ELSEVIER

Explaining currency crises: a duration model approach

Merxe Tudela [*]

Macro Prudential Risks, HO-3, Bank of England, Threadneedle Street, London WC2R 8AH, UK

Abstract

In this paper we estimate a duration model for OECD countries during the 1970–97 period. We use semiparametric methods to estimate a model with unrestricted base-line hazards and test if the time length already spent on a tranquil period is a determinant of the probability of exit into a currency crisis state. The results indicate, first, that increases in export growth, bank deposits growth and openness decrease the probability of exit into a currency crises state. Whereas, increases in import growth, claims on government and foreign portfolio investment, and appreciated REER, increase the probability of currency crises. And, second, the existence of a highly significant negative duration dependence. The highest probability of exit into a currency crash state is given at the initial of the tranquil period.
© 2004 Elsevier Ltd. All rights reserved.

1. Introduction

In this paper we seek to explain the origins of currency crises for a group of developed countries. Specifically, we attempt to illustrate the mechanism that generates currency crises by relating their occurrence first, to realizations of explanatory variables and, second, to the duration pattern of the non-crisis periods.

For 20 OECD countries we construct a data set for the period 1970–97, consisting of 81 tranquility spells. These spells are defined as those episodes for which a particular currency does not suffer from a speculative attack; we call these episodes

[*] Fax: +44-20-7601-4947.
   E-mail address: merxe.tudela@bankofengland.co.uk (M. Tudela).

tranquil periods. We define a crisis state as a period characterised by the presence of a speculative attack, either successful or not. The definition of a speculative attack is based on an exchange market pressure (*EMP*) index (defined in Section 3) of the type of Eichengreen et al. (1996b). If the value of the *EMP* index is above a certain threshold, we define that period as a crisis state; otherwise the period is defined as a tranquil state.

We use duration analysis to study the countries' probability to leave a tranquil state by exiting into a currency crisis state. The use of duration models is an innovative strategy for estimating the probability of exiting a currency peg. This method allows us not only to study the determinants of the likelihood of a currency crash, but also the duration of spells of tranquility, how much this varies over the business cycle, and how the duration of tranquil states varies across countries.[1] The duration of the spells of tranquility is important in assessing currency stability. Exchange rate credibility depends not only on the reaction to a speculative attack, but also on the time already spent in a tranquil episode.

Duration models allow us to test for the length of time already spent on the spell as a determinant of the likelihood of exit into a turbulent episode. The specific pattern of the duration dependence lets us test if the likelihood of a devaluation is higher for tranquil periods, say, in the first quarters, than for periods that have lasted longer, after controlling for other time-varying factors.

Klein and Marion (1997) suggest that, even if some of the determinants for the duration of a fixed exchange-rate spell may remain constant over a spell, others will change. A simple correlation of the length of each spell with some constant measure of each explanatory variable fails to capture important information about the time path of the variable during the spell. Therefore, they call for an empirical approach that allows the consideration of time-varying determinants, rejecting explicitly the use of ordinary least squares or duration analysis. They use logit models instead. Nevertheless, in this paper we propose more sophisticated duration models with the added feature of time-varying variables, so we do not miss the explanatory power of time-varying determinants and, moreover, incorporate duration dependence.

The remainder of the paper is organized as follows. Section 2 concentrates on methodological issues. Section 3 depicts the measure of speculative pressure. We describe the data in Section 4. In Section 5 we present the main results, and Section 6 concludes.

2. Methodological issues

In analyzing the process of transition from a tranquil state to a crisis state, we define a tranquil state as a period of time in which there is no pressure on the currency. A crisis state is defined as a period characterised by the presence of a speculative attack, whether this is successful or not.

---

[1] These are the classical questions that Kiefer (1988) raised in his seminal paper on duration methods applied to unemployment data.