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The Current Account as A Dynamic Portfolio Choice Problem

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Abstract

The current account can be understood as the outcome of investment decisions made by domestic and foreign investors. These decisions can be decomposed into a portfolio rebalancing and a portfolio growth component. This paper provides empirical evidence of the importance of portfolio rebalancing for the dynamics of the current account. The authors evaluate the predictions of a partial-equilibrium model of the current account with dynamic portfolio choices, in which portfolio rebalancing is driven by changes in investment opportunities. Using data for the United States and Japan, the authors find evidence supporting innovations in investment opportunities as an important mechanism to explain international capital flows.

This paper—a product of the Office of the Chief Economist, Latin America and the Caribbean Region—is part of a larger effort in the department to understand the driving forces of international capital flows and their implications for macroeconomic policies. Policy Research Working Papers are also posted on the Web at http://econ.worldbank.org. The author may be contacted at tdidier@worldbank.org.

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THE CURRENT ACCOUNT AS A DYNAMIC PORTFOLIO CHOICE PROBLEM[*]

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1 Introduction

In theory, the current account can be understood as the outcome of investment decisions made by domestic and foreign investors. Empirically, we can study the outcome of these decisions by analyzing a country's gross foreign asset positions. Therefore, factors that affect these gross positions, such as asset returns and exchange rates, also have an impact on the current account. Furthermore, the recent empirical literature on the dynamics of countries' portfolios highlights the importance of their variations over time.[1] Thus, in this paper, we analyze the implications of changes in a country's optimal portfolio allocation for the dynamics of the current account. In particular, we focus on time-varying optimal portfolio shares caused by innovations in the investment opportunity set.[2] Most significantly, we empirically evaluate the relevance of these variations to explain movements in the current account. We focus on the predictions of a partial-equilibrium model of the current account with dynamic portfolio choice. In this model, time-varying investment opportunities, captured by the dynamics of asset returns, are the main mechanism behind portfolio rebalances. In sum, our approach highlights changes in expected asset returns as an important factor to explain international capital flows.

Although the current account is essentially an issue of portfolio allocation, standard macroeconomic models have not incorporated this aspect of the problem until very recently. Even then, commonly used models have static-like solutions with constant portfolios over time. For example, Kraay and Ventura (2000) use Merton's (1971) model of portfolio allocation to analyze the current account. This model assumes constant asset risk and return, and agents with log-utilities. The optimal portfolio allocation is thus characterized by constant portfolio shares, implying that a country's net foreign asset position is a constant fraction of its wealth. Therefore,

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[1] See, for example, Lane and Milesi-Ferretti (2006), and Gourinchas and Rey (2006).

[2] Other reasons for optimal portfolio reallocations have been suggested, namely time-varying preferences (e.g. risk aversion), parameter uncertainty, and financial constraints.

this model highlights a portfolio growth component as an explanation for the dynamics of the current account.

On the other hand, in this paper, we focus on portfolio rebalancing as the driving force behind the dynamics of the current account. We extend existing structural models of the current account in order to incorporate the growing empirical evidence on the dynamics of countries' portfolios. More specifically, we emphasize the importance of innovations in investment opportunities, captured by changes in expected asset returns, as the main mechanism behind variations in countries' portfolios. Merton's (1971) portfolio model is the foundation of our theoretical framework. By changing two central assumptions of Merton's model, we are able to obtain a structural model of the current account with dynamic portfolio choice. First, we assume that asset returns are non-i.i.d. and exploit their predictability. Second, we depart from the assumption of a log utility function. To separate the elasticity of intertemporal substitution from the relative risk aversion parameter, and therefore to model savings and investment decisions separately, we assume agents with Epstein-Zin utility function. We also assume a relative risk aversion parameter greater than one. Both assumptions are important in obtaining time-varying optimal portfolio shares for investors with long-term investment horizons. As already discussed, the main mechanism behind optimal portfolio reallocations in our model is time-varying investment opportunities, characterized by the dynamics of expected asset returns. The model allows us to obtain clear predictions of this mechanism for the current account balance.

Next, we empirically analyze the model's implications for the current account. Due mostly to data availability, we focus on two countries and their bilateral current account. Campbell, Chan and Viceira´s (2003) method is used to solve and estimate the model for U.S. and Japanese investors. We present robust empirical evidence that time-varying investment opportunities are important determinants of the dynamics of the bilateral current account. We show that variations in expected asset returns change agents' optimal portfolios in a direction consistent with the actual bilateral current account movements. We also find that positive changes in the predicted bilateral current account are significantly associated with improvements in the actual bilateral current account. Furthermore, we provide robust evidence that predicted portfolio shares, combined with actual data on savings and consumption instead of the model's predictions, can explain the dynamics of the bilateral current account. Our empirical results thus provide support for the main mechanism highlighted in this paper.

Although our model effectively captures the dynamics of the bilateral current account, it does not successfully explain the level of the bilateral current account. There are two reasons for that. First, we do not impose either borrowing or short-selling constraints in the model, and as a result, we allow leveraged portfolios. We are thus bound to obtain larger and more volatile capital flows than actual ones. This problem is typical of models which assume perfect mobility of capital flows. Similar implications have been reported in portfolio allocation models by Campbell, Chan, and Viceira (2003), Evans and Hnatkovska (2005), and Mendoza, Quadrini, and Rios-Rull (2007) for example. Correcting this issue in a portfolio model with several assets is not simple, so we share this problem with the rest of the literature.

Furthermore, similar models have been widely used to analyze issues of optimal portfolio allocation. For example, Campbell and Viceira (1999), Watcher (2002), Normandin and St-Amour (2005), and Sangvinatsos and Watcher (2005) highlight these models' success in explaining optimal portfolio choice in different contexts. However, they acknowledge that they are not well-suited to capture the dynamics of agents' wealth. The models predict rapidly growing wealth, low consumption-wealth ratios, and relatively low consumption volatility.

Nonetheless, the predicted dynamics of consumption is reasonable: an investor wants more wealth in states when the marginal utility is higher. Therefore, given our focus on changes in optimal portfolio allocation as an explanation for the dynamics of the current account, we believe that our model is appropriate. It effectively captures variations in the optimal portfolio allocation caused by changes in the investment opportunity set.

To the best of our knowledge, this is the first paper to empirically analyze the relevance of portfolio rebalancing caused by changes in investment opportunities for the dynamics of the current account. Although we develop our own theoretical framework, a few theoretical papers should be mentioned.[3] Devereux and Sutherland (2007) and Tille and van Wincoop (2007) highlight the importance of time-varying portfolio shares in a dynamic stochastic general equilibrium (DSGE) model with portfolio choice. In theoretical terms, they show the importance of portfolio rebalancing for net and gross capital flows. Also from a theoretical perspective, Evans and Hnatkovska (2005) and Hnatkovska (2006) use a general equilibrium model with portfolio choice to discuss the size and volatility of capital flows and their determinants.

The rest of the paper is structured as follows. In Section 2, we present preliminary evidence to illustrate the empirical relevance of our argument. Section 3 presents our model of the current account with dynamic asset allocation. In Section 4, we further develop our empirical analysis. We estimate the model for the U.S. and Japan and compare its predictions with the actual bilateral current account data. Section 5 concludes and is followed by the appendices.

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[3] From a different perspective, the International RBC literature has incorporated the effects of changes in the productivity of physical capital on investment decisions. See, for example, Backus, Kehoe, and Kydland (1992).

2 Preliminary Empirical Evidence

As a starting point to illustrate the empirical importance of portfolio rebalancing as opposed to the portfolio growth component, a simple accounting exercise is helpful. A country's wealth can be decomposed in to the sum of its net foreign asset positions and domestic assets:

$$W_t = NFA_t + Dom.Assets_t \tag{1}$$

We can then define the portfolio share in net foreign assets as:

$$NFA_t = \alpha_t^* \cdot W_t \tag{2}$$

By differentiating this equation, we obtain the standard definition of the current account:

$$\underbrace{\Delta NFA_t}_{\text{Current Account}} = \underbrace{\Delta\alpha_t^* \cdot W_t}_{\substack{\text{Portfolio Rebalancing} \\ \text{Component}}} + \underbrace{\alpha_t^* \cdot \Delta W_t}_{\substack{\text{Portfolio Growth} \\ \text{Component}}} \tag{3}$$

Lastly, we perform a variance-decomposition analysis based on equation (3):

$$\begin{aligned} \text{var}(\Delta\alpha_t^* \cdot W_t + \alpha_t^* \cdot \Delta W_t) = \text{var}(\Delta\alpha_t^* \cdot W_t) + \text{var}(\alpha_t^* \cdot \Delta W_t) + \\ + 2\,\text{cov}(\Delta\alpha_t^* \cdot W_t, \alpha_t^* \cdot \Delta W_t) \end{aligned} \tag{4}$$

The results are shown in Table I. High-income countries are shown in the top panel, middle-income and low-income countries in the bottom panel.[4] The first column on this table, R-squared, reports how much of the time-series variation of the current account can be explained by portfolio growth and portfolio rebalancing. The next three columns report the three RHS variables on equation (4), scaled by the LHS variable. Lastly, the other two columns report the relative size of the portfolio rebalancing and the portfolio growth components.

The portfolio rebalancing component is on average three-times as large as the portfolio growth component. This is indeed the case for both the U.S. and Japan for example. Although these average effects are large, there is heterogeneity across countries. The portfolio growth

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[4] A detailed description of the data is presented in Section 4.

component can be as large as 98% in China and 92% in the U.K. and Malaysia or as low as 37% in Argentina. But in either scenario, the portfolio rebalancing component is important to explain the dynamics of the current account.

Next, we focus on the empirical relevance of changes in expected asset returns as the main mechanism behind the portfolio rebalancing component to explain the dynamics of the current account. We propose a simple reduced-form model of the bilateral current account. We assume that *ex-ante* domestic and foreign expected asset returns (both in levels and in differences), and domestic and foreign savings can explain the dynamics of the bilateral current account, from the perspective of a domestic investor. Expected asset returns are capturing changes in investment opportunities as a driving force behind portfolio reallocations. For example, as domestic expected asset returns increase, *ceteris paribus*, there is an incentive for both domestic and foreign investors to rebalance their portfolios toward domestic assets. Therefore, a decrease in foreign investments by domestic investors and an increase in domestic investments by foreign investors imply a deterioration of the current account. The opposite effect happens if foreign expected asset returns increase. Domestic and foreign savings capture a portfolio growth effect. Larger domestic savings should imply larger holdings of foreign assets, being thus associated with an improvement on the bilateral current account. Conversely, if foreign savings increase, we should observe a negative effect on the bilateral current account. Equation (5) summarizes this reduced-form model:

$$\begin{aligned} BCA_t = {} & \beta_0 + \beta_1 (E_t R_{t+1}) + \beta_2 (E_t R^*_{t+1}) + \beta_3 (E_t R_{t+1} - E_{t-1} R_t) + \beta_4 (E_t R^*_{t+1} - E_{t-1} R^*_t) \\ & + \beta_5 S^*_t + \beta_6 S_t \end{aligned} \tag{5}$$

We estimate equation (5) for the bilateral current account between the U.S. (domestic) and Japan (foreign) from 1960 to 2005.[5] The following assets are considered: short-term and long-term government bonds and equities.[6] The estimated coefficients are correctly signed and statistically significant in both annual and quarterly samples.[7] Figure I plots the fitted values of this model. For comparison purposes, we also show the results for a model with only a portfolio growth component. This latter model is a variant of Kraay and Ventura's (2000) model of the current account.

As can be seen in Figure I, our simple setup, with portfolio rebalancing effects, explains the dynamics of the bilateral current account remarkably well. It provides us preliminary evidence that portfolio rebalancing induced by changes in expected asset returns can be empirically important in explaining the dynamics of the current account. In the next sections, we further develop the argument behind the preliminary evidence shown here. We extend existing structural models of the current account in order to allow optimal time-varying portfolio shares caused by changes in investment opportunities. We then empirically evaluate the predictions of our model of the current account.

3 A Dynamic Portfolio Allocation Model of the Current Account

In this section, we present a structural model of the current account, with dynamic portfolio choice. The main mechanism behind portfolio reallocations in our model is time-varying investment opportunities, characterized by the dynamics of expected asset returns. Therefore, this model provides a theoretical framework to further analyze the empirical evidence shown in

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[5] As will become clear in Section 4, the empirical analysis of this paper focuses on the bilateral current account between the U.S. and Japan, as opposed to the total U.S. current account.

[6] Expected returns are calculated using a vector autoregression system (VAR) with past returns and other predictive variables identified in the finance literature. Our methodology is explained in Section 4.

[7] See Appendix A for a detailed description of the estimated regressions.

Section 2. It allows us to obtain clear predictions of the effects of changes in expected returns on the current account balance.

Our model is an extension of Merton's (1971) model to examine the dynamics of the current account. Merton's model assumes agents with logarithmic utility functions and i.i.d. asset returns. It thus implies that long-term investors behave as mean-variance optimizers, choosing the same portfolio as a short-term investor. Given the assumptions, the optimal portfolio allocation is characterized by constant portfolio shares. To obtain a model with dynamic portfolio choice, we change two central assumptions of Merton's model. We assume agents with an Epstein-Zin utility function and non-i.i.d. asset returns.

3.1 The Environment

The model is set in discrete time. We consider a partial equilibrium analysis in which agents face exogenous asset returns. There is an arbitrary set of traded assets. We also assume that all individuals are identical and have access to the same information set regarding the current state of the world. This common-knowledge assumption is standard in international macroeconomic models and it implies that capital flows in our model do not result from differences of opinion on future asset returns or risks.

