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The Feldstein–Horioka puzzle: A panel smooth transition regression approach

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Abstract

This paper proposes an original framework to determine the relative influence of five factors on the Feldstein and Horioka result of OECD countries with a strong saving–investment association. Based on panel threshold regression models, we establish country-specific and time-specific saving retention coefficients for 24 OECD countries over the period 1960–2000. These coefficients are assumed to change smoothly, as a function of five threshold variables, considered as the most important in the literature devoted to the Feldstein and Horioka puzzle. The results show that; degree of openness, country size and current account to GDP ratios have the greatest influence on the investment–saving relationship.

JEL classification: C23; F21; F32

Keywords: Feldstein Horioka puzzle; Panel smooth threshold regression models; Saving–investment association; Capital mobility

1. Introduction

In their seminal article, Feldstein and Horioka (1980) provide evidence of a high correlation between domestic saving and domestic investment rates for OECD countries. This robust finding of positive saving–investment correlations has launched a debate regarding the degree of financial integration and openness within the industrialised world.

In this paper, we investigate the potential threshold effects in the relationship between national saving and domestic investment rates. The baseline idea is very simple: common knowledge that international mobility of capital depends on other exogenous variables (trade openness, country size, demography, etc.) clearly matches the definition of a threshold regression model: "threshold regression models specify that individual observations can be divided into classes based on the value of an observable variable" (Hansen, 1999, page 346). Thus, we propose to test the relevance of breaking down the Feldstein and Horioka (FH thereafter) regression parameters (or saving-retention coefficients) into classes given the values of five main factors generally quoted in this literature: (i) economic growth, (ii) demography, in particular dependency ratios, (iii) degree of openness, (iv) country size and (v) current account balance.

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In a panel data context, the simplest way to introduce threshold effects consists in using a Panel Threshold Regression (PTR) Model proposed by Hansen (1999). This model assumes a transition from one regime to another depending on the value of a threshold variable (the trade openness for instance). In a model with two regimes, if the threshold variable is below a given value, called the threshold parameter, the domestic investment is defined by one equation (with a particular value of the saving-retention coefficient), while it is defined by another equation (with another saving-retention coefficient) if the threshold variable exceeds this threshold parameter. This model has been used by Ho (2003) to empirically re-evaluate the country-size argument for the FH puzzle. In his approach, country-size is modelled as the threshold variable, so that the saving-retention coefficients are then distinguished by differing country-size regimes. However, one of the main drawbacks of this PTR model is that it allows only for a small number of classes, i.e. of saving-retention coefficients. This implicit assumption may be suitable for the country-size effect since generally the economist only distinguishes between "small" and "big" countries depending on the value of their GDP (Murphy, 1984). On the contrary, the influence of growth or trade openness on the magnitude of the saving-retention coefficient may be more subtle.

The alternative solution adopted in this paper consists in using a Panel Smooth Threshold Regression (PSTR) model recently developed by González et al. (2005) and Fok et al. (2004). Two interpretations of these models are possible. On the one hand the PSTR can be thought of as a regime-switching model that allows for a small number of extreme regimes (saving-retention coefficients) associated with the extreme value of a transition function and where the transition from one regime to another is smooth. On the other hand, the PSTR model can be used to allow for a "continuum" of regimes (saving-retention coefficients), each one being characterised by a different value of the transition variable. The logic is then similar to that developed in the standard univariate time series STAR.

Our approach has two main advantages. First, based on PSTR specifications, we derive saving-retention coefficients, which vary not only between countries but also with time. Thus, our work provides a simple parametric approach to capture both cross-country heterogeneity and time variability of the saving–investment correlations. Second, our approach allows for smooth changes in country-specific correlations depending on a threshold variable. Consequently, we consider the five potential threshold variables previously mentioned as potential explanations of the cross-country heterogeneity and/or the time variability of saving-retention coefficients for OECD countries and we then compare the corresponding estimated FH parameters. This comparative dimension of our approach is particularly important since studies on the saving–investment relationship have been conducted along a number of divergent methodological approaches and have come to varying conclusions regarding the interpretation of findings. For instance, Taylor (1994) found no correlation between domestic investment share in GDP and ratio of domestic saving to GDP, when controlling the FH cross-section regression for relative domestic prices, age pyramid and interaction between dependency and growth rates. Using a 17 OECD countries sample, Murphy (1984) obtained significantly different saving-retention coefficients depending on country size.[1] Nevertheless, no one has ever assessed the relative influence of each of these variables on saving–investment correlations. On the contrary, our panel threshold regression framework allows establishing a "ranking" for the most frequently quoted explicative factors.

The rest of the paper is organised as follows. In the next section, we discuss the threshold specification of FH regression and particularly, the cross-country heterogeneity and the time variability of saving retention coefficients. The choice of the threshold variable, linearity tests and estimates for the parameters are then presented in a third section. The fourth part of the paper is given over to the results of the linearity tests and the estimates obtained from various panel threshold models. Finally, based on these PSTR estimates, we calculate the individual FH parameters and discuss the relative influence of the various threshold variables. The last section concludes.

2. The Feldstein–Horioka puzzle: Toward a threshold specification

The basis of our empirical approach is exactly the same as that used by many authors since the seminal paper of Feldstein and Horioka (1980). It consists of evaluating the mobility of capital for a panel of N countries. The corresponding model is then defined as follows:

$$I_{it} = \alpha_i + \beta S_{it} + \varepsilon_{it} \tag{1}$$

[1] These diverging coefficients have also been found by Feldstein and Horioka (1980), and then confirmed by Tesar (1991), Baxter and Crucini (1993), Obstfeld (1995), Coakley et al. (1998) and Ho (2003).