What Drives US Foreign Borrowing? Evidence on External Adjustment to Transitory and Permanent Shocks

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Introduction

- Correctly measured, the US external position can be estimated to be as high as -15% of US GDP in 2007.
- A picture from Milesi-Ferretti:
What drives the current account? Basic theory

- Modern international economics stress that the current account results from the intertemporal investment and consumption decisions by firms and households: \( CA_t = S_t - I_t = \) Changes in net foreign wealth.

- Models of equilibrium dynamics of foreign wealth build on the Permanent Income Hypothesis (PIH) and later developments of consumption theory (see e.g. Obstfeld and Rogoff [1995, 1996]).
  - Countries should run deficits when shocks lower the current (net) output is below its permanent level;
  - or when returns fluctuate around their long-run levels.
  - Also in the presence of financial frictions, domestic income and production uncertainty tends to generate surpluses (via higher precautionary savings, and lower investment) – see e.g. Mendoza et al. 2008.
What drives the current account? From theory to empirics

- The essential ingredients of the intertemporal-trade model

1. Because of smoothing, consumption should adjust swiftly to \textit{permanent} increases in income, but be relative insulated from \textit{transitory} variations – in \textbf{all forms of income: production or portfolio}.

2. In response to positive shocks that raise net output gradually towards a higher long-run level, consumption smoothing implies that the economy should run a current account deficit.

- Despite the relevance of the intertemporal-trade approach to the current account, the empirical evidence on these basic propositions has remained controversial.
Empirical models

- Early approach employs variants of Campbell [1987] and Campbell and Shiller [1987]: testing frameworks build on enough restrictions to derive a present value relation equating, in expectations, the current account balance to the present discounted value of changes in net output:

$$CA_t = - \sum_{i=1}^{\infty} \left( \frac{1}{1 + r} \right)^i E_t \{ \Delta Z_{t+i} \}.$$ 

- These present-value restrictions are not rejected for some countries, strongly rejected for others

- Limits of the early approach: strong auxiliary assumptions commonly adopted to make the model testable e.g. quadratic preferences and constant return to net foreign wealth.
Restrictive assumptions: returns

Two main assumptions are extremely restrictive from the outset:

1. Constant return on NFA portfolio
   - when the return to net foreign wealth is allowed to vary stochastically according to some stationary process, this improves considerably the fit of the model (Bergin and Sheffrin [2000], Nason and Rogers [2006]).
   - In this case foreign markets are seen not only as an opportunity to trade intertemporally, but also as a source of shocks external to the domestic economy.
   - Gourinchas and Rey [2007a] underscore capital gains and losses (and therefore stochastic returns) on foreign assets driven by expected movements in exchange rates as a distinct, financial adjustment channel, complementing the traditional trade channel.
Restrictive assumptions: permanent/transitory

2. All shocks to (net) output are permanent – there is only one disturbance, a unit root country-specific technology shock that generates a permanent response in output!

- Without being necessary to the main thesis, this assumption is based on the finding that (net) output is well characterized as an integrated process, hence it possesses a unit root.

- The fact that output is an integrated process, should not be taken to imply that it does not have a strong transitory component.

- In contrast, since it is deviations of output from its trend that matter (as it is not a pure random walk), other transitory shocks might be of importance as well.
Restrictive assumptions: theory-consistent data

- Most previous empirical models employed current account data based either on national accounting identities, or on balance of payments data.

- Results in Tille [2003], Lane and Milesi-Ferretti [2001, 2007] and Gourinchas and Rey [2007b] demonstrate that the relation between changes in a countries NFA position (market-valued estimates) and official measures of the CA bear little, if any, relation.
Taking stock: two main questions

- Theory suggests that, to understand the $CA$, relevant shocks are
  - returns vs. output,
  - transitory vs. permanent

1. What is the evidence on the relative weight of different shocks in explaining external imbalances?

2. Does the macroeconomic response to these different types of shocks square the main predictions of current account theory?

- We address the two questions above, by characterizing empirically the joint dynamics of consumption, net output, and the market value of foreign assets and liabilities for the United States, for the post-Bretton Woods period.