3.2 A Representative Country

Consider a country populated by identical and infinitely lived individuals whose preferences are represented by Epstein-Zin (1991) recursive preferences defined over their consumption stream:

$$U(C_t, E_t(U_{t+1})) = \left[(1-\delta)C_t^{1-\gamma/\theta} + \delta\left(E_t\left(U_{t+1}^{1-\gamma}\right)\right)^{1/\theta}\right]^{\theta/1-\gamma}, \tag{6}$$

where $\theta \equiv \frac{1-\gamma}{1-\psi^{-1}}$, C_t is consumption at time t, $0 < \delta < 1$ is the time discount factor, $\gamma > 0$ is the relative risk aversion coefficient, and $\psi > 0$ is the elasticity of intertemporal substitution.

This utility function nests as special cases the power utility specification, in which the relative risk aversion (RRA) coefficient is the reciprocal of the elasticity of intertemporal substitution (EIS), and the log-utility specification, in which both parameters are equal to one. Therefore, these preferences have the flexibility of modeling the EIS and the RRA parameters separately. The former has first order effects on savings versus consumption decisions and only secondary effects on investment decisions. In contrast, the RRA parameter is essential to portfolio allocation. Hence, this functional form disentangles savings and portfolio allocation decisions.[8]

We assume that individuals can invest in domestic and foreign assets. There are *n* securities available for investment at home and *n* securities available abroad, so that *2n* is the total number of available securities. Therefore, the intra-temporal budget constraint can be defined as:

$$\mathrm{W_t} = C_t + \sum_{i=1}^{n} A_{i,t+1} + \sum_{j=1}^{n} A^{*}_{j,t+1}, \tag{7}$$

where W_t is total wealth at time t, $A_{i,t+1}$ is the amount invested in domestic asset i at time t, and $A^{*}_{j,t+1}$ is the amount invested in foreign asset j at time t.

The wealth accumulation equation can then be defined as:

$$W_{t+1} = \sum_{i=1}^{n} R_{i,t+1} A_{i,t+1} + \sum_{j=1}^{n} R^{*}_{j,t+1} A^{*}_{j,t+1}, \tag{8}$$

where $R_{i,t+1}$ is the gross real return on domestic asset i from time t to time $t+1$, and $R^{*}_{j,t+1}$ is the gross real return on foreign asset j from time t to time $t+1$.

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[8] The reason for this particular utility function as opposed to a more standard power utility function will become clear in Section 3.4.

As can be seen from equations (7) and (8), we do not model labor income. The income available for consumption at time *t* is given by the returns on portfolio holdings and by the sales of these assets (short sales are allowed). This country's GDP can be interpreted as the total real return on domestic assets, independently of who owns them.

From equation (7), we can define portfolio shares $\alpha_t \equiv A_{t+1}/(W_t - C_t)$:

$$\sum_i A_{i,t+1} + \sum_j A^*_{j,t+1} = W_t - C_t$$

$$\sum_i [A_{i,t+1}/(W_t - C_t)] + \sum_j [A^*_{j,t+1}/(W_t - C_t)] = 1$$

$$\sum_i \alpha_{i,t} + \sum_j \alpha^*_{j,t} = 1,$$

where $\alpha_{i,t}$ is the proportion of a country's wealth, net of consumption, invested in a domestic asset *i* from *t* to *t+1*, and $\alpha^*_{j,t}$ is the proportion of a country's available wealth invested in foreign asset *j* from *t* to *t+1*.

The real portfolio return, $R_{p,t+1}$, is thus given by:

$$R_{p,t+1} = \sum_{i=1}^{n} \alpha_{i,t} R_{i,t+1} + \sum_{j=1}^{n} \alpha^*_{j,t} R^*_{j,t+1}. \tag{9}$$

Finally, equations (7), (8), and (9) can be combined in order to obtain the intertemporal budget constraint:

$$W_{\mathrm{t}+1} = R_{p,t+1}(W_t - C_t). \tag{10}$$

In summary, the problem faced by individuals in this representative country is to choose consumption (C_t) and portfolio shares (α_t) that maximize (6) subject to (10), given an initial level of wealth W_0. We thus allow countries to differ in their size, i.e., investors from different countries can start with different levels of wealth, W_0. In this setup, Epstein and Zin (1991) show that investors' optimal consumption decision must satisfy the following Euler equation:

$$E_{\mathrm{t}}\left\{\left[\delta(C_{t+1}/C_{t})^{-1/\psi}\right]^{\theta} R_{p,t+1}^{-(1-\theta)} R_{k,t+1}\right\} = 1, \forall k, \qquad (11)$$

where $R_{k,t+1}$ is the gross real return on any asset, including the portfolio itself.

When investment opportunities are constant, portfolio shares are also constant, implying that $R_{p,t+1}$ is time-invariant. Thus, the optimal consumption policy, characterized by equation (11), implies a constant consumption-wealth ratio. It also entails a constant portfolio share in all available assets. In other words, agents behave as short-term investors and optimally choose a "myopic" portfolio allocation. To obtain dynamic portfolio choices, we relax the hypothesis of constant investment opportunities over time. In our setup, if asset returns are non-i.i.d., a relative risk aversion parameter greater than one is a sufficient condition for the optimal portfolio allocation to be dynamic (non-myopic).[9] Thus, we assume a relative risk aversion parameter greater than one.

Therefore, to model time-varying investment opportunities, we explore the empirical evidence that financial asset returns are predictable to some extent.[10] For example, Amromin and Sharpe (2006) provide empirical evidence based on survey data suggesting, for example, that expected stock returns are extrapolated from actual returns. We thus assume that asset returns follow a first-order vector autoregression (VAR).[11] This assumption captures the history-dependence of expected returns. The empirical finance literature has identified several predictive variables, besides the historical values of asset returns themselves. Nominal yield on short-term bonds, the term spread, and earnings-to-price ratio have been documented to forecast asset returns for many asset classes. Thus, we also use these variables (s_t) to estimate expected returns.

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[9] See Campbell and Viceira (2002) for an extensive study on strategic asset allocation.

[10] See Campbell (1987), Campbell and Shiller (1988), Fama and French (1988, 1992), and more recently, Campbell and Yogo (2006) and Watcher and Warusawitharana (2007), among many others.

[11] A similar specification can be found in Campbell, Chan, and Viceira (2003) and Barberis (2000), for example.

Define a vector z_{t+1} containing the log real return of a benchmark asset ($r_{1,t+1}$), log excess returns of domestic and foreign assets, i.e. ($r_{i,t+1}$ - $r_{1,t+1}$) and ($r^*_{j,t+1}$ - $r_{1,t+1}$), and other state variables (s_{t+1}) used to predict asset returns:

$$z_{t+1} = \begin{bmatrix} r_{1,t+1} \\ x_{t+1} \\ s_{t+1} \end{bmatrix}, \text{ where } \quad x_{t+1} = \begin{bmatrix} r_{i,t+1} - r_{1,t+1} \\ \ldots \\ r^*_{j,t+1} - r_{1,t+1} \\ \ldots \end{bmatrix}, \tag{12}$$

and where $r_{1,t+1}$ is the log real return on the benchmark asset, and x_{t+1} is the vector of log excess returns, measured as excess returns over this benchmark asset.

As mentioned above, we assume that z_{t+1} follows a VAR(1) process:

$$\begin{aligned} & z_{t+1} = \Phi_0 + \Phi_1 z_t + v_{t+1} \\ & \text{where } \quad v_{t+1} \overset{i.i.d.}{\sim} N(0, \Sigma_v) \text{ and } \Sigma_v = \begin{bmatrix} \sigma_1^2 & \sigma_{1x}' & \sigma_{1s}' \\ \sigma_{1x} & \Sigma_{xx} & \Sigma_{xs}' \\ \sigma_{1s} & \Sigma_{xs} & \Sigma_{ss} \end{bmatrix}. \end{aligned} \tag{13}$$

We allow shocks to be cross-sectionally correlated, but homoskedastic and independently distributed over time. In other words, we assume that state variables are not able to predict changes in asset risk. Therefore, only changes in expected asset returns affect portfolio choices. Even though this assumption may be unrealistic, it is not restrictive from the perspective of long-term portfolio allocation. The empirical evidence suggests that changes in risk are not persistent enough to have large effects on portfolio choices.[12]

3.3 The Current Account

At every period, agents decide how to allocate their wealth, net of consumption, among available financial assets. By analyzing this portfolio choice, it is possible to determine the total wealth allocated to domestic and foreign assets at each point in time. More specifically, we can

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[12] See Campbell (1987), Harvey (1991), and Chacko and Viceira (2005).

determine the optimal portfolio allocation. Therefore, obtaining an expression for the current account balance is straightforward.

The current account balance of the Home country (H) can be defined as domestic savings minus investment in domestic assets: $CA_t = S_t - I_t$. Using equations (7) and (8), it is clear that domestic savings must equal domestic and foreign investments made by domestic agents. Hence, domestic savings are given by:

$$S_{\mathrm{t}} = \sum_i (A^H_{i,t+1} - A^H_{i,t}) + \sum_j (A^{*,H}_{j,t+1} - A^{*,H}_{j,t})\,. \tag{14}$$

Investment in domestic assets is given by the change in holdings of all domestic assets, aggregated across all countries (c) that have access to domestic assets:

$$I_t = \sum_c \sum_i (A^c_{i,t+1} - A^c_{i,t}). \tag{15}$$

Thus, the current account balance of the Home country is defined as (14) minus (15):

$$\begin{aligned} CA_t &= \sum_j (A^{*,H}_{j,t+1} - A^{*,H}_{j,t}) - \sum_{c\neq H}\sum_i (A^c_{i,t+1} - A^c_{i,t}) \\ &= \sum_j [\alpha^{*,H}_{j,t}(W^H_t - C^H_t) - \alpha^{*,H}_{j,t-1}(W^H_{t-1} - C^H_{t-1})] \\ &\qquad - \sum_{c\neq H}\sum_i [\alpha^c_{i,t}(W^c_t - C^c_t) - \alpha^c_{i,t-1}(W^c_{t-1} - C^c_{t-1})]. \end{aligned} \tag{16}$$

Similarly, the Home country bilateral current account with a Foreign country (F) can be defined as:

$$\begin{aligned} BCA_{HF,t} &= \sum_{j\in F} [\alpha^{*,H}_{j,t}(W^H_t - C^H_t) - \alpha^{*,H}_{j,t-1}(W^H_{t-1} - C^H_{t-1})] \\ &\qquad - \sum_i [\alpha^F_{i,t}(W^F_t - C^F_t) - \alpha^F_{i,t-1}(W^F_{t-1} - C^F_{t-1})] \end{aligned} \tag{17}$$

Equations (16) and (17) clearly show how changes in wealth and optimal portfolio shares affect the bilateral and the total current account balances, respectively. Therefore, in order to explain the dynamics of the (bilateral) current account, we need an explicit solution for these time-varying optimal portfolio shares and for the dynamics of wealth. More specifically, in the case of the bilateral current account, we need the solutions for both Home and Foreign countries.

3.4 Model's Approximate Solution

Campbell, Chan, and Viceira (2003) show that there is no closed-form solution for this multivariate model of strategic asset allocation. However, they propose an approximate solution method. They show that we can reduce this model to an approximate system of linear-quadratic equations for portfolio weights and consumption as functions of the state variables. Therefore, we follow their procedure in order to obtain an approximate solution to our model.

The solution to our model is characterized by three equations: the portfolio return, the inter-temporal budget constraint of the representative country, and the Euler equation. We can rewrite equation (9), which characterizes the gross portfolio real return, in the following way:

$$R_{p,t+1} = \sum_{i=2}^{n} \alpha_{i,t} (R_{i,t+1} - R_{1,t+1}) + \sum_{j=1}^{n} \alpha^{*}_{j,t} (R^{*}_{j,t+1} - R_{1,t+1}) + R_{1,t+1}, \qquad (18)$$

where the first asset, whose real return is given by $R_{1,t+1}$, is a domestic short-term instrument used as a benchmark asset. Even though asset returns are measured relative to this benchmark asset, it is not assumed to be riskless. This benchmark asset is subject to short-term inflation risk. The log return on the portfolio can then be approximated as:

$$r_{p,t+1} \approx r_{1,t+1} + \alpha_t ' x_{t+1} + \frac{1}{2} \alpha_t ' (\sigma_x^2 - \Sigma_{xx} \, \alpha_t), \qquad (19)$$

where $\sigma_x^2 \equiv diag(\Sigma_{xx})$ is a vector containing the variance of excess asset returns, and α_t is a vector of portfolio shares. This approximation holds exactly in continuous time and it is highly accurate for short-time intervals.[13]

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[13] This approximation to the log return on the portfolio has the effect of ruling out the possibility of bankruptcy. See Campbell and Viceira (2002).

The next equation is the budget constraint, equation (10). Log-linearizing it around the unconditional mean of the log consumption-wealth ratio, we obtain the following expression for the wealth dynamics:

$$\Delta w_{t+1} \approx r_{p,t+1} + \left(1 - \frac{1}{\rho}\right)(c_t - w_t) + k, \tag{20}$$

where $\rho \equiv 1 - \exp(E[c_t - w_t])$ and $k \equiv \log(\rho) + (1-\rho)\log(1-\rho)/\rho$.

This form of the budget constraint is exact if the elasticity of intertemporal substitution (ψ) is equal to 1, in which case $\rho = \delta$ and $c_t - w_t$ is constant.

Lastly, we apply a second-order Taylor expansion to the Euler equation (11) around the conditional means of $\Delta c_{t+1}, r_{p,t+1}, r_{k,t+1}$ to obtain:

$$\begin{aligned} &\theta \log \delta - \frac{\theta}{\psi} E_t \Delta c_{t+1} - (1-\theta) E_t r_{p,t+1} + E_t r_{k,t+1} \\ &\quad + \frac{1}{2} \mathrm{var}_t\left[-\frac{\theta}{\psi} \Delta c_{t+1} - (1-\theta) r_{p,t+1} + r_{k,t+1} \right] \approx 0, \ \forall k. \end{aligned} \tag{21}$$

This form of the Euler equation is exact if consumption and asset returns are jointly log-normally distributed, e.g. when $\psi = 1$.

