Journal of International Economics 94 (2014) 18–32

Contents lists available at ScienceDirect

Journal of International Economics

journal homepage: www.elsevier.com/locate/jie

# External liabilities and crises ☆

Luis A.V. Catão [a], Gian Maria Milesi-Ferretti [a,b,*]

[a] IMF, United States
[b] CEPR, United Kingdom

ARTICLE INFO

*Article history:*
Received 5 September 2013
Received in revised form 23 April 2014
Accepted 14 May 2014
Available online 12 June 2014

*JEL classification:*
E44
F32
F34
G15
H63

*Keywords:*
International investment positions
Sovereign debt
Currency crises
Current account imbalances
Foreign exchange reserves

ABSTRACT

We examine the determinants of external crises, focusing on the role of foreign liabilities and their composition. Using a variety of statistical tools and comprehensive data spanning 1970–2011, we find that the ratio of net foreign liabilities to GDP is a significant crisis predictor. This is primarily due to the net position in debt instruments—the effect of net equity liabilities is weaker and net FDI liabilities seem, if anything, an offset factor. We also find that: i) breaking down net external debt into its gross asset and liability counterparts does not add significant explanatory power to crisis prediction; ii) the current account is a powerful predictor; iii) foreign exchange reserves reduce the likelihood of crisis more than other foreign asset holdings; and iv) a parsimonious probit containing those and a handful of other variables has good predictive performance in- and out-of-sample. The latter result stems largely from our focus on external crises sensu stricto.



## 1. Introduction

Large current account imbalances over the past decade have given rise to sizeable cross-country differences in net foreign asset (NFA) positions, as documented by the extensive literature on global imbalances. While the global financial crisis was not associated with a "disorderly unwinding" of these imbalances, the potential role of high external liabilities in triggering crises was underscored by recent developments in the euro area: four countries at the epicenter of financial turmoil (Greece, Ireland, Portugal, and Spain) had NFA/GDP ratios between −70% (Ireland) and −90% (Portugal) at the onset of the crisis at end-2008. And a broader look at advanced and emerging economies with net foreign liabilities above 70% of GDP at the end of 2007 shows the high incidence of countries that have subsequently faced an external crisis (Fig. 1, dark bars).

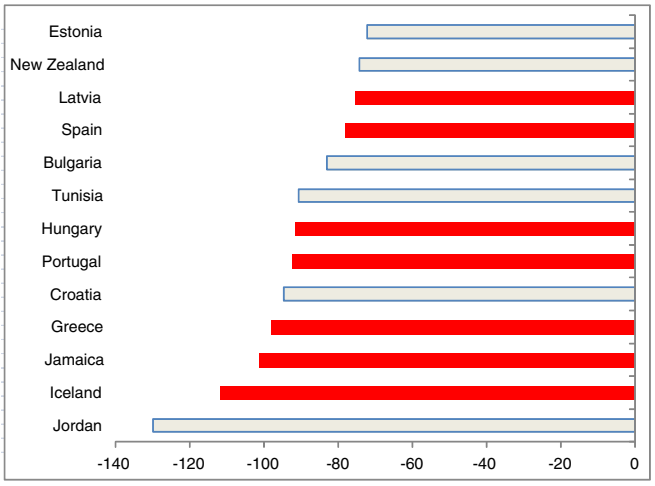
Against this background, we study whether the level and composition of NFA matter for crisis risk. Using an updated version of the Lane and Milesi-Ferretti (2007) dataset spanning the period 1970–2011 we break down NFA into net debt, net portfolio equity, and net foreign direct investment (FDI), as well as between reserve and non-reserve assets, and examine the impact of each of these components on crisis risk. We also consider a similar breakdown of gross positions (see Shin, 2012). Distinguishing these components of a country's external balance allows us to test whether countries with high debt liabilities are more vulnerable to external crises than those with non-debt liabilities, particularly FDI, and whether gross vs. net positions is the more relevant metric.

We focus strictly on external crises, defined to include external defaults and rescheduling events as well as recourse to sizable multilateral financial support in the form of programs with the International Monetary Fund (IMF). The vast literature on prediction models of "crises" (early warning systems—EWS) has considered on several definitions of crises, including currency crises (e.g. Frankel and Rose, 1996;

☆ We thank our discussants Andrei Levchenko, Cédric Tille, and Alessandro Turrini, as well as Olivier Blanchard, Aitor Erce, Graciela Kaminsky, Philip Lane, Jay Shambaugh, Alan Taylor, Thierry Tressel, and two anonymous referees for the extensive and insightful comments on earlier versions. We also greatly benefitted from comments by the seminar participants at the George Washington University, the Fundação Getulio Vargas, IMF, the NBER-IFM meetings, the Latin America and Caribbean Economic Association (LACEA), and the Swiss National Bank, and are particularly thankful to Alan Taylor for suggesting that we use the ROC approach and to Marola Castillo for the excellent research assistance. The views expressed in this paper are those of the authors and do not necessarily represent those of the IMF or IMF policy.

* Corresponding author at: IMF, Research Department, 700 19th Street NW, Washington, DC 20431.
*E-mail addresses:* lcatao@imf.org (L.A.V. Catão), gmilesiferretti@imf.org (G.M. Milesi-Ferretti).

http://dx.doi.org/10.1016/j.jinteco.2014.05.003
0022-1996/




Source: Lane and Milesi-Ferretti, External Wealth of Nations Database

**Fig. 1.** Net foreign assets of selected countries, 2007 (percent of GDP).

Kaminsky and Reinhart, 1999; Berg and Pattillo, 1999); banking crises (e.g. Caprio and Klingebiel, 1996; Laeven and Valencia, 2012); sovereign crises (e.g. McFadden et al, 1985; Kraay and Nehru, 2006; Manasse and Roubini, 2009); and sudden stops/current account reversals (e.g. Milesi-Ferretti and Razin, 2000; Calvo et al., 2004). These crises are sometimes correlated, as shown, for example, in the twin crisis literature (e.g. Kaminsky and Reinhart, 1999), but this is not always the case—indeed, the proximate causes of each type of crisis may be different a priori. While our study focuses primarily on external crises as defined above, we also examine their correlation with currency and sovereign crises and the extent to which NFA and its composition help explain their occurrence.

