + \frac{1+a}{R} Y + \frac{1+a}{a} B_0^h\right)$$

is the household's consumption in period 1. Since households hold an equally weighted portfolio of safe assets from all countries, $R = \frac{1}{N+1}\sum_{m=1}^{N+1} R_m$. Since households are identical across countries and make the same savings decisions following the same interest rate, we can drop the country subscript to B^h.

The first order condition of the arbitrageur's problem is

$$R_n - a_0 \left(B_n - \bar{B}_n\right) - \mu = 0$$

where μ is the Lagrange multiplier associated with (57). This implies

$$B_n - \bar{B}_n = \frac{R_n}{a_0} - \frac{\mu}{a_0}$$

Summing over all n gives

$$\frac{\mu}{a_0} = \frac{1}{N+1} \sum_{n=1}^{N+1} \frac{R_n}{a_0}$$

Therefore

$$B_n - \bar{B}_n = \frac{1}{a_0} \left(R_n - \frac{1}{N+1} \sum_{m=1}^{N+1} R_m\right) \tag{60}$$

Households and arbitrageurs are the only agents that hold foreign safe assets. Foreign safe assets held by households from country n are $\sum_{m \neq n} \frac{1}{N+1} B_m^h = \frac{N}{N+1} B^h$. Foreign households hold $\frac{N}{N+1} B^h$ safe assets from country n. Country n arbitrageurs hold $\sum_{m \neq n} B_m$ foreign safe assets and foreign arbitrageurs hold NB_n of the country n safe asset. Then

$$NFA_n^{safe} = \frac{N}{N+1} B^h - \frac{N}{N+1} B^h + \sum_{m \neq n} B_m - NB_n = -\left(N+1\right) B_n$$

The second equality uses that $\sum_{m=1}^{N+1} B_m = 0$. Dividing by GDP, $Y+1$, and using (60), we then have

$$nfa_n^{safe} - nfa_{n,0}^{safe} = -\frac{1}{\chi}\left(R_n - \frac{1}{N+1}\sum_{m=1}^{N+1} R_m\right) \tag{61}$$

where

$$\chi = a_0 \frac{Y+1}{N+1}$$

The pre-shock equilibrium remains unchanged, with all interest rates equal to $(1+a)/a$. $\bar{B}_n$ follows from (59), after substituting the pre-shock B^h, wealth and portfolio shares. The equilibrium after the shock involves $N+1$ risky asset prices and $N+1$ interest rates on the safe assets. These can be solved by imposing the $N+1$ risky asset market equilibrium conditions and the $N+1$ safe asset market equilibrium conditions (59), using the solution (60) for B_n.

In Section 7.5 we rewrite (61) as

$$R_n - \frac{1}{N+1}\sum_{m=1}^{N+1} R_m = -\chi\left(nfa_n^{safe} - nfa_{n,0}^{safe}\right) \tag{62}$$

Figure 1: MAR Factor and First Capital Flows Factor (quarterly data)