- Drawing on Campbell and Mankiw [1989] and Lettau and Ludvigson [2001, 2004], we adopt a methodology that allows us to
  - decompose shocks moving these variables according to their transitory and permanent nature;
  - relax a number of restrictive assumptions e.g. preferences/returns.
Key assumptions

- Our results are based on enough assumptions that guarantee the existence of a long-run equilibrium.
  - All the is required is that a country’s intertemporal budget constraint holds, and ...
  - a *balanced-growth* assumption to be satisfied in the limit.
  - Note: no specific assumptions about preferences, but non-satiation.
- Deal with potential issues in structural changes (liberalization).
Data Issues

- In our empirical work we employ two datasets on gross positions: a dataset that we build on a quarterly frequency based on the database of Lane and Milesi-Ferretti [2007].
  - These include capital gains and losses.
  - Hence, they are viewed as best estimates of the *true market value* of these positions.

- We also examine the robustness of our findings using the dataset put together by Gourinchas and Rey [2007a, 2007b]
  - Similar to the dataset we have built in terms of item coverage
  - But referring to a larger period (1952-2004).

- Data on Consumption: Non-durables and Services vs. Total Consumption.
  - Our findings are robust to either measure.
  - NB: The appropriate deflator is used in each case.
Methodology

- As a preliminary step, we test a (weak) implication of the intertemporal budget constraint for the US, that a balanced growth path exists in the limit.
  - This implies that consumption, the stock of gross assets and liabilities are cointegrated with net output.

- We then make use of the long-run restrictions implied by cointegration to identify empirically the permanent and transitory shocks.

- The shocks that move the variables in our systems in either a permanent or a temporary fashion correspond to a variety of structural disturbances hitting the economy at either national or international level.

- However, similar to PV models, our study does not distinguish between US-specific and global shocks — distinction would be crucial in the analysis of SOE.
Cointegration Analysis

- In our analysis \( x_t = [c_t, z_t, a_t, l_t]' \). We first examine whether the log-ratios: \( c_t - z_t\), \( a_t - z_t\) and \( l_t - z_t\) are trend-stationary as assumed in our derivations.
  - In this instance the cointegrating relations are of the form: \( w_t - z_t - \hat{\theta}_w t\), with \( w = c, a, l\).

- Under these cointegrating restrictions, we estimate a VEC Model for \( x_t \) which takes the form

\[
\Gamma(L) \Delta x_t = \delta + \alpha \left( \hat{\beta}', \hat{\theta}_1 \right) \begin{pmatrix} x_{t-1} \\ t - 1 \end{pmatrix} + u_t, \tag{1}
\]

where \( \alpha \equiv (\alpha'_c, \alpha'_z, \alpha'_a, \alpha'_a)' \) is a \((4 \times 3)\) matrix, \( \hat{\beta} \) is the \((4 \times 3)\) matrix of the cointegrating coefficients, \( \hat{\theta}_1 \) are the coefficients of the deterministic trends in the cointegrating space, and \( \Gamma(L) \) is a finite matrix polynomial in the lag operator.
Permanent and Transitory Decomposition

- Cointegration with rank $r = 3$, implies that there is just one permanent shock – common trend as in Stock and Watson [1988]. Then shocks may be distinguished by their degree of persistence (Gonzalo and Granger [1995]; Gonzalo and Ng [2001]; King et al. [1991]; Mellander et al. [1992])
- We find that $\alpha_c = 0$, implying that consumption is mostly driven by a permanent component (in line with Lettau and Ludvigson [2004]).
- The Idea:
  - As cointegration restricts the matrix of long-run multipliers of shocks...
  - we can identify the permanent component/shock...
  - and we identify one (unique) permanent shock $\eta_{1t}^P$.
  - We interpret this as a permanent supply shock.
Main Results (1)

- Transitory shocks are key drivers of the dynamics of foreign borrowing.

- Consistently with key implications of current account theory, we find that virtually all variation in aggregate consumption is dominated by permanent innovations (97%-99% at all horizons).