We also seek to identify thresholds beyond which a further build-up of net external liabilities sharply raises the risk of external crises. We measure the significance of this threshold relative to absolute (cross-country) levels, as well as to country-specific levels, using a treatment effect model with country and time effects. In addition, and unlike previous studies, we use multivariate information to identify such thresholds in a probit. Establishing whether external liabilities beyond certain levels appear to be particularly risky is an important question for fiscal policy, financial stability, and macro-prudential supervision.

Finally, we investigate how an econometric model featuring these variables as well as a few other controls performs at predicting external crises, both in- and out-of-sample, focusing in particular on the predictive accuracy over the recent crisis. Critics of previous work on EWS pointed at their failure in predicting out of sample. We thus examine whether this criticism applies to a more focused definition of external crises – comprising debt defaults and major external lending from the IMF, along the lines of McFadden et al (1985), Kraay and Nehru (2006), and Manasse and Roubini (2009) – and to a model featuring disaggregated NFA components and other controls not featured in earlier studies.

The main findings are as follows. First, higher net foreign liabilities (NFL) increase the risk of external crises even after controlling for a wide range of other factors. In particular, crisis risk increases sharply as NFL exceeds 50% of GDP and whenever the NFL/GDP ratio rises some 20 percentage points above the country-specific historical mean. Second, external crisis risk rises as the composition of NFL is tilted toward net debt liabilities. The effects of net portfolio equity liabilities are weaker, whereas higher FDI liabilities tend, if anything, to reduce crisis risk. Third, current account deficits have a higher predictive power than any other individual regressor in most specifications. This predictive power is higher for unconditional levels of the current account relative to deviations from a model-based "norm" using standard specifications of the latter. Fourth, higher foreign exchange reserves reduce external crisis risk by more than other asset holdings, in line with the results of Obstfeld et al. (2010) on the rationale for holding reserves as a precautionary/crisis prevention device. Finally, a multivariate but reasonably parsimonious probit model including all these controls has substantial predictive power, in and out of sample—particularly regarding the 2008–2011 crises. Also importantly, we find that many other variables featured in the previous literature on explaining different types of crises do not add significant explanatory and predictive power.

These results speak to a large body of work on crisis early warning, current account and external debt sustainability, and sovereign risk. Main precursors of our empirical approach are the studies on early warning systems (EWS) which have sought to identify macroeconomic indicators that help predict currency crises (Frankel and Rose, 1996; Eichengreen et al., 1996; Kaminsky et al., 1998; Kaminsky and Reinhart, 1999). These studies have singled out leading indicators including the current account, foreign change reserves, and real exchange "gaps" alongside with a few domestic variables. Yet, disparate definitions of currency crises and sample selection criteria as well as weak predictive performance have also been widely recognized as Achilles heels of this literature (e.g., Berg and Pattillo, 1999; Abiad, 2003; Edison, 2003). Recent studies have examined whether those early warning indicators help predict countries' relative performance in the 2008–09 global financial crisis. Using a broad crisis definition encompassing large drops in real GDP growth, in the stock market, in the exchange rate, and in sovereign risk indicators, Rose and Spiegel (2009, 2011) are unable to identify variables that consistently explain the cross-country incidence and severity of the crisis. Obstfeld et al. (2009, 2010) find that the ratio of reserves to M2 (relative to their model's estimates of demand for reserves) is a useful predictor of currency depreciation; yet, the effect varies considerably across samples and the *unconditional* level of reserves/M2 does not fare as well. Using a crisis definition similar to Rose and Spiegel – but including resort to IMF financing and a slightly longer data sample – Frankel and Saravelos (2012) find that external debt, the current account, and credit growth have some predictive power, but the *unconditional* ratio of reserves to GDP or to external debt, as well as real exchange rate "gaps" are by far the most robust predictor. In contrast, Blanchard et al. (2009) find that pre-crisis reserve accumulation is not a strong predictor of growth 'surprises' during the crisis.

Relative to these strands of literature, the main contributions of this paper are threefold. One is the use of level and composition of NFA, in addition to standard controls. The second is the use of data for both advanced and emerging markets for the period 1970–2011. Inter alia, this allows us to gauge whether previous results primarily reflect the influence of the external crisis events of the 1980s–1990s and probe the model's out-of-sample predictive performance over the post-2007 events. Finally, the paper focuses on external crises "sensu stricto". As shown below, the latter are positively but not tightly correlated with currency crises. A clear distinction between these types of crises, coupled with a wider set of controls and a longer time series, allows us to gauge the extent to which the poorer out of sample performance of earlier models was due to the choice of the dependent variable or of independent variables.

This paper is also related to a sizeable literature on external sustainability and the risk of sudden stops (Calvo, 1998; Milesi-Ferretti and Razin, 2000; Calvo et al., 2004; Edwards, 2004; Kraay and Nehru, 2006; Aguiar and Gopinath, 2006; Pistelli et. al., 2008; Gourinchas and Obstfeld, 2012; Jordá et al., 2011). A main distinction with Kraay and Nehru (2006), Pistelli et al. (2008), and Manasse and Roubini (2009) is that we include advanced economies alongside emerging markets. In relation to the work on external sustainability and sudden stops,