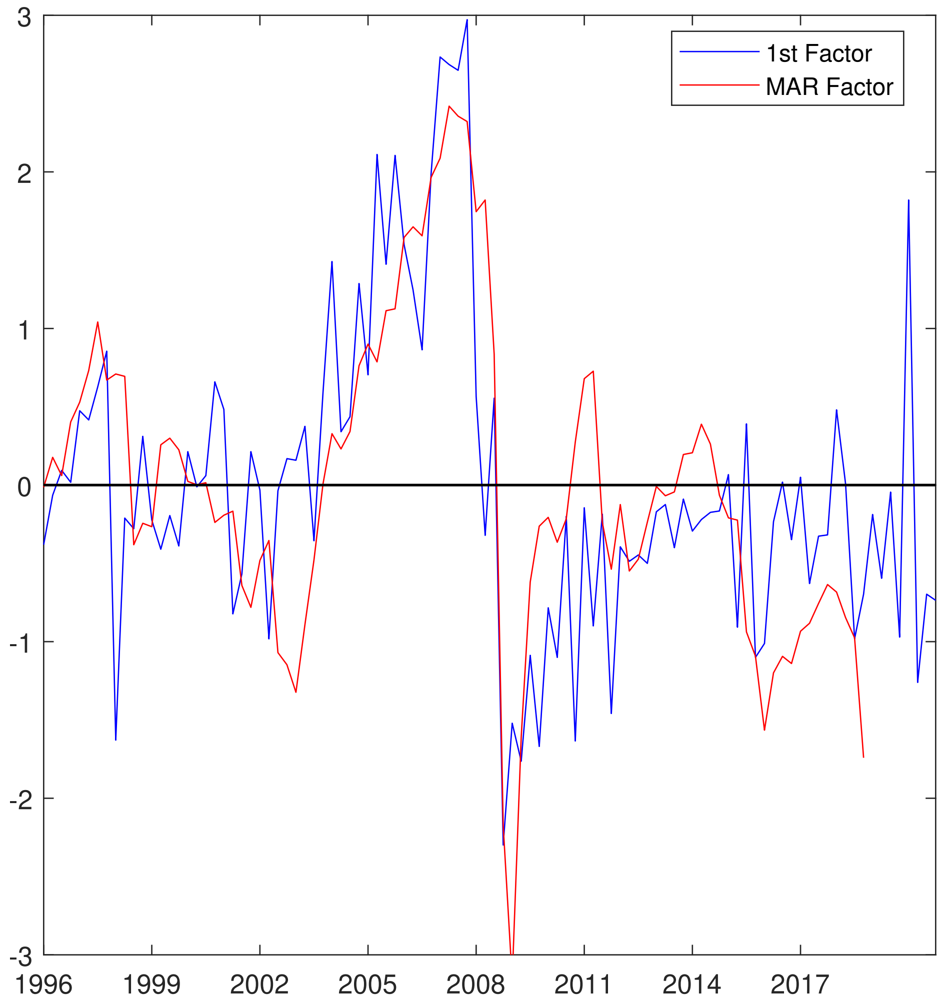

Table 1: Regressions on the MAR factor

	ΔR_t	$\Delta q_{n,t}$	$\Delta of^{risky}_{n,t}$	$\Delta of^{risky}_{n,t}$	$\Delta of^{risky}_{n,t} + \Delta if^{risky}_{n,t}$
ΔF_t	0.483**	18.655***	2.908**	1.808**	4.661**
	(0.227)	(1.634)	(1.163)	(0.799)	(1.900)
R^2	0.288	0.326	0.260	0.071	0.149

Notes: ΔR_t is the year-over-year change in the real 1-year U.S. treasury interest rate, $\Delta q_{n,t}$ is the year-over-year log change in the stock market index in county n, $\Delta of^{risky}_{n,t}$ and $\Delta if^{risky}_{n,t}$ are the year-over-year change in risky capital outflows and inflows, and ΔF_t is the year-over-year change in the MAR factor. All outflows and inflows are normalized by the prior year's GDP. All regressions also include a country-fixed effect and a one year lag of the dependent variable. Robust standard errors are clustered by country. ***/**/* denotes significance at the 1/5/10% level.

Table 2: Panel Regressions on the MAR factor

	$\Delta nf^{safe}_{n,t}$	$\Delta nf^{safe}_{n,t}$	$\Delta nf^{safe}_{n,t}$			
ΔF_t	-0.885	-0.412	-0.449			
	(0.958)	(0.526)	(0.460)			
$nfa^{safe}_{n,t} \times \Delta F_t$		0.032***	0.033***			
		(0.006)	(0.006)			
$nfa^{risky}_{n,t} \times \Delta F_t$			0.004			
			(0.012)			
R^2	0.077	0.251	0.252			
	$\Delta nf_{n,t}$	$\Delta nf_{n,t}$	$\Delta nf_{n,t}$	$\Delta nf^{risky}_{n,t}$	$\Delta nf^{risky}_{n,t}$	$\Delta nf^{risky}_{n,t}$
ΔF_t	0.119	0.363	0.165	1.004*	0.775*	0.614**
	(0.506)	(0.328)	(0.395)	(0.579)	(0.432)	(0.313)
$nfa^{safe}_{n,t} \times \Delta F_t$		0.017***	0.019***		-0.016***	-0.014***
		(0.002)	(0.004)		(0.005)	(0.004)
$nfa^{risky}_{n,t} \times \Delta F_t$			0.019			0.016
			(0.016)			(0.024)
R^2	0.472	0.515	0.521	0.470	0.504	0.508
	$\Delta save_{n,t}$	$\Delta save_{n,t}$	$\Delta save_{n,t}$	$\Delta invest_{n,t}$	$\Delta invest_{n,t}$	$\Delta invest_{n,t}$
ΔF_t	0.801***	0.876***	0.781***	0.780***	0.743***	0.714***
	(0.212)	(0.181)	(0.140)	(0.115)	(0.093)	(0.073)
$nfa^{safe}_{n,t} \times \Delta F_t$		0.005**	0.006**		-0.003**	-0.002**
		(0.003)	(0.003)		(0.001)	(0.001)
$nfa^{risky}_{n,t} \times \Delta F_t$			0.009**			0.003
			(0.005)			(0.004)
R^2	0.138	0.176	0.189	0.284	0.300	0.302

