The nonlinear nature of country risk

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Abstract

In the paper we focus on the nonlinear relationship between the risk premium and the NFA position of a country. We see two important contributions, one for policy and one for modeling. Both are not offered by linear models. First, from the policy perspective our estimates help to determine the regions where an economy risks falling into a self fulfilling debt trap. From the modeling perspective, we offer a ready-to-use calibration of the risk premium - NFA relationship that can be applied in DSGE models. We show that adjusting the usually applied calibration to the one offered in our paper has the potential to substantially affect the model dynamics. From this perspective our results could also be considered as motivation to provide a structural derivation of this link in the DSGE literature. Our results could then serve as a check whether the derived link is in line with empirics.

We collect annual data for 40 advanced and emerging economies. Our panel extends from 1991 to 2014, is however unbalanced due to limited availability of data on long-term interest rates. The dependent variable is defined as the difference between a country's long-term ineterest rate and the rate for United States and in most cases represents the yield on 10-year government bonds. For a few countries, where 10-year bonds were missing we approximate the spread using 5-year bonds. As the control variables we use several macroeconomic variables, which may potentially affect the risk premium: the general government debt, inflation differential and exchange rate volatility. We estimate the parameters of a dynamic panel with instrumental variables to account for potential endogeneity. First we test the general non-linearity as proposed by Gonzales, Terasvirta and van Dijk (2005). While the linear relationship between risk premium and NFA position has been strongly rejected we estimate the non-linear smooth transition regression (STR) model with the logistic transition function, as preferred by the data.

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We found the non-linear relationship between NFA position and county's risk premium. We identify the level at which strongest nonlinearities kick in at approximately -70% NFA/GDP ratio. At this level of foreign debt risk premia begins to increase very rapidly - the semi-elaticity of spreads with respect to NFA increases almost tenfold. We also found that the risk premia is negatively affected by the level of the government debt and positively by exchange rate volatility. It depends also on inflation differential and GDP per capita. The results are robust to the choice of the estimation method and the dynamic specification of the panel.

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