In sum, the model's approximate solution can be described by these three equations, (19), (20), and (21). The optimal solution is accurate for an elasticity of intertemporal substitution around one, independent of the value of the relative risk aversion parameter.[14] A model with a distinction between these two parameters is important to the empirical evidence presented in the next section. We evaluate the sensitivity of the optimal portfolio allocation to different values of the relative risk aversion parameter. In the power utility case, as we increase the relative risk aversion parameter, the model solution becomes inaccurate. However, with the Epstein-Zin

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[14] This is consistent with recent estimates of the elasticity of intertemporal substitution. See for example Vissing-Jorgensen (2002) and Yogo (2004).

utility function, we have the autonomy to do so without interfering with the accuracy of the solution. This reason underpins our focus on an Epstein-Zin utility function as opposed to the more standard power utility function.

Campbell, Chan, and Viceira (2003) show that the optimal portfolio choice is linear in the VAR state vector. It is characterized by the following optimal portfolio allocation:

$$\alpha_t = A_0 + A_1 z_t, \tag{22}$$

where

$$A_0 = \left(\frac{1}{\gamma}\right)\Sigma_{xx}^{-1}\left(H_x\Phi_0 + \frac{1}{2}\sigma_x^2 + (1-\gamma)\sigma_{1x}\right) + \left(1-\frac{1}{\gamma}\right)\Sigma_{xx}^{-1}\left(\frac{-\Lambda_0}{1-\psi}\right),$$

$$A_1 = \left(\frac{1}{\gamma}\right)\Sigma_{xx}^{-1} H_x\Phi_1 + \left(1-\frac{1}{\gamma}\right)\Sigma_{xx}^{-1}\left(\frac{-\Lambda_1}{1-\psi}\right),$$

and Λ_0 and Λ_1 are constants.

They also show that the optimal consumption rule is quadratic in this VAR state vector:

$$c_t - w_t = -\rho\psi\log\delta - \rho\chi_{p,t} + \rho(1-\psi)E_t(r_{p,t+1}) + \rho k + \rho E_t(c_{t+1} - w_{t+1}), \tag{23}$$

where $\mathrm{E}_t(r_{p,t+1})$ and $\chi_{p,t}$ are quadratic functions of the VAR state variables.

A numerical recursive procedure, described in Campbell, Chan, and Viceira (2003), is used to solve for the optimal consumption and portfolio shares. Using equation (17), we are thus able to construct a measure of the predicted current account balance based on this model of the current account with dynamic portfolio choice.

4 An Application to the U.S. Bilateral Current Account with Japan

In this section, we present a quantitative analysis of the framework developed in Section 3. More specifically, we focus on the bilateral current account between the U.S. and Japan. The model yields optimal portfolio rules that are linear in the vector of state variables. Therefore, we empirically evaluate time-varying portfolio shares, caused by changes in expected asset returns, as an explanation for the actual dynamics of the U.S. bilateral current account with Japan. We estimate our model separately for investors in the U.S. (Home) and in Japan (Foreign) from 1960 to 2005. We then construct the time series of portfolio weights for each country, i.e., $\alpha_{j,t}^{*,H}$ *and* $\alpha_{i,t}^{F}$. After aggregating foreign holdings for both countries, we present a first round of empirical evidence. We analyze whether variations in expected asset returns change agents' optimal portfolios in a direction consistent with the actual bilateral current account movements. Next, we combine these optimal portfolio weights, according to equation (17), to obtain our predicted measure of the bilateral current account. We take into consideration differences in the countries' sizes. We then evaluate whether our predicted measure can explain the dynamics of the actual bilateral current account data. Finally, as a robustness exercise, we construct a hybrid version of equation (17): we use the optimal portfolio shares combined with actual data on wealth, savings, and consumption. We thus obtain another measure of the predicted current account. We re-estimate the relation between the predicted and the actual bilateral current accounts. In summary, we provide strong empirical evidence that changes in investment opportunities are an important mechanism behind the dynamics of the bilateral current account between the U.S. and Japan.

4.1 Why the Bilateral Current Account between the U.S. and Japan?

A large number of countries have significant exposure to U.S. assets. An empirical analysis of the mechanism highlighted in this paper for the total U.S. current account would thus require an estimation of the model for all these countries. Moreover, many assets would need to be considered in our quantitative analysis. By focusing on two countries and their bilateral current account, we only need to analyze the behavior of two investors. Hence, we empirically study the

U.S. and Japan and their bilateral current account. In this case, only U.S. holdings of Japanese assets and Japanese holdings of U.S. assets matter.

There are many reasons for choosing the U.S. and Japan in our empirical exercise. The first one is data availability. Bilateral current account data between the U.S. and Japan, Canada, or the U.K. is available since 1960 on a quarterly basis. The data for other countries starts in the late 1970s, and therefore, has an insufficient time span for our purposes. Furthermore, in our empirical exercise, we use asset returns on stock markets, government bonds, and private firm profits (return on equity). This last variable is not available for the U.K. and Canada, although we could have excluded it from our analysis.

Second, Japan was economically relevant for international capital flows from 1960 to 2006. Both the U.S. and Japan are representatives of the so-called “global imbalances.” The current account deficit in the U.S. was soaring and reached 7% of its own GDP in 2005 – almost 2% of world GDP. Japan has long been the country with the largest current account surplus. Furthermore, the U.S. and Japanese current account balances were mirror images of each other until the late 1990s, suggesting that they could have had a large counterpart in each other’s balances.

Third, the total U.S. current account and the U.S.-Japan bilateral current account have similar dynamics. This is highlighted in Figure II, which plots these series as a percentage of U.S. GDP. Movements in the total U.S. current account clearly resemble movements in the U.S. bilateral current account with Japan. Thus, determinants of the bilateral current account can be indeed relevant to the understanding of factors affecting the total U.S. current account.

Lastly, it is well known that countries’ portfolios are subject to home bias – that is, portfolio composition tends to be biased toward domestic assets. For example, institutional investors in the

U.S. held only 11% of their portfolios in foreign equity and bonds in 2003. A similar pattern is observed in Japan, where institutional investors held only 16% of their portfolios abroad in 2003.[15] Although domestic residents hold the majority of their assets in their own countries, a large number of foreign investors, if allowed, tend to hold these foreign assets as well. Survey data published by the U.S. Department of the Treasury shows that residents of Japan were the largest foreign portfolio investors in U.S. securities by a wide margin in 2005.[16] They held U.S. $1.1 trillion (or 16% of the total holdings of U.S. securities by foreign investors), whereas residents of the U.K., the second major investing country, had holdings of U.S. $0.56 trillion, only half the holdings of Japanese investors. Previous surveys show that this pattern is stable over time. For example, in 1994, when the first survey was conducted, Japan held 18% of the total foreign holdings of U.S. securities. At the same time, Japan has consistently been one of the main destinations of foreign purchases of securities by U.S. residents. U.S. investors held around 10% of total market capitalization of equity markets in Japan in 2005.[17] Moreover, in 1994 U.S. residents invested 15% of their foreign portfolio holdings in Japan – the country that attracted the largest share of U.S. portfolio investments abroad. A more recent survey shows that Japan is still a large destination for U.S. funds, attracting 12% of U.S. holdings of foreign securities in 2005. Although no data is available on the holdings of other foreign investors in Japan (or even other holdings of Japanese investors), the evidence presented here suggests that the U.S. has been a major participant in this market.

By focusing on the U.S. and Japan and their bilateral current account, given the survey evidence presented above, we are analyzing the two largest holders of U.S. securities: U.S. investors themselves and Japanese investors, the largest foreign holders. We also examine large

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[15] See IMF (2005).

[16] See "Report on U.S. Portfolio Holdings of Foreign Securities," U.S. Department of the Treasury.

[17] See "Report on Foreign Portfolio Holdings of U.S. Securities," U.S. Department of the Treasury.

holders of Japanese securities: Japanese investors themselves and U.S. investors. In sum, U.S. and Japanese investors together are possibly the largest holders of U.S. and Japanese securities. Moreover, this survey evidence also suggests that U.S. and Japanese investors hold the majority of their portfolios in the U.S. and Japan themselves. Therefore, this empirical evidence, combined with the data presented in Figure II, suggests that U.S. and Japanese assets are the most relevant assets affecting the bilateral current account between the U.S. and Japan, and possibly the total U.S. current account.

Therefore, we assume in our empirical exercise that U.S. and Japanese investors can only hold assets from either the U.S. or Japan. Because of the limited time span of our sample, we do not consider other assets; four decades of data would not be enough for an estimation of our VAR system. On the other hand, we assume that investors from other countries can hold assets anywhere, including the U.S. and Japan. Thus, if a Japanese investor decides to sell some of her holdings, a U.S. investor does not need to buy them. In other words, we are considering a partial-equilibrium analysis. We are fully aware of the limitations of this last assumption. Including assets from other countries in the analysis could significantly change the calculated optimal portfolio allocation among the assets actually considered here. For robustness purposes, we tried to include assets from a "third" country in our empirical analysis. According to the survey evidence reported by the U.S. Department of the Treasury, the U.K. and the Euro-area as a whole are the relevant candidates. Thus, we included in our exercise assets from either the U.K. or Germany, the latter as a representative of Euro-area assets. The results are qualitatively similar to the ones presented in this paper and, therefore, not reported. Moreover, if the inclusion of other relatively large investors does not qualitatively change our empirical analysis, the inclusion of other smaller investors is similarly unlikely to affect our results.

4.2 Data Description

We use quarterly data extending from the second quarter of 1960 to the third quarter of 2005. As already discussed, we consider financial assets from the U.S. and Japan. The data was obtained from Global Financial Database, the financial statements from the Ministry of Finance in Japan, and the U.S. Flow of Funds Accounts calculated by the U.S. Federal Reserve. The following asset classes are considered in the analysis: stocks, short-term government bonds, long-term government bonds, and private firms' profits (ROE). U.S. stock returns are calculated as returns on the S&P 500 index, and Japanese stock returns are given by the returns on the Tokyo Stock Exchange Topix All Shares Index. The U.S. and Japanese returns on short-term interest rates are the quarterly returns implied by the Fed Funds rate and the Japanese Discount rate, respectively. The return on long-term government bonds is calculated as the return on 10-year constant maturity U.S. government bonds and as the return on 7-year Japanese government bonds. Government bonds of longer maturity were not available for Japan. ROE is constructed as the total operational profits divided by capital (net worth).

Our model is written in real terms. Therefore, our benchmark asset is the *ex-post* real return on short-term government bonds. More specifically, the benchmark asset is the real return on a U.S. short-term bond for a U.S. investor and a Japanese short-term bond for a Japanese investor. Real returns are constructed as the difference between the log return on an asset and the log of CPI-inflation. In our theoretical framework, investors analyze excess returns over the benchmark asset. Thus, all excess returns are calculated as the log difference between the real return on a specific asset and the real return on the appropriate benchmark asset, both denominated in the same currency. We use the log change of the real exchange rate to convert returns to a common currency. We define the log real exchange rate as the sum of log nominal exchange rate and log domestic CPI less the log foreign CPI. Lastly, we use variables known to predict asset returns, such as nominal short-term yield (3-month T-Bills), price-to-earnings ratio, and the nominal term spread in government bonds.

Table II reports the summary statistics for real asset returns denominated in local currency. Data is in annualized percentage units. It shows the sample average and the standard deviations of the quarterly asset returns used in the analysis. The table also reports these sample statistics for the CPI-inflation rates and the real exchange rate. Among the U.S. assets, the short-term government bond is the safest asset, with an average real return of 1.8% p.a., and equities are the riskiest asset, with larger real returns, 7.1% p.a. on average. A similar pattern is observed in Japan. Stocks are also the riskiest asset class and short-term government bonds, the safest, with average real returns of 7.6% p.a. and 0.4% p.a., respectively. Average inflation rates are smaller in Japan than in the U.S., but more volatile. Lastly, the real exchange rate shows, on average, an appreciation of the Japanese yen against the U.S. dollar in our sample from 1960 to 2005.

We have tested all series of asset returns for unit roots using Augmented Dickey-Fuller tests. These tests strongly reject unit roots in all data series considered, except for the returns on U.S. long-term government bonds. However, we recognize the low power of these tests and the evidence in favor of mean-reversion in the long run, and assume U.S. long-term bonds to be stationary.[18] Our VAR estimations also include the CPI-inflation rates, the nominal exchange rate, or the real exchange rate, depending on the specification considered. Both CPI-inflation rates are stationary according to Augmented Dickey-Fuller tests. These tests on the nominal exchange rate and the real exchange rate could not reject the existence of a unit root. However, the empirical evidence on the stationarity of exchange rates is highly controversial.[19] Therefore,

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[18] Excluding this variable from the analysis does not qualitatively change the results.

[19] See for example Rogoff (1996) and Imbs, Mumtaz, Ravn, and Rey (2005).

in order to show the robustness of our results, we present them considering exchange rates in levels or in differences, or no exchange rate at all.

Besides asset returns, our empirical analysis also uses data on the bilateral current account between the U.S. and Japan, total wealth, national savings, national consumption, and GNP. The bilateral current account data is from the U.S. Bureau of Economic Analysis. We follow the methodology described in Kraay et al. (2005) to construct measures of total wealth. National savings, national consumption, and GNP are from IMF's *International Financial Statistics.*

4.3 VAR Estimation

Our empirical results depend on the estimation of the system of equations (13). We thus report the estimations based on five different specifications of this VAR system.[20] Through the rest of the paper, we report results for all these specifications. We show that the expected asset returns obtained from these different estimations have similar dynamics. We will argue that our empirical analysis is robust to these different estimations. In other words, the portfolio allocations implied by these different VAR systems are similar in their composition, and thus lead to similar predictions for the bilateral current account between the U.S. and Japan.