Notes: $\Delta nf^{safe}_{n,t}$ is the year-over-year change in net safe capital outflows, $\Delta nf^{risky}_{n,t}$ is the year-over-year change in net risky capital outflows, $\Delta nf_{n,t}$ is the year-over-year change in total net capital outflows (safe plus risky), $\Delta save_{n,t}$ is the year-over-year change in savings, $\Delta invest_{n,t}$ is the year-over-year change in investment, $nfa^{safe}_{n,t-1}$ and $nfa^{risky}_{n,t-1}$ are a country's net foreign asset positions in safe and risky assets. All variables are normalized by the prior years GDP. All regressions include a country-fixed effect and a one-year lag of the year-over-year change in net risky capital outflows, net safe capital outflows, and savings. Robust standard errors are clustered by country. ***/**/* denotes significance at the 1/5/10% level.

Table 3: Regressions on First Capital Flows Factor (quarterly data)

	ΔR_t	$\Delta q_{n,t}$	$\Delta of_{n,t}^{risky}$	$\Delta of_{n,t}^{risky}$	$\Delta of_{n,t}^{risky} + \Delta if_{n,t}^{risky}$
ΔF_t	0.529***	16.226***	3.323***	2.438**	5.721***
	(0.115)	(0.644)	(1.301)	(1.015)	(2.217)
R^2	0.298	0.377	0.158	0.095	0.122

Notes: ΔR_t is the year-over-year change in the 4 quarter sum of the real 1-year U.S. treasury interest rate, $\Delta q_{n,t}$ is the year-over-year log change in the 4 quarter sum of the stock market index in county n, $\Delta of_{n,t}^{risky}$ and $\Delta if_{n,t}^{risky}$ are the year-over-year change in the 4 quarter sum of risky asset capital outflows and inflows, and ΔF_t is the year-over-year change in the 4 quarter sum of the GFC factor. All outflows and inflows are normalized by the prior year's GDP. All regressions also include a country-fixed effect and a one year lag of the dependent variable. Robust standard errors are clustered by country. ***/**/* denotes significance at the 1/5/10% level.

Table 4: Panel Regressions on First Capital Flows Factor (quarterly data)

