

Notes on "International
Financial Adjustment by
Gourinchas and Rey

February 22, 2005

Hélène Rey (Princeton)

paper at <http://www.princeton.edu/~hrey>

‘To what extent should surplus countries expand;
to what extent should deficit countries contract?’
asked Mundell (1968)

The Intertemporal Approach to the Current Account

$$CA_t = NA_{t+1} - NA_t = Y_t - C_t - I_t - G_t$$

Attempt to understand the dynamic process of adjustment of a country's external balance.

Typically models assume a strong form of market incompleteness (one foreign riskless bond).

Solving out for consumption:

Results:

Given a series of shocks, what is the response of the current account.

Consumption smoothing intuition: effect of transitory or permanent income shocks on the current account.

But restrictions of the model are rejected and actual current account more volatile than predicted.

No predictions on returns.

Literature

Gosh (1995), Otto (1992), Sheffrin and Woo (1990)

Glick and Rogoff (1995): allow for global and country specific shocks.

More recently

Bergin and Sheffrin (2000), Nason and Rogers (2002)
allow for time varying interest rates.

Kraay and Ventura (2000 and 2002) : Merton model with a domestic and foreign risky asset and a riskless foreign asset. They look at optimal portfolio allocations.

In reality

Portfolio of foreign assets and liabilities much richer than a riskless bond.

Net and gross flows quite different.

**Composition* (asset types, currencies) matters increasingly.

Example: At end 2003, US liabilities=\$10.5 trillion; US assets=\$7.9 trillion. Net foreign asset position=-\$2.7 trillion.

US liabilities are almost 100% in dollars but around 70% of US assets are in foreign currencies.

G-R approach

G-R model in detail the financial account.

G-R find evidence of a *valuation channel* and of a *trade channel* of adjustment.

G-R attempt to quantify their relative importance.

They operate at different horizons.

Deviations of net exports and net foreign assets from trend forecast future variables.

Major Claim: predictability in differential of returns between the US and the rest of the world and pre-

Our model

Minimal set of assumptions:

Intertemporal budget constraint.

Stationarity assumptions (steady state).

No ponzi condition.

Net exports:

$$NX_t = X_t - M_t$$

Net foreign assets:

$$NA_t = A_t - L_t$$

Law of motion on net foreign assets:

$$NA_{t+1} = R_{t+1} (NA_t + NX_t) \quad (1)$$

$R_{t+1} \equiv$ return on net foreign asset portfolio:

$$R_{t+1} = w_{At} \cdot \left(\widetilde{R}_{t+1}^A + \Delta e_{t+1} \right) - w_{Lt} \cdot \widetilde{R}_{t+1}^L - \pi_{t+1}$$

Why the trade balance and not the current account?

The current account presents two major disadvantages from our perspective:

1. *CA* includes investment income (which should be part of the return on *NA*) : double counting.
2. *CA* does not record changes in *NA* associated with capital gains (changes in valuation, exchange rates).

On NA returns:

R_{t+1}^A (resp R_{t+1}^L) measures gross return on foreign (resp. domestic) assets holdings, i.e. equity and debt.

If $R_{t+1}^A = R_{t+1}^L = R_{t+1}$, then gross positions do not matter.

If $R_{t+1}^A \neq R_{t+1}^L$. Gross positions matter.

A depreciation improves returns on gross assets, not gross liabilities (unless liabilities in foreign currency):

$$R_{t+1}^A = \widetilde{R}_{t+1}^A + \Delta e_{t+1}$$

Linearization of the Law of Motion

$$NA_{t+1} = R_{t+1} (NA_t + NX_t)$$

Assumptions (basically to get log-linear model)

i) If W_t is wealth: ratios A_t/W_t , L_t/W_t , X_t/W_t , M_t/W_t , W_{t+1}/W_t and R_t are stationary [balanced growth path].

ii) In steady state $NA = A - L \neq 0$, $NX = X - M \neq 0$.

iii) If γ is the steady state rate of growth of wealth: $\gamma < R$ [long-term growth rate of the economy lower than equilibrium rate of return on portfolio]

Loglinearization gives after solving forward, imposing a non-ponzi condition and taking expectations:

$$\begin{aligned}nxa_t &= \mu_x x_t - \mu_m m_t - (\mu_a a_t - \mu_l l_t) \\ &= -E_t \sum_{j=1}^{+\infty} \rho^j [r_{t+j} + \Delta n x_{t+j}]\end{aligned}$$

where $\rho = 1 + \frac{NX}{NA} < 1$

.

Compare:

$$nxa_t = -E_t \sum_{j=1}^{+\infty} \rho^j \left[r_{t+j} + \Delta nx_{t+j} \right]$$

$$CA_t = -E_t \left[\sum_{s=t+1}^{\infty} \left(\frac{1}{1+r} \right)^{s-t} \Delta Q_s \right]$$

Interpretation: The role of the net foreign asset portfolio.

External adjustment can come either from the financial channel or the trade channel.

Net export to net foreign asset ratio $nx a_t$ must forecast changing returns to NA portfolio, or changing net export growth.