In our theoretical model, we have assumed that investors from both countries have access to the same information set. They use the same model and know the current state of the world. Therefore, to characterize the dynamics of asset returns, we estimate a single VAR that treats Home and Foreign symmetrically.[21] The single framework described in this section summarizes concisely the information set available to both investors, although it is not in the format of the

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[20] We have analyzed more than these five reported specifications, but choose not to report them here. The results are qualitatively similar to those shown in this paper.

[21] One of the VAR specifications considered here cannot be estimated by this unified framework; other control variables are needed. Thus, in this particular case, separate VARs are estimated for U.S. and Japanese investors.

system of equations (13). In Appendix B, we show how to obtain the parameters of the system of equations (13) for each investor from these estimated VARs.

When estimating these VARs, we have imposed the following restriction: the unconditional means of the variables implied by the estimated coefficients should be equal to their full-sample arithmetic counterparts. Moreover, the estimated systems might be subject to finite sample bias. However, bias corrections are complex in a multivariate system. Thus, no corrections were attempted here. Instead, the estimated coefficients are taken as given and known by investors.

As already mentioned, we estimate five different specifications of this system of equations. The following variables are considered: real asset returns in local currency, predictive variables (nominal yield on T-Bills, price-earnings ratio, and the term spread), the nominal and real exchange rates, and the inflation rates for both countries. The first estimated system includes only real asset returns and predictive variables for both the U.S. and Japan. This is our basic VAR.[22] The other estimated VARs add control variables to this basic system. Our second specification includes the real exchange rate in levels. The third one adds the real exchange rate in differences instead of levels to the basic system. Our fourth specification includes the nominal exchange rate and the CPI-inflation rates. Lastly, our fifth specification expands the basic VAR system by including the nominal exchange rate in differences and the CPI-inflation rates.

We report only the estimation of the VAR system based on our second specification in order to save space.[23] The results are presented in Table III. The estimated coefficients are comparable to the ones identified in the finance literature.[24] The coefficients in all equations are jointly

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[22] This system cannot be estimated by our single unified framework – other control variables are necessary. One VAR was estimated for U.S. investors with all variables denominated in U.S. dollars, and another VAR was estimated for Japanese investors with all variables denominated in Japanese yen.

[23] The other estimated VARs are qualitatively similar and the results are available upon request.

[24] See Campbell and Shiller (1988), Fama and French (1988, 1992), Hodrick (1992), Lettau and Ludvigson (2001), Campbell and Yogo (2006), Ang and Bekaert (2007), among many others.

significant at the standard significance level, as can be seen from the low p-values of the F-statistics. The U.S. short-term return is significantly explained by the short-term nominal yield and the term spread with a positive coefficient, however, its own lagged value is not significant. The R-squared is similar to what has been found in other studies. The same variables significantly explain U.S. long-term government bond returns. U.S. stock returns are negatively related to price-earnings ratio. No other variable is significant in this equation. Stock returns have proven rather difficult to predict, and, as expected, this equation has the lowest R-squared. U.S. ROE, U.S. short-term bond yield, and the U.S. price-earnings ratio are significantly explained by their own lagged values, illustrating that a univariate AR(1) process could describe them reasonably well. The results for the Japanese real returns are less typical than the ones for U.S. assets. Most of the predictive variables do not significantly explain asset returns, which in turn can be explained mostly by their own lagged values. However, empirical evidence on Japanese returns is scarce. Therefore, we do not lengthen our discussion here.

As already highlighted, the model uses the information on expected asset returns. Table IV reports summary statistics of expected real asset returns implied by the estimated VARs. They are reported in local currency. Common across all specifications, short-term government bonds are the safest asset. In both U.S. and Japanese markets, stocks are the riskiest asset. Therefore, the basic mean-variance pattern of actual returns is reflected in these expected returns. Furthermore, the standard deviation of expected real returns is stable across different specifications. Although they consistently increase when the nominal exchange rate and the CPI-inflation rates are included in the VAR (instead of the real exchange rate), they do so by less than 1% p.a. Thus, these measures of expected returns seem robust to different system estimations. The real expected returns are on average equal to actual returns, given the in-sample predictions considered here. Nevertheless, they are much less volatile than actual returns (summary statistics reported in Table II). In other words, these real expected returns are more persistent than the actual real returns.

4.4 Optimal Portfolio Choice and the Bilateral Current Account

Using the estimated VAR coefficients, the model is calibrated using different relative risk aversion parameters (γ). As already mentioned, the model's calibration is accurate for elasticities of intertemporal substitution around 1. Therefore, results are reported for different risk aversion coefficients, but we assume that $\psi = 0.99$ and $\delta = 0.92$ in annual terms.[25] We first calculate each country's optimal allocation to foreign assets. For a U.S. investor, this optimal allocation is the sum of all holdings in Japanese assets. Similarly, for a Japanese investor, it is the share of Japanese post-consumption wealth invested in U.S. assets. Formally, we obtain the time series of $\alpha_t^{*,H}$ and α_t^F:

$$\alpha_t^{*,H} = \alpha_{stb,t}^{*,H} + \alpha_{ltb,t}^{*,H} + \alpha_{stocks,t}^{*,H} + \alpha_{ROE,t}^{*,H}, \tag{24}$$

$$\alpha_t^{F} = \alpha_{stb,t}^{F} + \alpha_{ltb,t}^{F} + \alpha_{stocks,t}^{F} + \alpha_{ROE,t}^{F}. \tag{25}$$

Figure III plots the time series of $\alpha_t^{*,H}$, $(-\alpha_t^F)$, and the U.S. bilateral current account with Japan. The negative of the optimal Japanese portfolio shares allocated to U.S. assets is the variable relevant to the U.S. bilateral current account according to equation (17). These optimal portfolio shares are calculated based on the VAR specification with real exchange rates. We plot these series for relative risk aversion parameters of 10 and 100.[26]

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[25] The results are robust to different parameter values of the time discount factor and the elasticity of intertemporal substitution, as long as these values are close enough to 1.

[26] The empirical evidence on the equity premium puzzle suggests values between 0 and 60. See Ait-Sahalia and Lo (2000).

Even though this figure addresses only part of the story, it sheds some light on agents' behavior. The main mechanism behind the time-varying portfolio shares in our model is the expected changes in asset returns across the different assets. If we assume a permanent improvement in the U.S. investment opportunity set and everything else remains unchanged, then, according to our model, an investor should increase her portfolio share on U.S. assets. If this investor is Japanese, she would increase her holdings of U.S. assets. If a U.S. investor is considered, her holdings of Japanese assets should fall. This implies, *ceteris paribus*, that the U.S. bilateral current account with Japan should worsen. The reported results are robust to the exclusion of individual assets and to different parameter values. Although the dynamics of optimal portfolio shares does not change considerably with the relative risk aversion parameter, the average values of $\alpha_t^{*,H}$ and α_t^F are highly sensitive to this parameter. When a smaller value of the relative risk aversion parameter is used, individual portfolio shares are extremely high – because of leveraged portfolios. Reasonable values for these shares are obtained only when larger parameter values are considered. In our model with exogenous asset returns and endogenous portfolios, agents take advantage of any small excess risk-adjusted returns. High levels of relative risk aversion are thus needed to discourage excessive portfolio leverage. This parameter might be capturing the model's sensitivity to the well-known equity premium puzzle, extensively documented in the international finance literature.

Given the mechanism highlighted in this paper and the estimated expected asset returns, the pattern of increased weight on U.S. assets reported in Figure III is striking. The correlation coefficient between these two measures is around 0.75, varying little with the relative risk aversion parameter. The fit of the graphs is remarkable, especially if one considers that only information on asset returns was used. Therefore, the main argument in this paper relies on these figures: optimal portfolio reallocations, caused by improvements in the U.S. investment opportunity set relative to its Japanese counterpart, are partly responsible for the shift of the countries' portfolios toward U.S. assets in recent decades.

Formally, a regression analysis confirms the evidence from the figures. The results are reported in Table V for different values of the relative risk aversion parameter, for our five different VAR specifications, and for U.S. and Japanese investors, respectively. Three different regressions are reported: a basic specification that regresses the bilateral current account on contemporaneous and lagged optimal portfolio shares, the basic specification with a time trend, and the basic specification with a lagged dependent variable. We have no priors with respect to the magnitude of these coefficients. However, our theoretical framework, summarized in equation (17), allows us to sign them. Increases in the optimal portfolio shares abroad should be associated with positive changes in the U.S. bilateral current account with Japan, if a U.S. investor is considered. On the other hand, if a Japanese investor is considered, such increases should be related to negative changes in the bilateral current account. The results confirm these priors. They are also consistent across the different regression specifications, different measures of expected returns, and different risk aversion parameters. It should be noted that the regression coefficients increase in magnitude as the relative risk aversion parameter increases. This simply reflects the smaller portfolio shares, as observed in Figure III: the larger the risk aversion parameter, the smaller the shares. Lagged values of optimal portfolio shares tend not to be significant, although correctly signed. The R-squared obtained from the basic regression specification is between 0.39 and 0.58, though it is not reported. If a time trend or a lagged dependent variable is added, the R-squared increases to values around 0.63 and 0.92, respectively. Thus, in this section, we show that variations in investment opportunities change agents' optimal portfolios in a direction consistent with actual bilateral current account movements.

4.5 The Bilateral Current Account: Predicted vs. Actual Values

Going one step further, we use the model's calibrated wealth and consumption to fit equation (17). Our predicted measure of the bilateral current account is scaled by U.S. wealth, the stock variable of our model. We thus need to make an assumption about relative country sizes in order to aggregate U.S. and Japanese investors. We assume U.S. wealth is four times Japanese wealth when denominated in the same currency. This assumption is consistent with actual data on total wealth for these countries.

Table VI shows our econometric analysis based on the predicted bilateral current account. We report the regression results based on a quarterly sample. Once more, four different regression specifications are analyzed. First, our basic specification considers a regression of the actual bilateral current account on our predicted measure. The second specification adds a time trend to the basic specification. Given the highly persistent dynamics of the current account, our third specification adds a lag of both dependent and independent variables. Finally, the fourth specification considers these variables in differences. As shown in previous tables, we report the results for our five different measures of expected returns. Furthermore, we have shown that our measures of optimal portfolio allocation are similar across different levels of risk aversion. The results in this section are also robust to different parameter values. Therefore, we report only those for a reasonable value of the relative risk aversion coefficient – we use a parameter value of 10. The results are also robust to annual samples.[27]

The empirical evidence from this econometric analysis reinforces the intuition behind our previous results. The estimated regression coefficients are significant and correctly signed in all

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[27] These results are available upon request from the authors.

specifications. They are always significant at the 1% level in our basic specifications, whether a trend is added or not. In other words, our predicted values can explain more than just a trend in the actual data. In our third specification, the lagged independent variable is also significant and negative, as equation (17) would suggest. That is to say, an increase in the predicted bilateral current account is associated with a contemporaneous significant increase in the bilateral current account, and with a decrease in next period's balance. The regressions in differences shed some light on the relevance of changes in expected returns as a mechanism to explain short-term movements in the bilateral current account. Therefore, based on the evidence of the third and fourth specifications, positive changes in our predicted values are associated with positive changes in the actual data.

Although the regression coefficients are always significant and correctly signed in Table VI, they also reflect problems in our model. Our theory suggests that the coefficients of our basic specification should be equal to one. Even though these coefficients increase with larger values of the risk aversion parameter, they are statistically different from one for any value of the relative risk aversion parameter considered. The first source of this problem is attenuation bias. If we predict expected returns that are more volatile than actual non-observable expected returns, then our regression coefficients are downward biased. Although potentially relevant, it is not the main reason behind the low estimated coefficients. Our assumptions of no financial constraints on investors or market-wide financial frictions are, however, relevant in our theoretical model. These assumptions imply larger and more volatile capital flows than actual ones, thus smaller regression coefficients. In the next section, we discuss these modeling issues. Nevertheless, our model still effectively captures the dynamics of the bilateral current account. Empirically, our model is able to explain the short-run movements and long-run trends of the bilateral current account between the U.S. and Japan. Therefore, our results provide strong evidence that changes in investment opportunities can explain current account movements.

4.6 Modeling Issues

We use a portfolio model of the current account with uncertainty to explain the dynamics of the current account. We do not impose financial constraints on investors nor market-wide financial frictions. Thus, we are bound to obtain larger and more volatile capital flows than actual ones. This problem is typical of models with free capital flows. Similar implications have been reported in portfolio allocation models by Campbell, Chan, and Viceira (2003), Evans and Hnatkovska (2005), and Mendoza, Quadrini, and Rios-Rull (2007). Therefore, the differences between the actual and our fitted bilateral current account balances are caused by large portfolio shares allocated abroad and their impact on the dynamics of wealth.

As already mentioned, we allow portfolios to be leveraged. We do not impose either borrowing or short-selling constraints. In our model with exogenous asset returns and endogenous portfolios, agents thus take advantage of any small excess risk-adjusted returns. When small values of the risk aversion parameter are used, portfolio shares are exceedingly high. Reasonable values of portfolio shares are obtained only when investors become extremely risk averse. Campbell, Chan, and Viceira (2003) acknowledge the problem. In an application to U.S. bonds and equities only, their model also predicts very large portfolio shares. Similar issues have been reported by Campbell Sangvinatsos and Watcher (2005) and Brandt and Santa-Clara (2006), for example. Correcting this first problem is particularly difficult. The approximate solution used here is no longer valid. Discrete-state numerical algorithms become slow and unreliable in the presence of many assets and state variables.[28] Therefore, it remains extremely hard to solve realistically complex cases of the Merton model.