	$\Delta nf^{safe}_{n,t}$	$\Delta nf^{safe}_{n,t}$	$\Delta nf^{safe}_{n,t}$			
ΔF_t	-1.126	-0.661	-0.805			
	(0.741)	(0.538)	(0.509)			
$nfa^{safe}_{n,t} \times \Delta F_t$		0.020*	0.022**			
		(0.010)	(0.011)			
$nfa^{risky}_{n,t} \times \Delta F_t$			0.017			
			(0.011)			
R^2	0.093	0.138	0.142			
	$\Delta nf_{n,t}$	$\Delta nf_{n,t}$	$\Delta nf_{n,t}$	$\Delta nf^{risky}_{n,t}$	$\Delta nf^{risky}_{n,t}$	$\Delta nf^{risky}_{n,t}$
ΔF_t	-0.151	-0.165	-0.370	0.974	0.496	0.435*
	(0.261)	(0.303)	(0.403)	(0.659)	(0.374)	(0.244)
$nfa^{safe}_{n,t} \times \Delta F_t$		-0.001	0.002		-0.021***	-0.020***
		(0.005)	(0.007)		(0.006)	(0.005)
$nfa^{risky}_{n,t} \times \Delta F_t$			0.024			0.007
			(0.018)			(0.025)
R^2	0.197	0.197	0.204	0.6	0.358	0.358
	$\Delta save_{n,t}$	$\Delta save_{n,t}$	$\Delta save_{n,t}$	$\Delta invest_{n,t}$	$\Delta invest_{n,t}$	$\Delta invest_{n,t}$
ΔF_t	0.319***	0.437***	0.376***	0.380***	0.264***	0.257***
	(0.123)	(0.099)	(0.093)	(0.141)	(0.063)	(0.069)
$nfa^{safe}_{n,t} \times \Delta F_t$		0.005***	0.006***		-0.005***	-0.005***
		(0.001)	(0.001)		(0.001)	(0.001)
$nfa^{risky}_{n,t} \times \Delta F_t$			0.007**			0.001
			(0.003)			(0.003)
R^2	0.044	0.094	0.105	0.173	0.253	0.254

Notes: $\Delta nf^{safe}_{n,t}$ is the year-over-year change in the 4 quarter sum of net safe capital outflows, $\Delta nf^{risky}_{n,t}$ is the year-over-year change in the 4 quarter sum of net risky capital outflows, $\Delta nf_{n,t}$ is the year-over-year change in the 4 quarter sum of total net capital outflows (safe plus risky), $\Delta save_{n,t}$ is the year-over-year change in the 4 quarter sum of savings, $\Delta invest_{n,t}$ is the year-over-year change in the 4 quarter sum of investment, $nfa^{safe}_{n,t-1}$ and $nfa^{risky}_{n,t-1}$ are a country's net foreign asset positions in safe and risky assets. All variables are normalized by the prior year's GDP. All regressions include a country-fixed effect and a one-year lag of the year-over-year change in the 4 quarter sum of net risky capital outflows, net safe capital outflows, and savings. Robust standard errors are clustered by country. ***/**/* denotes significance at the 1/5/10% level.

Table 5: Debt and Equity Capital Flow Loadings on First Factor (annual data)

	λ^{net}	$\lambda^{net,risky}$	$\lambda^{net,safe}$	$\lambda^{out,risky}$	$\lambda^{in,risky}$	$\lambda^{out,safe}$	$\lambda^{in,safe}$
CHE	2.29	1.78	0.51	2.80	1.01	11.95	11.45
DEU	-0.12	-0.18	0.07	0.23	0.42	3.40	3.33
DNK	-0.30	1.20	-1.50	1.52	0.32	3.76	5.25
ESP	-2.09	1.55	-3.64	1.90	0.34	2.01	5.65
FIN	1.30	-0.54	1.84	1.33	1.88	-0.94	-2.78
FRA	0.27	0.39	-0.12	1.30	0.91	4.79	4.91
GBR	-0.15	2.69	-2.84	3.96	1.27	15.64	18.48
ISL	-9.23	11.57	-20.80	20.58	9.01	44.44	65.24
ITA	-0.24	0.13	-0.36	0.70	0.58	1.96	2.32
NLD	-1.53	0.15	-1.68	12.99	12.84	9.27	10.95
NOR	0.27	-0.65	0.92	0.74	1.40	8.61	7.69
PRT	-1.38	0.60	-1.97	1.16	0.57	2.35	4.32
SWE	0.66	-0.04	0.69	1.48	1.51	3.26	2.57
SGP	2.42	-1.11	3.53	3.34	4.45	23.36	19.83
AUS	-0.79	0.68	-1.46	0.33	-0.35	-0.28	1.18
JPN	0.12	-0.80	0.93	-0.37	0.43	1.08	0.15
KOR	-0.45	0.79	-1.24	0.30	-0.49	0.17	1.41
USA	-0.91	0.08	-0.99	0.36	0.28	1.68	2.68
CAN	1.36	-0.01	1.37	0.50	0.51	0.54	-0.83
ISR	0.30	-0.47	0.77	0.87	1.34	0.83	0.05