- In contrast, transitory shocks explain
  - most of the variation in net output over short and medium horizons;
  - most of the variability in gross asset and liabilities positions (more than 70% of their fluctuations over the 40 quarters horizon).
  - or 95% of the current account fluctuations at virtually all horizons ($CA_t^* = \Delta NFA_{t+1}$).
Main results (2)

- Theory: In response to permanent shocks, consumption should jump on impact, and reach its new permanent level either immediately (if the interest rate is constant) or along the optimal path dictated by short-run variations in its intertemporal price.

- Our impulse-response analysis shows that
  - (net) output jumps on impact, but then grows at a contained rate for many quarters, raising to its new long-run level only gradually.
  - US consumption indeed responds to permanent shocks to the system quite swiftly (4 quarters).

- This second result nicely relates to the literature documenting that consumption is excessively smooth vis-à-vis persistent shocks to income (see e.g. Campbell and Deaton [1989]).
Main Results (3)

- In response to positive shocks that raise net output gradually,
  - consumption smoothing implies that the economy runs a current account deficit, which is what we indeed find — although its dynamics is non linear.
  - However, national residents simultaneously increase both their positive and negative external financial positions — in other words, the stocks of US Foreign assets and liabilities move in the same direction.

- This *novel* result — also confirmed in SVAR analyses of shocks to US manufacturing (Corsetti et al. [2008b]) — provides an interesting benchmark for models of international portfolio diversification.
Empirical Findings
Impulse Responses

**Impulse Responses to Permanent Shock**

![Graphs of Net Output, ND&S Consumption, Gross Assets, Gross Liabilities, and Current Account over time.](image)

Corsetti, Konstantinou (EUI, UoM)  US Borrowing: P vs. T Shocks  Boston NASM ES 2009  18 / 23
Main results (4)

- Our measures of assets and liabilities are all valuation-adjusted, i.e. our time series record the estimated market values of bonds, equities and other assets in the US foreign wealth.

- As the process of financial globalization has translated into the accumulation of very large stocks of foreign assets and liabilities, capital gains and losses affecting asset market valuation are arguably playing an increasing role in agents’ intertemporal and portfolio decisions.

- Our study documents that transitory fluctuations in these stocks are highly correlated with transitory fluctuations in the returns on the underlying assets, both variables displaying swings that are quantitatively large and persistent.
Transitory Shocks and Variations in Gross Positions

- Components normalized in such a way that, whenever gross positions are above trend, the transitory components are positive.
Robustness Analysis

- Total vs. ND&S Consumption: Identical Results.

- We have also explored how much our results are influenced by the restriction $\alpha_c = 0$, we have imposed in our analysis:

  1. The permanent shock plays a bigger role in explaining the variation of $a_t$, and hence it accounts for a larger share of the variation of the current account.

  2. IRFs: $c_t$ now adjusts more gradually to its new steady state level, making the nonlinearity in the response of $CA_t$ more apparent: the current account improvement in the first two quarters is larger; the subsequent deficit lasts between the third and the nineteenth quarters after the shock.

- As a last test, we employ the dataset built by Gourinchas and Rey [2007a, 2007b]: Nearly identical results.
Conclusions

- In this paper, we carry out an empirical analysis of the US external balance differentiating between *trend* and *cycle* components in US consumption, net output, gross foreign assets and gross foreign liabilities.
  - We identify permanent and transitory shocks, and analyze the dynamics of the adjustment mechanism.

- **A key finding**: transitory variations in output, gross asset positions and on the current account are quantitatively large over both short and long horizons.
  - transitory shocks contribute to the majority of fluctuations in quarterly gross positions and the current account—well beyond typical business cycle frequencies.
  - **Importantly**, temporary fluctuations in the stocks of valuation-adjusted US foreign assets and liabilities match fluctuations in the rates of returns on these stocks.
Conclusions

- **In line with the IACA**: consumption is ‘insulated’ from the corresponding transitory variations in output and gross asset positions.

  - Consumption is well described by a trend component/its variation is dominated by permanent shocks.
  - Consumption responds swiftly to permanent shocks, adjusting within a year.
    - In response to positive shocks that raise net output gradually towards its new long-run level, the economy thus runs a current account deficit.

- We find that much of the movements in valuation-adjusted gross external positions are of transitory nature, but these movements are quite persistent.

  - So: while transitory build up of assets and liabilities can be expected to revert to trend, the process may take quite some time.