Nevertheless, similar models have been widely used to analyze issues of optimal portfolio allocation. For example, Campbell and Viceira (1999), Watcher (2002), Normandin and St-Amour (2005), and Sangvinatsos and Watcher (2005) highlight the models' success in explaining optimal portfolio choice in different contexts. However, they also acknowledge that these models are not well-suited to capture the dynamics of agents' wealth. Normandin and St-Amour (2005) test whether portfolio models, similar to ours, are able to replicate the dynamics of consumption-wealth ratios and optimal portfolio choices between equities and bonds in the U.S. and in Canada. They obtain portfolio allocations consistent with actual data, but recognize the difficulty in replicating the empirical process of consumption.

According to equation (10), the total portfolio return is the main channel through which portfolio shares affect the dynamics of wealth. These portfolio returns can be high when portfolio shares are large. Therefore, wealth grows too rapidly. Transaction costs proportional to wealth could minimize the problem. However, they would not solve this issue, given the size of quarterly portfolio returns. Developing a model with financial constraints, such as borrowing and short-selling constraints, could potentially minimize the problem of large predicted portfolio shares and, therefore, obtain a better fit for wealth dynamics.

These models of dynamic portfolio allocation, including ours, predict reasonable dynamics for consumption shares: an investor wants more wealth in states when the marginal utility is higher. However, they predict low consumption-wealth ratios and relatively low consumption volatility. For example, consumption-wealth ratios implied by these models are around 2% p.a., whereas the actual data for the U.S. suggests values around 10% p.a., according to Normandin

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[28] See for example Lynch (2001).

and St-Amour (2005). Furthermore, the implications of a model with financial constraints for the optimal consumption path are ambiguous. Although the average portfolio return falls, potentially causing an increase in average consumption, the standard deviation of the consumption-wealth ratio tends to fall in comparison to the unconstrained portfolio allocation, assuming binding constraints. Thus, a portfolio allocation model with financial constraints is not a *panacea*. Given our focus on changes in the optimal portfolio allocation as an explanation for changes in the current account, we believe that our model is still appropriate. It effectively captures the dynamics of optimal portfolio allocation caused by changes in investment opportunities.

4.7 Predicted Portfolio Allocation: Further Analysis

The empirical evidence reported in Section 4.5 suggests that our model captures changes in optimal portfolio allocation consistent with movements in the bilateral current account, although it does not succeed at fitting wealth dynamics. Therefore, in order to further test whether the mechanism in our model is empirically relevant, we construct a hybrid version of equation (17). Depending on data availability, we combine the predicted portfolio shares with actual data on total post-consumption wealth or domestic savings. We then compare these new measures of the bilateral current account with the actual data.

Wealth data is only available on an annual basis. On the other hand, savings and consumption data are available on a quarterly basis. Thus, we need to adapt our theoretical framework to use quarterly data. We can rewrite equation (17) in the following way:

$$\frac{BCA_{HF,t}}{Y_t^H} = [\Delta\alpha_t^{*,H}(\frac{W_t^H - C_t^H}{Y_t^H}) + \alpha_{t-1}^{*,H}\frac{\Delta(W_{t-1}^H - C_{t-1}^H)}{Y_t^H}] - [\Delta\alpha_t^F(\frac{W_t^F - C_t^F}{Y_t^H}) + \alpha_{t-1}^F\frac{\Delta(W_{t-1}^F - C_{t-1}^F)}{Y_t^H}].$$

If we assume that W_t / Y_t and W_t^F / Y_t^F are constant (*K+1* and *K*^{F}*+1*, respectively), we can write this last equation as a function of the savings rate and GNP:

$$\frac{BCA_{HF,t}}{Y_t^H} = \alpha_t^{*,H}\frac{S_t^H}{Y_t^H} - \alpha_t^F\frac{S_t^F}{Y_t^H} + \Delta\alpha_t^{*,H}K - \Delta\alpha_t^F K^F\frac{Y_t^F}{Y_t^H}. \tag{26}$$

Table VII reports the regressions of the actual bilateral current account on these predicted values. These regressions use our quarterly sample based on equation (26). We have assumed K and K^F equal to their sample averages, given the data availability on wealth. The top panel shows the regressions for a relative risk aversion parameter of 10. As discussed in the previous section, more risk averse investors hold smaller portfolio shares. Furthermore, the evidence presented in Section 4.4 shows that the dynamics of portfolio holdings are independent of the level of risk aversion. Thus, in the bottom panel of Table VII, we report the same regressions for an extreme value of the relative risk aversion parameter, 2000 – the largest value used in the literature on optimal portfolio allocation. The results are robust to the level of risk aversion: positive changes in the predicted values are strongly associated with improvements in the current account. Moreover, the estimated coefficients are significantly larger in the bottom panel of the table. It suggests that if our model could endogenously generate smaller portfolio shares for reasonable risk aversion parameters, we would be able to better explain the level of the current account.

In sum, the quantitative analysis presented here in Section 4 provides strong support for the mechanism highlighted in this paper. Variations in investment opportunities change agents' optimal portfolios in a direction consistent with actual bilateral current account movements. Furthermore, changes in the predicted bilateral current account are associated with positive changes in the actual bilateral current account.

5 Conclusion

The current account is essentially an issue of portfolio allocation. In this paper, we focus on this asset allocation aspect by analyzing the current account as a portfolio choice problem with uncertainty. We explore the recent empirical evidence on the dynamics of countries' portfolios.

More specifically, we evaluate the implications of optimal time-varying portfolio shares on the dynamics of the current account. We highlight the importance of innovations in investment opportunities, captured by changes in expected asset returns, as the main mechanism behind variations in countries' portfolios. Thus, the main contribution of the paper is to provide a theoretical framework and, most significantly, to empirically test this mechanism on the current account dynamics.

We propose a partial-equilibrium portfolio model of the current account to empirically analyze our main hypothesis. We extend Merton's (1971) model of portfolio allocation to obtain a structural model of the current account with dynamic portfolio choice. We assume non-i.i.d. asset returns and exploit their predictability. We also depart from the assumption of log utility and model agents with Epstein-Zin utility functions. Both assumptions are important in obtaining optimal time-varying portfolio shares for investors with long-term investment horizons. More specifically, we analyze optimal time-varying portfolio shares caused by changes in investment opportunities. These innovations in the investment opportunity set are captured by the dynamics of expected asset returns. Our model allows us to obtain clear testable predictions for the current account. Therefore, our approach highlights changes in expected asset returns as an important factor to explain international capital flows.

In our empirical analysis, due mostly to data availability, we focus on two countries, namely the U.S. and Japan, and analyze the model implications for their bilateral current account. First, we show that changes in expected asset returns change agents' optimal portfolios in a direction consistent with the actual bilateral current account movements. Second, we compare the time series of the predicted bilateral current account with its observed counterpart. Econometric tests provide robust evidence of a positive relation between these two series, although the model does not fully capture the average level of the bilateral current account. More specifically, we find that changes in the predicted bilateral current account are significantly associated with improvements in the actual data. Furthermore, we provide robust empirical evidence that predicted portfolio shares, if combined with actual data on savings and consumption instead of the model's predictions, are able to explain the dynamics of the bilateral current account. Therefore, our results strongly suggest that changes in expected asset returns are an important factor behind movements in the bilateral current account between the U.S. and Japan. In order to improve the empirical results obtained, we leave for future research extensions to the model related to financial constraints, such as short-sale constraints or limited ability to invest abroad in order to generate home bias in countries' portfolios.

6 Appendices

A Preliminary Empirical Evidence

In this paper, we empirically analyze the relevance of time-varying investment opportunities, captured by changes in expected returns, as an explanation for the dynamics of the current account. The following reduced form specification, equation (A1.1), has been assumed as a starting point: the bilateral current account depends linearly on ex-ante domestic and foreign expected returns (both in levels and in differences) and on domestic and foreign savings.

$$\begin{aligned} BCA_t = \beta_0 + \beta_1(E_t R_{t+1}) + \beta_2(E_t R^*_{t+1}) + \beta_3(E_t R_{t+1} - E_{t-1}R_t) + \beta_4(E_t R^*_{t+1} - E_{t-1}R^*_t) \\ + \beta_5 S^*_t + \beta_6 S_t \end{aligned} \qquad \text{(A1.1)}$$

In Figure I in the main text, we also plotted the fitted results from an adaptation of Kraay and Ventura's (2000) model. They use Merton's (1971) model to develop their predictions for the current account. In their model, asset risk and return are constant over time and agents have log-utilities, implying constant portfolio shares. Therefore, the current account response to a temporary income shock depends on the (optimal) portfolio allocation. In order to maintain its portfolio unchanged, the marginal unit of savings should be invested as the average unit. The argument can be simplified as follows: define the current account as in (A1.2):[29]

$$CA_t = S_t - I_t \tag{A1.2}$$

Investment is thus:

$$\begin{aligned} I_t &= K_t - K_{t-1} \\ &= \frac{K_t}{(W_t\text{-}C_t)}(W_t\text{-}C_t)\text{-}\frac{K_{t\text{-}1}}{(W_{t\text{-}1}\text{-}C_{t\text{-}1})}(W_{t\text{-}1}\text{-}C_{t\text{-}1}) \\ &= \alpha_t(W_t\text{-}C_t)\text{-}\alpha_{t\text{-}1}(W_{t\text{-}1}\text{-}C_{t\text{-}1}). \end{aligned}$$

But $\forall i : \alpha_{\mathrm{t}} = \alpha_{\mathrm{t\text{-}i}} = \alpha$:

$$I_{\mathrm{t}} = \alpha\Delta(W_t\text{-}C_t) = \alpha S_t .$$

Substituting this expression for investment in (A1.2), we obtain the following:

$$CA_t = S_t - \alpha S_t = \alpha^* S_t = (NFA/W)S_t , \tag{A1.3}$$

where α is the portfolio share allocated to domestic assets, α^* is the portfolio share allocated to foreign assets, and *NFA* is the home country's net foreign assets, i.e., $\alpha^* W$.

This analysis can be extended to obtain predictions for the bilateral current account:

$$CA_t = \alpha^* S_t = (\sum_i \alpha_i^*)S_t ,$$

where *i* represents foreign countries. Therefore, the bilateral current account between the Home country (H) and the Foreign country (F) can be expressed in the following way:

$$BCA_{t,HF} = \alpha_F^{*,H} S_t = \beta\alpha^{*,H} S_t , \tag{A1.4}$$

where $\beta \equiv (\alpha_{\mathrm{F}}^{*,\mathrm{H}} / \sum_i \alpha_{\mathrm{i}}^{*,\mathrm{H}})$.

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[29] The authors assume that foreigners cannot hold domestic capital, and therefore, they focus on net capital flows instead of gross flows.

Under the assumption of constant portfolio shares, the net foreign asset position between the U.S. and any other country is proportional to the net foreign asset position between the U.S. and the rest of the world.

Table A.1 shows the estimated regressions for the bilateral current account between the U.S. and Japan from 1960 to 2005 (1970-2004 for annual data). The first column reports the regression based on (A1.4) on an annual basis.[30] However, because we do not observe β, this specification does not provide us a test of this theory. The other columns show the results for equation (A1.1), using both annual and quarterly data. The coefficient on domestic savings is correctly signed and significant in all specifications. The coefficient on foreign savings is also significant and correctly signed in the quarterly regressions, but not significant in the annual regressions. Expected long-term and short-term government bond returns have significant and correctly signed coefficients in most specifications. However, when the two variables are simultaneously included in the same regression, the coefficient on the short-term bond changes sign. The expected U.S. stock return is not significant, except for one specification in which it is wrongly signed. The expected Japanese stock return is usually not significant, but where it is, it is wrongly signed. Changes in expected returns, when significant, have the same sign as their level counterparts. Figure I, in the main text, plots the fitted values from the regressions in columns (1) and (5) of Table A.1.

B VAR Estimated Parameters

In this appendix, we describe how to obtain the coefficients of the system (13) for a U.S. investor from the estimated VARs presented in Section 4.3. I focus specifically on the fourth VAR specification, with the nominal exchange rate in levels and the U.S. and Japanese inflation

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[30] Ventura (2003) extends this analysis by introducing adjustment costs and are better able to explain the time series variation of the current account.

rates. This is the most complicated case. An adaptation for the other cases is straightforward and not shown here. In order to simplify the notation, I consider only four assets, two from each country. An extension to eight assets, as estimated in the main text, is simple. Japanese real asset returns are denoted with stars. s_t includes both U.S. and Japanese predictive variables. Thus, the following VAR system is estimated:[31]

$$Z_{t+1} = A_0 + A_1 Z_t + u_{t+1}, \tag{A2.1}$$

where $Z_{t+1} = \begin{bmatrix} r_{1,t+1} \\ r_{2,t+1} \\ r^*_{1,t+1} \\ r^*_{2,t+1} \\ s_{t+1} \\ e_{t+1} \\ \pi_{t+1} \\ \pi^*_{t+1} \end{bmatrix}$.