Table 6: Debt and Equity Capital Flow Loadings on First Factor (quarterly data)

	λ^{net}	$\lambda^{net,risky}$	$\lambda^{net,safe}$	$\lambda^{out,risky}$	$\lambda^{in,risky}$	$\lambda^{out,safe}$	$\lambda^{in,safe}$
DEU	-0.08	0.08	-0.16	0.24	0.15	4.73	4.90
DNK	-0.84	1.27	-2.12	1.46	0.18	4.07	6.19
ESP	-2.25	1.33	-3.58	1.66	0.33	2.18	5.76
FIN	1.41	0.28	1.13	1.79	1.51	2.80	1.67
FRA	0.44	0.47	-0.02	1.04	0.57	8.80	8.83
GBR	-0.11	1.50	-1.62	2.35	0.84	21.78	23.40
ISL	-7.28	11.56	-18.84	20.23	8.67	40.21	59.05
ITA	-0.27	0.09	-0.36	0.68	0.60	2.30	2.65
NLD	-0.84	0.54	-1.38	15.27	14.74	14.37	15.74
NOR	0.82	0.14	0.68	0.86	0.72	7.80	7.12
PRT	-1.39	0.74	-2.13	0.93	0.19	2.93	5.06
SWE	0.60	0.14	0.45	1.96	1.82	5.32	4.86
SGP	-0.16	-0.77	0.61	1.33	2.10	40.68	40.08
AUS	-0.90	0.56	-1.46	0.18	-0.38	0.55	2.00
JPN	0.28	-0.50	0.78	-0.39	0.11	2.97	2.19
KOR	-0.59	0.84	-1.43	0.35	-0.50	0.58	2.01
USA	-0.88	0.06	-0.94	0.52	0.46	2.18	3.12
CAN	1.15	-0.15	1.30	0.32	0.47	0.17	-1.13
ISR	0.73	-0.32	1.05	0.77	1.09	1.19	0.14

Table 7: Sectoral Variance Decomposition of Debt Capital Inflows

	S^o_{Pd}	S^g_{Pd}	S^c_{Pd}	S^b_{Pd}	S^o_{Ot}	S^g_{Ot}	S^c_{Ot}	S^b_{Ot}
CHE	0.18	0.82	0.00	0.00	0.09	0.00	-0.02	0.93
DEU	0.01	0.25	-0.14	0.88	0.06	0.04	0.18	0.72
DNK	0.02	0.20	0.00	0.78	0.20	-0.01	0.08	0.74
ESP	0.12	0.56	0.00	0.32	0.02	0.01	0.69	0.28
FIN	0.16	0.45	0.00	0.40	0.05	-0.01	0.00	0.96
FRA	0.23	0.55	0.00	0.21	0.05	-0.01	0.02	0.94
GBR	NA	NA	NA	NA	0.44	-0.01	0.00	0.57
ISL	0.02	0.03	0.00	0.95	0.16	0.00	0.01	0.82
ITA	0.10	0.72	0.00	0.18	0.20	0.02	0.78	-0.01
NLD	0.21	0.29	0.00	0.50	0.20	-0.01	0.05	0.76
NOR	0.01	0.16	0.00	0.82	0.07	0.64	0.14	0.14
PRT	0.11	0.49	0.00	0.40	0.05	0.14	0.04	0.77
SWE	0.11	0.38	0.00	0.52	0.12	0.00	0.21	0.68
SGP	NA	NA	NA	NA	NA	NA	NA	NA
AUS	0.19	0.13	0.00	0.68	0.13	0.00	0.27	0.61
JPN	0.06	0.89	0.00	0.04	0.48	0.05	0.05	0.42
KOR	0.21	0.30	0.25	0.24	0.06	0.04	0.19	0.71
USA	0.14	0.82	0.00	0.04	0.59	0.00	-0.05	0.46
CAN	NA	NA	NA	NA	0.39	0.00	0.00	0.61
ISR	0.10	0.30	0.60	0.00	0.45	0.05	0.00	0.51
Average	0.12	0.43	0.04	0.41	0.20	0.05	0.14	0.61
Median	0.11	0.38	0.00	0.40	0.13	0.00	0.05	0.68