Special case:

If $r'_{t+j} = r'$, any adjustment must come from the trade balance (intertemporal approach to the current account)

Empirical implications

1. $nxat$ is a theoretically grounded measure of external imbalances over time
2. What are the share of the financial and trade channels in the process of adjustment?
3. Deviations of net exports to net foreign assets from trend must predict either return on NA portfolio or future net export growth.
4. If true, what does it predict exactly? R^{US} ?

Data [Methodology documented in "US Financial Adjustment: The Exorbitant Privilege"]

Foreign assets and liabilities disaggregated into debt, equity, FDI, other (mostly bank loans, trade credit...).

Two sources of data for gross asset positions: BEA/IMF; Flow of Funds.

1) Flow of Funds Accounts for the rest of the world (NIPA concept):

Quarterly series of equity, FDI, debt and 'other' positions (1952-).

Equity at market value; debt, FDI and 'other' at

Equity assets: G-R use MSCI stock indexes (in dollar) for valuations of stocks. Before 1970, we use the broadest indexes available.

Debt assets: G-R use 3 months interest rates for the short term component and annual returns on 7-10 year bonds for valuations of debt. We use an estimate of the currency composition and of the maturity.

Example of valuation:

$$S_{i,t+1} = \left(S_{i,t} + F_{i,t} \right) \frac{P_{t+1}}{P_t}$$

Stationarity tests

1. Tests for the stationarity of the three series X_t/A_t , M_t/A_t and L_t/A_t using FIML-Johansen tests of cointegration.
2. Estimate the cointegration vectors by Dynamic Least Squares (Stock and Watson 1993).

Dynamic OLS estimation of the cointegrating
vectors

$$x_t = \alpha_m + \beta_m m_t + \sum_{i=-k}^k b_{m,i} \Delta m_{t-i} + \epsilon_{mt}$$

$$a_t = \alpha_l + \beta_l l_t + \sum_{i=-k}^k b_{l,i} \Delta l_{t-i} + \epsilon_{lt}$$

$$x_t = \alpha_a + \beta_a a_t + \sum_{i=-k}^k b_{a,i} \Delta a_{t-i} + \epsilon_{at}$$

Estimated deviation from trend:

$$n\tilde{x}_t = x_t - 0.91m_t + 0.79a_t - 0.47l_t$$

A theoretically grounded measure of imbalances

$n\tilde{x}a_t$ gives the time path of US external imbalances in unit of US exports, taking into account valuation effects. [Figure 2]

The current imbalance is smaller than the one in 1980s. This is due to the dollar depreciation of 2002 and the increasing degree of leverage of the net foreign asset portfolio of the US.

But for valuation effects to work, the foreigners need to be willing to hold dollar assets....

Decomposition of the trade and financial adjustment channels

$$\begin{aligned} nxa_t &= - \sum_{j=1}^{+\infty} \rho^j E_t r_{t+j} - \sum_{j=1}^{+\infty} \rho^j E_t \Delta nx_{t+j} \quad (2) \\ &\equiv nxa_t^r + nxa_t^{\Delta nx} \end{aligned}$$

nxa_t^r is the component of nxa_t that forecasts future returns, while $nxa_t^{\Delta nx}$ is the component that forecasts future net exports growth.

$$nxa_t^r = -\rho e_r' \mathbf{A} (\mathbf{I} - \rho \mathbf{A})^{-1} \bar{\mathbf{z}}_t$$

Decomposition of the trade and financial
adjustment channels in the long run

$$\begin{aligned} 1 &= \frac{\text{cov}(nxa, nxa)}{\text{var}(nxa)} && (3) \\ &= \frac{\text{cov}(nxa^r, nxa)}{\text{var}(nxa)} + \frac{\text{cov}(nxa^{\Delta nx}, nxa)}{\text{var}(nxa)} \\ &= \beta_r + \beta_{\Delta nx} \end{aligned}$$

Predictability of quarterly returns and exchange rates

$$y_t = \alpha + \beta \text{ nxa}_{t-1} + \gamma z_{t-1} + \epsilon_t$$

Decompose total return in return on assets, liabilities, exchange rates.

Long horizon forecasts

Does the forecasting power increase with the horizon?

What share of the adjustment occurs through net exports vs revaluations at longer horizons?

. Regress

$$y_t = \alpha + \beta nxa_{t-k} + \epsilon_t$$

. Robust standard errors when forecast horizon ex-

Out-of-sample forecasts

Nested approach: compare model with our variable (unrestricted) to model excluding it (restricted).

Cut sample in half, perform rolling regressions reestimating the cointegration vectors each time.

Revisit Meese Rogoff.

Conclusions

Paper proposes a decomposition of external adjustment into *valuation channel* and *net export channel*.

- Valuation channel responsible for approximately 30% of the total external adjustment
- Find that valuation channel is important at short and medium horizons, net export channel important at long horizon
- Find good predictability of net asset returns and exchange rates, even at relatively short horizons.
- Can reject the random walk.

The exchange rate performs an important *dual role*

QUESTIONS STILL UNANSWERED:

What is the right theory?

Counterintuitive result: investors buy US assets when they are predicted to fall.

Explore portfolio balance mechanism. (Henderson and Rogoff (1982), Kouri (1982), Branson Henderson)

Explore time varying risk premium (Campbell and Cochrane (1999))

Explore official financing