Considering a U.S. investor, notice that:

$$z_{t+1} = B_0 Z_{t+1} + B_1 Z_t, \tag{A2.2}$$

where B_0 and B_1 are defined as:

$$\begin{bmatrix} r_{1,t+1} \\ r_{2,t+1} - r_{1,t+1} \\ r^*_{1,t+1} - r_{1,t+1} - \Delta RER_{t+1} \\ r^*_{2,t+1} - r_{1,t+1} - \Delta RER_{t+1} \\ s_{t+1} \\ \Delta e_{t+1} \\ e_{t+1} \\ \pi_{t+1} \\ \pi^*_{t+1} \end{bmatrix} = \begin{bmatrix} 1 & 0 & 0 & 0 & 0 & 0 & 0 & 0 \\ -1 & 1 & 0 & 0 & 0 & 0 & 0 & 0 \\ -1 & 0 & 1 & 0 & 0 & -1 & -1 & 1 \\ -1 & 0 & 0 & 1 & 0 & -1 & -1 & 1 \\ 0 & 0 & 0 & 0 & 1 & 0 & 0 & 0 \\ 0 & 0 & 0 & 0 & 0 & 1 & 0 & 0 \\ 0 & 0 & 0 & 0 & 0 & 1 & 0 & 0 \\ 0 & 0 & 0 & 0 & 0 & 0 & 1 & 0 \\ 0 & 0 & 0 & 0 & 0 & 0 & 0 & 1 \end{bmatrix} \begin{bmatrix} r_{1,t+1} \\ r_{2,t+1} \\ r^*_{1,t+1} \\ r^*_{2,t+1} \\ s_{t+1} \\ e_{t+1} \\ \pi_{t+1} \\ \pi^*_{t+1} \end{bmatrix} + \begin{bmatrix} 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 \\ 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 \\ 0 & 0 & 0 & 0 & 0 & 1 & 0 & 0 \\ 0 & 0 & 0 & 0 & 0 & 1 & 0 & 0 \\ 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 \\ 0 & 0 & 0 & 0 & 0 & -1 & 0 & 0 \\ 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 \\ 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 \\ 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 \end{bmatrix} \begin{bmatrix} r_{1,t} \\ r_{2,t} \\ r^*_{1,t} \\ r^*_{2,t} \\ s_t \\ e_t \\ \pi_t \\ \pi^*_t \end{bmatrix}.$$

Also notice that $B_1 Z_t = \lambda z_{t+1}$, where λ is defined as:

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[31] Variables are in natural units.

$$B_1 Z_t = \begin{bmatrix} 0 \\ 0 \\ e_t \\ e_t \\ 0 \\ -e_t \\ 0 \\ 0 \\ 0 \end{bmatrix} = \begin{bmatrix} 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 \\ 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 \\ 0 & 0 & 0 & 0 & 0 & -1 & 1 & 0 & 0 \\ 0 & 0 & 0 & 0 & 0 & -1 & 1 & 0 & 0 \\ 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 \\ 0 & 0 & 0 & 0 & 0 & 1 & -1 & 0 & 0 \\ 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 \\ 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 \\ 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 \end{bmatrix} \begin{bmatrix} r_{1,t+1} - \pi_{t+1} \\ r_{2,t+1} - r_{1,t+1} \\ r^*_{1,t+1} - r_{1,t+1} - \Delta e_{t+1} \\ r^*_{2,t+1} - r_{1,t+1} - \Delta e_{t+1} \\ s_{t+1} \\ \Delta e_{t+1} \\ e_{t+1} \\ \pi_{t+1} \\ \pi^*_{t+1} \end{bmatrix}.$$

Therefore, replacing it in (A2.2):

$$\begin{aligned} (1-\lambda) z_{t+1} &= B_0 Z_{t+1} \\ (B_0' B_0)^{-1} B_0' (1-\lambda) z_{t+1} &= Z_{t+1} \end{aligned}$$

or

$$(B_0' B_0)^{-1} B_0' (1-\lambda) z_t = Z_t. \qquad \text{(A2.3)}$$

We can re-write (A2.1) in the following way:

$$\begin{aligned} Z_{t+1} &= A_0 + A_1 Z_t + u_{t+1} \\ B_0 Z_{t+1} + B_1 Z_t &= B_0 A_0 + (B_0 A_1 + B_1) Z_t + B_0 u_{t+1}. \end{aligned}$$

Using (A2.2) on the LHS and (A2.3) on the RHS, we have the desired relation between the estimated VAR coefficients and the ones in the system of equations (13):

$$z_{t+1} = B_0 A_0 + (B_0 A_1 + B_1)(B_0' B_0)^{-1} B_0' (1-\lambda) z_t + B_0 u_{t+1}, \qquad \text{(A2.4)}$$

where $\Phi_0 = B_0 A_{0,}$ $\Phi_1 = (B_0 A_1 + B_1)(B_0' B_0)^{-1} B_0' (1-\lambda)$, $v_{t+1} = B_0 u_{t+1}$, and $\Sigma_v = B_0 \Sigma_u B_0'$.

An analogous exercise should be conducted for the case of a Japanese investor. To save space, we do not describe it here.

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Table I. Current Account: Variance-Decomposition Analysis

		Composition			Relative Importance	
Country	**R^2**	**Portfolio Rebalancing**	**Portfolio Growth**	**2*cov(PR,PG)**	**Portfolio Rebalancing**	**Portfolio Growth**
			High-Income Countries			
Australia	0.989	1.638	0.860	-1.498	66%	34%
Austria	0.938	1.689	0.462	-1.149	79%	21%
Canada	0.992	1.008	0.418	-0.423	71%	29%
Denmark	0.935	2.430	1.318	-2.749	65%	35%
Finland	0.819	4.248	3.461	-6.709	55%	45%
France	0.992	0.815	0.098	0.087	89%	11%
Germany	0.999	0.818	0.028	0.152	97%	3%
Ireland	0.951	2.295	1.030	-2.325	69%	31%
Israel	0.977	1.514	0.336	-0.850	82%	18%
Italy	0.985	1.015	0.083	-0.099	92%	8%
Japan	0.996	0.613	0.206	0.178	75%	25%
Netherlands	0.983	0.848	0.966	-0.814	47%	53%
New Zealand	0.986	1.389	0.804	-1.193	63%	37%
Norway	0.997	0.731	0.081	0.187	90%	10%
Singapore	0.997	0.599	0.144	0.257	81%	19%
Sweden	0.818	2.855	1.450	-3.304	66%	34%
Switzerland	0.994	0.927	0.590	-0.516	61%	39%
U.K	0.996	0.842	0.075	0.082	92%	8%
U.S.	0.999	0.505	0.161	0.334	76%	24%
AVERAGE					74%	26%
			Developing Countries			
Argentina	0.916	1.143	1.933	-2.076	37%	63%
Brazil	0.915	2.318	1.955	-3.273	54%	46%
Chile	0.885	2.717	1.671	-3.388	62%	38%
China	0.993	0.854	0.018	0.127	98%	2%
India	0.991	1.633	0.528	-1.161	76%	24%
Indonesia	0.967	1.567	0.455	-1.022	78%	22%
Malaysia	0.998	0.895	0.075	0.029	92%	8%
Mexico	0.982	1.390	0.775	-1.165	64%	36%
Peru	0.642	6.533	6.866	-12.40	49%	51%
Philippines	0.991	1.115	0.350	-0.465	76%	24%
South Africa	0.956	1.311	0.305	-0.616	81%	19%
South Korea	0.991	0.638	0.229	0.132	74%	26%
Thailand	0.996	1.082	0.304	-0.385	78%	22%
Trinidad Tobago	0.878	1.632	0.278	-0.910	85%	15%
Turkey	0.865	2.160	1.084	-2.243	67%	33%
Venezuela	0.975	1.215	0.182	-0.397	87%	13%
AVERAGE					72%	28%

This table reports the variance-decompositon analysis based on equation (4) in the main text. The first column reports how much of the variation of the current account can be explained by the portfolio growth and portfolio rebalancing components. The next three columns report the three RHS components of equation (4), scaled by the LHS variable. Thus, these three columns should sum up to one. The last two columns report the relative size of the portfolio rebalancing and portfolio growth components. The top-panel shows the results for high-income countries. The middle-panel reports the results for middle-income and low-income countries. This country classification follows the official World Bank classification of countries according to their income levels.

Table II. Summary Statistics

Variables	Mean	Std. Dev.
U.S. Short-term Government Bond	1.8	2.9
U.S. Long-term Government Bond	2.6	3.1
U.S. Stock	7.1	29.8
U.S. ROE	1.3	3.9
Japanese Short-term Government Bond	0.4	4.0
Japanese Long-term Government Bond	2.1	4.3
Japanese Stock	7.6	34.1
Japanese ROE	0.8	4.5
U.S. CPI-Inflation	4.3	3.6
Japanese CPI-Inflation	3.9	5.6
Real Exchange Rate (Change)	-2.0	24.5

This table shows the summary statistics of quarterly real returns from 1960 to 2005. The assets considered in the analysis are: short-term government bonds, long-term government bonds, stocks, and ROE for both the U.S. and Japan. It also shows the sample summary statistics of the CPI-inflation rates and the real exchange rate. Real returns are reported in local currency. Data is in annual percentage units.

Source: *Global Financial Database.*

Table III. VAR Estimation

		$ussb_t$	$uslb_t$	uss_t	$usroe_t$	$ustbill_t$	$uspe_t$	$usspread_t$	$jpsb_t$	$jplb_t$	jps_t	$jproe_t$	$jptbill_t$	$jppe_t$	$jpspread_t$	rer_t	R^2
US Short-term Bond	$ussb_{t+1}$	0.43	-1.11	0.01	0.81	1.58	0.00	1.71	-0.59	0.92	0.00	-0.32	-0.13	0.00	-0.46	-0.02	0.37
		[0.30]	[0.42]	[0.01]	[0.22]	[0.29]	[0.00]	[0.49]	[0.36]	[0.44]	[0.01]	[0.20]	[0.23]	[0.00]	[0.36]	[0.01]	[0.00]
US Long-term Bond	$uslb_{t+1}$	0.19	-0.73	0.01	0.67	1.36	0.00	2.13	-0.73	1.41	0.00	-0.64	-0.37	0.00	-0.88	-0.01	0.50
		[0.28]	[0.40]	[0.01]	[0.21]	[0.28]	[0.00]	[0.47]	[0.35]	[0.42]	[0.01]	[0.20]	[0.22]	[0.00]	[0.35]	[0.01]	[0.00]
US Stock	uss_{t+1}	-7.72	9.61	0.04	-1.56	-3.23	-0.02	-10.70	1.52	4.18	-0.12	-4.80	-6.30	0.00	-7.24	-0.07	0.17
		[3.59]	[5.13]	[0.08]	[2.77]	[3.60]	[0.01]	[6.02]	[4.46]	[5.47]	[0.07]	[2.52]	[2.81]	[0.00]	[4.46]	[0.10]	[0.01]
US ROE	$usroe_{t+1}$	0.14	-1.68	0.00	1.65	1.42	0.00	2.23	-0.91	1.73	0.00	-0.79	-0.51	0.00	-1.09	-0.01	0.65
		[0.30]	[0.43]	[0.01]	[0.23]	[0.30]	[0.00]	[0.51]	[0.37]	[0.46]	[0.01]	[0.21]	[0.24]	[0.00]	[0.37]	[0.01]	[0.00]
US T-Bill Yield	$ustbill_{t+1}$	0.09	-0.15	0.00	0.08	0.89	0.00	0.21	0.17	-0.47	0.00	0.31	0.22	0.00	0.42	0.00	0.90
		[0.11]	[0.15]	[0.00]	[0.082]	[0.11]	[0.00]	[0.18]	[0.13]	[0.16]	[0.00]	[0.07]	[0.08]	[0.00]	[0.13]	[0.00]	[0.00]
US P/E Ratio	$uspe_{t+1}$	-15.58	51.84	0.12	-34.14	-53.38	0.84	-83.73	11.52	33.85	-0.68	-39.49	-46.94	-0.01	-70.38	-0.07	0.93
		[23.66]	[33.78]	[0.51]	[18.24]	[23.70]	[0.04]	[39.69]	[29.37]	[36.02]	[0.47]	[16.60]	[18.53]	[0.01]	[29.39]	[29.39]	[0.00]
US Spread	$usspread_{t+1}$	0.01	0.18	0.00	-0.18	-0.11	0.00	0.58	-0.07	0.31	0.00	-0.25	-0.18	0.00	-0.33	0.00	0.71
		[0.08]	[0.12]	[0.00]	[0.06]	[0.08]	[0.00]	[0.14]	[0.10]	[0.13]	[0.00]	[0.06]	[0.07]	[0.00]	[0.10]	[0.00]	[0.00]
JP Short-term Bond	$jpsb_{t+1}$	-0.57	1.37	-0.01	-0.42	-0.04	0.00	-1.05	-1.35	2.63	0.00	-1.26	-1.28	0.00	-2.27	-0.02	0.29
		[0.45]	[0.64]	[0.01]	[0.35]	[0.45]	[0.00]	[0.76]	[0.56]	[0.69]	[0.01]	[0.32]	[0.35]	[0.00]	[0.56]	[0.01]	[0.00]
JP Long-term Bond	$jplb_{t+1}$	-0.63	1.57	-0.01	-0.52	-0.21	0.00	-1.25	-2.01	3.26	0.01	-1.23	-1.23	0.00	-2.11	-0.02	0.33
		[0.45]	[0.65]	[0.01]	[0.35]	[0.45]	[0.00]	[0.76]	[0.56]	[0.69]	[0.01]	[0.32]	[0.36]	[0.00]	[0.56]	[0.01]	[0.00]
JP Stock	jps_{t+1}	0.45	4.71	0.27	-3.92	-6.02	-0.01	-5.91	-1.19	2.77	0.29	-0.74	-4.52	0.00	-4.23	-0.10	0.27
		[3.52]	[5.03]	[0.08]	[2.72]	[3.53]	[0.01]	[5.91]	[4.37]	[5.36]	[0.07]	[2.47]	[2.76]	[0.00]	[4.37]	[0.10]	[0.00]
JP ROE	$jproe_{t+1}$	-0.68	1.45	-0.01	-0.39	0.02	0.00	-1.05	-2.29	2.78	0.01	-0.46	-1.49	0.00	-2.44	-0.03	0.42
		[0.46]	[0.66]	[0.01]	[0.35]	[0.46]	[0.00]	[0.77]	[0.57]	[0.70]	[0.01]	[0.32]	[0.36]	[0.00]	[0.57]	[0.01]	[0.00]
JP T-Bill Yield	$jptbill_{t+1}$	0.04	-0.06	0.00	0.02	0.01	0.00	0.02	-0.07	-0.07	0.00	0.13	1.09	0.00	0.13	0.00	0.98
		[0.04]	[0.06]	[0.00]	[0.03]	[0.04]	[0.00]	[0.07]	[0.05]	[0.06]	[0.00]	[0.03]	[0.03]	[0.00]	[0.05]	[0.00]	[0.00]
JP P/E Ratio	$jppe_{t+1}$	90.59	-13.02	1.82	-72.43	-78.65	-0.15	-9.49	-78.49	229.13	1.31	-143.27	-181.45	0.89	-236.42	-3.91	0.94
		[70.42]	[100.56]	[1.50]	[54.30]	[70.55]	[0.11]	[118.18]	[87.45]	[107.25]	[1.39]	[49.43]	[55.17]	[0.03]	[87.49]	[2.02]	[0.00]
JP Spread	$jpspread_{t+1}$	-0.05	0.20	0.00	-0.11	-0.19	0.00	-0.23	0.20	-0.26	0.00	0.06	0.08	0.00	1.08	0.00	0.88
		[0.06]	[0.09]	[0.00]	[0.05]	[0.06]	[0.00]	[0.10]	[0.08]	[0.09]	[0.00]	[0.04]	[0.05]	[0.00]	[0.08]	[0.00]	[0.00]
Real Exchange Rate	rer_{t+1}	0.53	1.94	-0.03	-1.24	-1.87	-0.01	-6.75	0.74	-0.75	0.01	0.01	-2.78	0.00	0.41	0.02	0.12
		[2.67]	[3.81]	[0.06]	[2.06]	[2.67]	[0.00]	[4.47]	[3.31]	[4.06]	[0.05]	[1.87]	[2.09]	[0.00]	[3.31]	[0.08]	[0.05]

This table shows the results of our VAR estimation with log real asset returns on a quarterly basis from 1960 to 2005. The following asset returns are included in the estimation: short-term government bonds, long-term government bonds, stocks, and ROE. Other state variables include: T-Bill nominal yields, price-earnings ratios, term spreads, and the real exchange rate. Each row corresponds to one equation. The table also shows the R-squared for each equation (with p-values of the F-test of joint significance in brackets). *t-statistics* for coefficient estimates are shown in brackets.

