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On the solvency of nations: Cross-country evidence on the dynamics of external adjustment☆

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We test the hypothesis that net foreign asset positions are consistent with external solvency and examine the dynamics of external adjustment using data for 50 countries over the 1970–2006 period. Our analysis adapts Bohn's (2007) error-correction reaction function approach – which tests for a negative long-run relationship between net exports (NX) and net foreign assets (NFA) as a sufficiency condition for the intertemporal budget constraint to hold – to a dynamic panel framework. Pooled Mean Group (PMG) and Mean Group error-correction estimation yield evidence of a statistically significant, negative response of NX to NFA. Moreover, we cannot reject the hypothesis that the response is largely homogeneous across countries. Our sensitivity analysis shows that the countries with relatively weaker fundamentals need to respond more strongly to the changes in NFA to keep their NFAs on a sustainable path.

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1. Introduction

One of the most significant developments in international finance over the past decade was the emergence of large imbalances in current accounts and net foreign asset positions. Fig. 1a and b shows the evolution of these "global imbalances" since 1997. The U.S. current account deficit rose sharply in this period, reaching a record 1.6 percent of world GDP in 2006 (see Fig. 1a), while current account surpluses grew to record levels in Emerging Asia, oil exporting countries, and Japan. In line with these developments, the dispersion of NFA positions widened substantially (see Fig. 1b). The NFA position of the United States declined markedly, while those of Japan, Emerging Asia, and the oil exporting countries rose. Recent economic turmoil has reduced the U.S. current account deficit somewhat, but the nation's large negative NFA position has changed little, and this "stock imbalance" is very likely to persist.

Large and persistent imbalances in the NFA positions of nations pose three central questions that this paper aims to address: First, are the net exports and net foreign asset positions observed in the last few decades consistent with external solvency conditions (e.g., the expected intertemporal budget constraint (IBC) or the no-Ponzi game condition)? Second, if they are, what dynamic pattern of adjustment do net exports and net foreign assets follow in the process to attain external solvency? Third, how does this pattern of adjustment differ depending on country characteristics, such as income levels, institutional quality, leverage levels, trade openness, etc.?

To answer these questions, we implement a dynamic framework for evaluating external solvency based on recent theoretical results derived by Bohn (2007). In particular, we adapt his error-correction reaction function approach to a cross-country dynamic panel environment.

Bohn's Proposition 3 (henceforth, PB3) establishes a sufficiency condition for solvency according to which, if NX and NFA satisfy an error-correction specification of the form $NX_t - \rho NFA_{t-1} = z_t$, and z_t is integrated of order m for some $\rho < 0$ such that $|\rho| \in (0, 1 + r]$, where r is a constant interest rate, then the IBC holds. This proposition implies that we can study the dynamics of external solvency by estimating an error-correction "reaction function" between NX and NFA testing for a negative, statistically significant relationship between the two. Evidence that this reaction function exists indicates that NX reacts in the long run to changes in NFA in such a way that NFA grows slower than what a Ponzi scheme implies. Moreover, the magnitude of ρ drives the speed of the adjustment process by which trade surpluses or deficits adjust to larger or smaller NFA positions, and it becomes a key determinant of the long-run average of NFA.

The rationale for following this reaction function approach is that, as Bohn's Proposition 1 (henceforth, PB1) shows, all what is required for the IBC to hold is that the NFA series be integrated of order m for any finite $m \geq 0$. Thus, testing for solvency per se is not very interesting, because it is very unlikely that NFA (just like any other macroeconomic time series) is not integrated of low order. Hence, shedding light on the characteristics of the adjustment process that sustains solvency is a more important task, and for this purpose Bohn proposed the reaction function approach behind PB3.

In this paper, we use the reaction function approach to study the predictions of the data as to the nature of the dynamic process by which solvency is expected to be attained. To do so, we conduct panel error-correction estimation of a model of the NFA–GDP ratio (*nfa*) and the NX–GDP ratio (*nx*), using a panel dataset covering 50 countries for the period 1970–2006. We estimate Pesaran et al. (1999) Pooled Mean Group (PMG) and Mean Group (MG) estimators, and find evidence in favor of the homogeneity conditions of the former vis-à-vis the latter. PMG models the dynamic *nx* and *nfa* relationship as a long-run reaction function common to all countries in the sample, with homogeneity tests to validate this assumption (against the alternative MG estimator that uses country-specific long-run relationships). Despite this homogeneity restriction, PMG still allows for country-specific short-run deviations from the long-run relationship.

The PMG results show that there is a statistically significant error-correction relation between *nx* and *nfa* both for the full sample of countries and for sub-samples separating emerging from industrial countries, and creditor from debtor countries. The systematic long-run component of *nx* responds negatively to movements in *nfa*, in line with Bohn's PB3, and homogeneity tests cannot reject the hypothesis that this response coefficient is similar across countries (vs. the null of country-specific response coefficients produced by MG estimation).