Table IV. Summary Statistics of Expected Real Asset Returns

	Basic VAR (BVAR)		BVAR + RER in Levels		BVAR + RER in Differences		BVAR + NER in Levels and Inflation Rates		BVAR + NER in Differences and Inflation Rates	
Assets	**Mean**	**Std. Dev.**	**Mean**	**Std. Dev.**	**Mean**	**Std. Dev.**	**Mean**	**Std. Dev.**	**Mean**	**Std. Dev.**
U.S. Short-term Govt. Bond	1.75	1.74	1.75	1.77	1.74	1.78	1.75	1.81	1.74	1.81
U.S. Long-term Govt. Bond	2.63	2.21	2.63	2.22	2.61	2.25	2.63	2.25	2.61	2.28
U.S. Stocks	3.37	12.37	3.38	12.51	3.46	12.33	3.47	13.21	3.56	13.06
U.S. ROE	1.27	3.18	1.27	3.19	1.24	3.20	1.27	3.24	1.24	3.25
Japanese Short-term Govt. Bond	0.32	2.18	0.32	2.23	0.32	2.22	0.32	2.23	0.32	2.21
Japanese Long-term Govt. Bond	2.02	2.47	2.02	2.51	2.00	2.51	2.02	2.51	2.00	2.50
Japanese Stocks	3.67	16.50	3.70	16.76	3.52	16.41	3.77	17.29	3.59	16.92
Japanese ROE	0.74	2.91	0.74	2.96	0.76	2.94	0.74	2.96	0.76	2.94

This table shows the summary statistics of predicted real asset returns from 1960 to 2005 based on VAR estimations. The assets considered in the analysis are: short-term government bonds, long-term government bonds, stocks, and ROE for both the U.S. and Japan. The control variables are: nominal yield on T-Bills, price-earnings ratio, and the term spread. Depending on the specification, the nominal exchange rate (NER), the real exchange rate (RER), or the U.S. and Japanese CPI-inflation rates are included. The values are real returns in local currency. Data is shown in annual percentage units.

Table V. Regression Analysis: Actual Bilateral Current Account vs. Optimal Portfolio Shares

Panel A. U.S. Investors

	Basic Specification (BS)		BS + Time Trend		BS + Lagged BCA	
	Alpha	**L.Alpha**	**Alpha**	**L.Alpha**	**Alpha**	**L.Alpha**
Relative Risk Aversion: 5						
Basic VAR	0.002 ***	-0.000	0.001 **	-0.001	0.000 *	-0.000 *
+ RER in Levels	0.002 ***	-0.000	0.001 **	-0.001	0.000	-0.000 *
+ RER in Differences	0.002 ***	-0.000	0.001 **	-0.001	0.000 *	-0.000 *
+ Infl., NER in Levels	0.001 ***	-0.000	0.001 **	-0.001	0.000	-0.000
+ Infl., NER in Differences	0.002 ***	-0.000	0.001 ***	-0.001	0.000	-0.000 *
Relative Risk Aversion: 10						
Basic VAR	0.004 ***	-0.000	0.002 **	-0.002	0.001 *	-0.001 *
+ RER in Levels	0.003 ***	-0.000	0.002 **	-0.001	0.001 *	-0.001 *
+ RER in Differences	0.004 ***	-0.000	0.002 **	-0.001	0.001 *	-0.001 *
+ Infl., NER in Levels	0.003 ***	-0.000	0.002 **	-0.001	0.001 *	-0.001
+ Infl., NER in Differences	0.003 ***	-0.000	0.002 ***	-0.001	0.001	-0.001 *
Relative Risk Aversion: 30						
Basic VAR	0.011 ***	-0.000	0.006 **	-0.005	0.002 *	-0.002 *
+ RER in Levels	0.009 ***	-0.001	0.006 **	-0.004 *	0.002 *	-0.002 *
+ RER in Differences	0.011 ***	-0.000	0.006 **	-0.004	0.002 *	-0.002 *
+ Infl., NER in Levels	0.008 ***	-0.001	0.006 ***	-0.004 *	0.002 *	-0.002
+ Infl., NER in Differences	0.010 ***	0.001	0.006 ***	-0.003	0.002	-0.002 *
Relative Risk Aversion: 100						
Basic VAR	0.037 ***	-0.000	0.021 **	-0.016	0.008 *	-0.008 *
+ RER in Levels	0.030 ***	-0.005	0.021 ***	-0.014 *	0.007 *	-0.006 *
+ RER in Differences	0.036 ***	-0.000	0.021 **	-0.014	0.007 *	-0.007 *
+ Infl., NER in Levels	0.027 ***	-0.004	0.019 ***	-0.012 *	0.006 *	-0.005
+ Infl., NER in Differences	0.034 ***	0.002	0.020 ***	-0.011	0.006	-0.006 *

This table shows the regression results of the bilateral current account on the model-predicted portfolio shares. It shows the results for a U.S. investor. Three different regressions are reported: our basic specification that regresses the bilateral current account on contemporaneous and lagged optimal portfolio shares (alpha and L.alpha, respectively), the basic specification with a time trend, and the basic specification including a lagged dependent variable. The results are shown for different values of the relative risk aversion parameter: 5, 10, 30, and 100. Different series of model-predicted portfolio shares are considered based on our five VAR specifications used to calculate expected asset returns. The bilateral current account data is expressed as a percentage of GNP. * means significant at 10%, ** at 5%, and *** at 1% levels.

Table V. Regression Analysis: Actual Bilateral Current Account vs. Optimal Portfolio Shares
Panel B. Japanese Investors

	Basic Specification (BS)		BS + Time Trend		BS + Lagged BCA	
	Alpha	**L.Alpha**	**Alpha**	**L.Alpha**	**Alpha**	**L.Alpha**
Relative Risk Aversion: 5						
Basic VAR	-0.002 ***	0.000	-0.001 **	0.001 *	-0.000	0.000
+ RER in Levels	-0.002 ***	0.000	-0.001 **	0.001 *	-0.000	0.000
+ RER in Differences	-0.002 ***	0.000	-0.001 **	0.001	-0.000	0.000
+ Infl., NER in Levels	-0.002 ***	0.000	-0.001 **	0.001 *	-0.000 **	0.000 **
+ Infl., NER in Differences	-0.002 ***	0.000	-0.001 **	0.001	-0.000 **	0.000 **
Relative Risk Aversion: 10						
Basic VAR	-0.004 ***	0.000	-0.002 **	0.002 *	-0.001	0.001
+ RER in Levels	-0.004 ***	0.000	-0.002 **	0.002 *	-0.001	0.000
+ RER in Differences	-0.004 ***	0.000	-0.002 **	0.002	-0.001	0.001
+ Infl., NER in Levels	-0.003 ***	0.000	-0.002 **	0.001 *	-0.001 **	0.001 **
+ Infl., NER in Differences	-0.004 ***	0.000	-0.002 **	0.001	-0.001 **	0.001 **
Relative Risk Aversion: 30						
Basic VAR	-0.012 ***	0.000	-0.007 **	0.005	-0.002	0.002
+ RER in Levels	-0.010 ***	0.002	-0.007 **	0.005 *	-0.002	0.001
+ RER in Differences	-0.011 ***	0.000	-0.007 **	0.005	-0.002	0.002
+ Infl., NER in Levels	-0.009 ***	0.001	-0.006 ***	0.004 *	-0.002 **	0.002 **
+ Infl., NER in Differences	-0.011 ***	0.000	-0.006 **	0.004	-0.003 **	0.003 **
Relative Risk Aversion: 100						
Basic VAR	-0.040 ***	0.001	-0.023 **	0.017	-0.006	0.006
+ RER in Levels	-0.034 ***	0.006	-0.024 ***	0.016 *	-0.006	0.005
+ RER in Differences	-0.038 ***	0.001	-0.022 **	0.016	-0.006	0.006
+ Infl., NER in Levels	-0.030 ***	0.005	-0.021 ***	0.014 *	-0.008 **	0.007 **
+ Infl., NER in Differences	-0.035 ***	-0.001	-0.021 **	0.014	-0.009 **	0.009 **

This table shows the regression results of the bilateral current account on the model-predicted portfolio shares. It shows the results for a Japanese investor. Three different regressions are reported: our basic specification that regresses the bilateral current account on contemporaneous and lagged optimal portfolio shares (alpha and L.alpha, respectively), the basic specification with a time trend, and the basic specification including a lagged dependent variable. The results are shown for different values of the relative risk aversion parameter: 5, 10, 30, and 100. Different series of model-predicted portfolio shares are considered based on our five VAR specifications used to calculate expected asset returns. The bilateral current account data is expressed as a percentage of GNP. * means significant at 10%, ** at 5%, and *** at 1% levels.

Table VI. Regression Analysis: Actual vs. Predicted Bilateral Current Account

	Basic Specification (BS)	BS + Time Trend	BS + Lagged Vars. PBCA	BS + Lagged Vars. L.PBCA	Vars. in Diff.
Basic VAR	0.004 ***	0.001 ***	0.001 **	-0.001 **	0.001 **
+ RER in Levels	0.003 ***	0.001 ***	0.001 *	-0.001 *	0.001 *
+ RER in Differences	0.004 ***	0.001 ***	0.001 *	-0.001 *	0.001 *
+ Infl., NER in Levels	0.003 ***	0.001 ***	0.001 **	-0.001 *	0.001 *
+ Infl., NER in Differences	0.004 ***	0.001 ***	0.001 **	-0.001 **	0.001 **

This table shows the results of four different regression specifications: a basic specification that regresses the actual bilateral current account on the predicted bilateral current account (PBCA), the basic specification with a time trend, the basic specification including lagged values of both the dependent and independent variables, and a fourth specification with both variables in differences. The results are reported for different series of model-predicted portfolio shares: our five VAR specifications are considered to calculate expected asset returns. The regressions use quarterly data. Actual data is scaled by U.S. GNP and the predicted data is scaled by model-based U.S. wealth. A relative risk aversion coefficient of 10 has been assumed. * means significant at 10%, ** at 5%, and *** at 1% levels.

Table VII. Regression Analysis: Actual vs. Hybrid Predicted Bilateral Current Account

	Basic Specification (BS)	BS + Time Trend	BS + Lagged Vars. HPBCA	BS + Lagged Vars. L.HPBCA	Vars. in Diff.
Relative Risk Aversion: 10					
Basic VAR	0.002 ***	0.001 **	0.000 *	-0.000	0.000 **
+ RER in Levels	0.003 ***	0.001 ***	0.000 *	-0.000	0.000 **
+ RER in Differences	0.002 ***	0.001 ***	0.000 *	-0.000	0.000 **
+ Infl., NER in Levels	0.002 ***	0.001 ***	0.000 **	-0.000 *	0.000 ***
+ Infl., NER in Differences	0.002 ***	0.001 **	0.000 **	-0.000 **	0.000 ***
Relative Risk Aversion: 2000					
Basic VAR	0.603 ***	0.205 ***	0.069 **	-0.045	0.058 **
+ RER in Levels	0.294 ***	0.124 ***	0.053 ***	-0.036	0.045 **
+ RER in Differences	0.599 ***	0.198 ***	0.065 **	-0.042	0.055 **
+ Infl., NER in Levels	0.310 ***	0.126 ***	0.061 ***	-0.040 **	0.052 ***
+ Infl., NER in Differences	0.544 ***	0.150 **	0.077 **	-0.051 *	0.065 ***

This table shows the results of four different regression specifications: a basic specification that regresses the actual bilateral current account on our hybrid measure (HPBCA), the basic specification with a time trend, the basic specification including lagged values of both the dependent and independent variables, and a fourth specification with both variables in differences. Our hybrid bilateral current account uses actual data on wealth, consumption, and savings. The results are based on different series of model-predicted portfolio shares: our five VAR specifications are considered to calculate expected asset returns. The regressions use quarterly data. Both measures of the bilateral current account are scaled by U.S. GNP. The results are shown for a relative risk aversion coefficient of 10 and 2000 in the top and bottom panel, respectively. * means significant at 10%, ** at 5%, and *** at 1% levels.

Table A.1. Determinants of the Bilateral Current Account

	(1)	(2)	(3)	(4)	(5)	(6)	(7)	(8)	(9)
Constant	-0.006	-0.003	-0.006	-0.007	-0.004	-0.011	-0.015	-0.014	-0.009
	[11.119]	[1.912]	[3.805]	[4.904]	[2.649]	[4.631]	[6.959]	[6.256]	[3.727]
Dom. Savings*(NFA/W)	0.265								
	[3.192]								
Dom. Savings		0.241	0.297	0.302	0.152	0.058	0.078	0.075	0.043
		[2.905]	[3.625]	[3.280]	[2.065]	[4.346]	[7.764]	[6.686]	[3.423]
For. Savings		0.025	0.021	0.017	0.019	-0.014	-0.023	-0.028	-0.023
		[1.563]	[1.073]	[0.810]	[1.055]	[2.615]	[4.146]	[5.159]	[4.476]
US Long-term Bond		-0.234	-0.017		-0.272	-0.126	-0.033		-0.131
		[2.960]	[0.826]		[3.966]	[5.551]	[3.920]		[6.068]
US Short-term Bond		0.153		-0.004	0.179	0.08		-0.016	0.094
		[2.411]		[0.209]	[3.176]	[4.011]		[2.194]	[4.915]
US Stocks			0.003	0.002	0		0.002	0.002	0.004
			[0.542]	[0.439]	[0.065]		[1.355]	[1.164]	[2.690]
JP Long-term Bond		0.244	0.013		0.377	0.038	0.007		0.058
		[2.411]	[1.369]		[3.369]	[1.538]	[2.763]		[2.526]
JP Short-term Bond		-0.233		0.011	-0.349	-0.029		0.005	-0.042
		[2.241]		[1.004]	[3.065]	[1.201]		[1.761]	[1.850]
JP Stocks			-0.006	-0.006	-0.01		-0.006	-0.006	-0.007
			[1.296]	[1.230]	[2.415]		[4.762]	[4.901]	[5.455]
D.US Long-term Bond		-0.047	0.057		-0.092	-0.049	-0.006		-0.041
		[0.528]	[1.003]		[1.103]	[3.167]	[0.477]		[2.793]
D.US Short-term Bond		-0.024		0.027	0.077	0.057		-0.019	0.093
		[0.338]		[0.542]	[1.166]	[1.910]		[0.753]	[3.171]
D.US Stock			0.006	0.006	0.002		0.000	-0.001	0.002
			[1.136]	[1.076]	[0.616]		[0.139]	[0.290]	[1.105]
D.JP Long-term Bond		0.048	0.014		0.146	0.056	0.004		0.101
		[0.566]	[1.899]		[1.297]	[1.331]	[1.250]		[2.478]
D.JP Short-term Bond		-0.044		0.018	-0.13	-0.053		0.002	-0.094
		[0.522]		[1.537]	[1.181]	[1.244]		[0.570]	[2.279]
D.JP Stock			-0.001	-0.002	0.000		-0.003	-0.003	-0.004
			[0.180]	[0.418]	[0.109]		[2.350]	[2.340]	[3.055]
Observations	35	34	34	34	34	180	180	180	180
R-squared	0.24	0.68	0.57	0.54	0.82	0.60	0.62	0.59	0.67

This table reports the regressions of the bilateral current account between Japan and the U.S. on: domestic and foreign savings, expected asset returns, and changes in expected asset returns. Expected asset returns are obtained from the VAR estimation presented in Table 2. The bilateral current account and the domestic and foreign savings are expressed as a percentage of GNP. Net foreign asset positions, taken from Lane and Milesi-Ferretti (2005), are expressed as a percentage of U.S. total wealth. Expected asset returns are denominated in U.S. dollars. The table also shows the R-squared for each equation and the number of observations. *t-statistics* are shown in brackets.

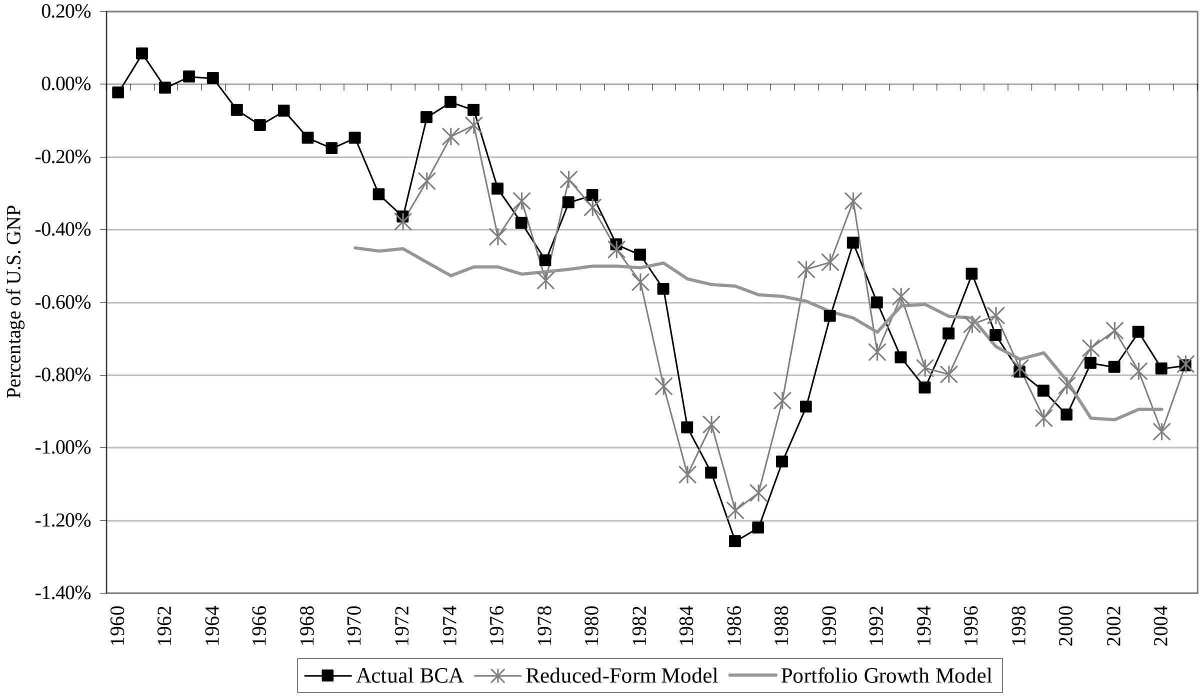

Figure I. Bilateral Current Account: U.S. and Japan

This figure shows the annual bilateral current account balance between the U.S. and Japan, from 1960 to 2005. It also shows the fitted values of a portfolio growth only model, representing an adaptation of Kraay and Ventura's (2000) model, and the estimates of our reduced-form model in equation (5) with both portfolio growth and portfolio rebalancing components. Values are shown as a percentage of U.S. GNP.

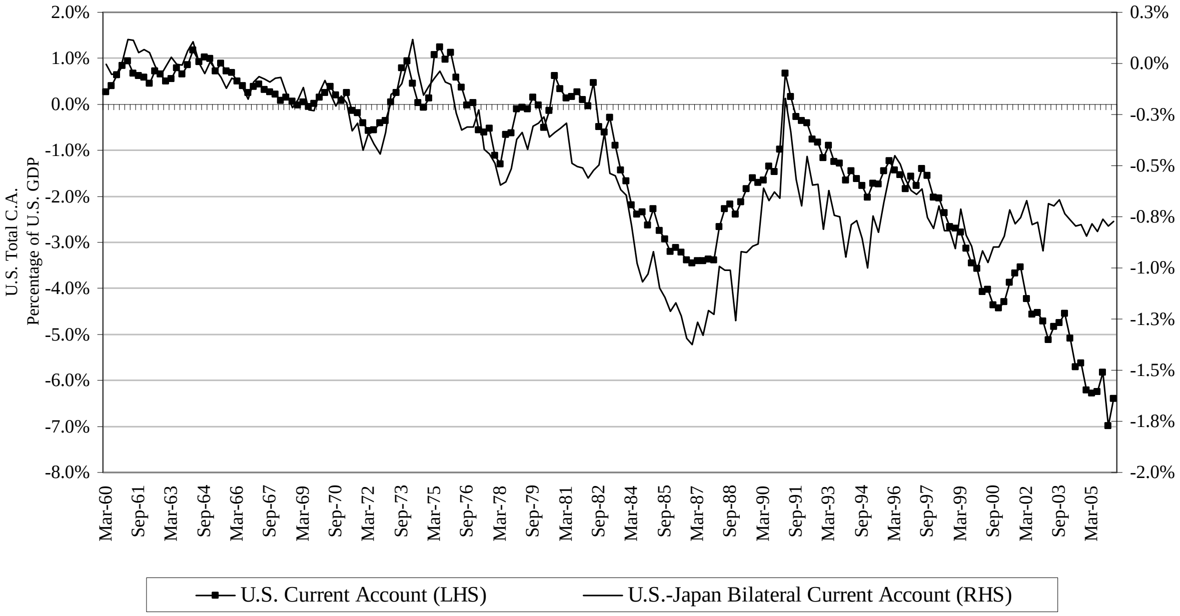

Figure II. U.S. Current Account and U.S. and Japan Bilateral Current Account

This figure shows the quarterly U.S. total current account balance and one of its components, the bilateral current account with Japan, from 1960 to 2005. Values are shown as a percentage of U.S. GDP.

Source: Bureau of Economic Analysis (U.S. Department of Commerce).

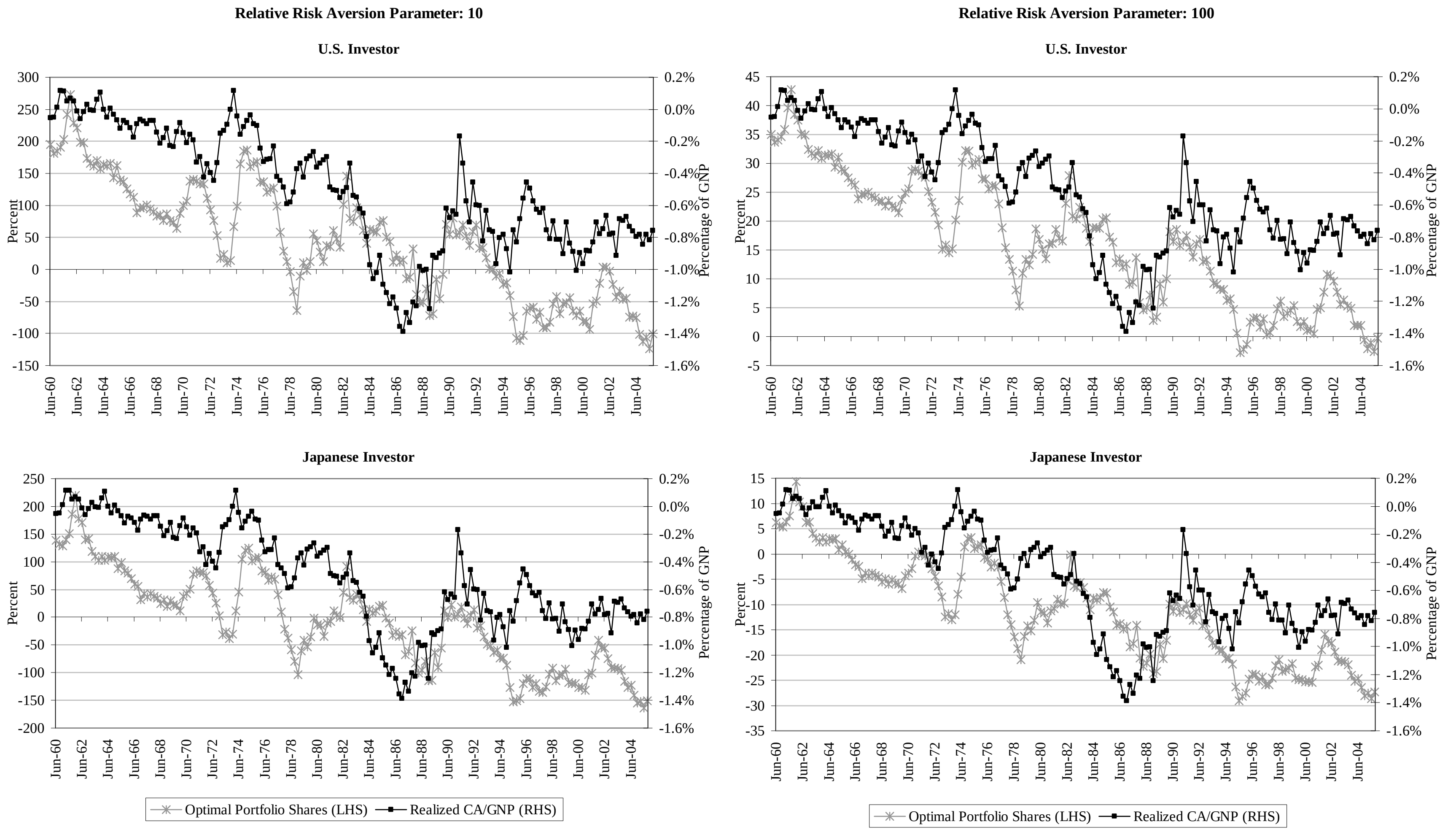

Figure III. Optimal Portfolio Share Abroad by Investor Type

This figure plots the actual bilateral current account and the model-predicted optimal portfolio shares of foreign investments by investor type, from 1960 to 2005. Expected returns are calculated according to the second specification of the VAR system. We plot the results for relative risk aversion coefficients of 10 and 100. The actual bilateral current account is scaled by U.S. GNP.