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Structural breaks in public finances in Central and Eastern European countries

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ABSTRACT

This article studies the evolution of quarterly government Total Deficit (TD) to Gross Domestic Product (GDP) and debt to GDP ratios of seven Central and Eastern European member states (CEEC-7) of the European Union over the period 2000 Q1 to 2011 Q2. Alternative unit root tests are applied to identify the number and date(s) of structural break(s) in the fiscal ratios. The breakpoint date(s) are estimated endogenously. The best performing unit root test is determined by the adjusted R-squared metric. The level and trend of fiscal ratios are estimated by using breaking trend regression models. Unit root tests performed for the period 2000 Q1 to 2007 Q4 identify the number and date(s) of structural break(s) in fiscal variables before the global economic crisis. Unit root tests and breaking trend regressions are estimated for total Eurozone TD to GDP and debt to GDP to compare the evolution of total Eurozone fiscal ratios with those of each CEEC-7.

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1. Introduction

After the political and economic changes that started in 1989, the 'Central and Eastern European Countries' (CEECs) have exhibited a catch-up process to the developed Western European countries. During this process, ten CEECs have joined the European Union (EU).[1] Moreover, three CEECs have adopted the common currency: Slovenia, Slovakia and Estonia. The other seven EU member CEECs

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[1] Bulgaria, the Czech Republic, Estonia, Hungary, Latvia, Lithuania, Poland, Romania, Slovakia and Slovenia.

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(CEEC-7, henceforth) are committed by the 'Treaty on the Functioning of the European Union' (Treaty, henceforth) to join the European Monetary Union (EMU).[2]

This article was motivated, at least, by the following two reasons. First, several previous works emphasised the importance of a prudent and sustainable fiscal policy during the EMU convergence process.[3] Second, the 2008 subprime mortgage crisis of the United States and the subsequent global financial and economic crises influenced the fiscal position of CEECs negatively, affecting their future EMU accession possibilities.[4]

The objectives of this article are: (a) to identify structural breaks in government Total Deficit (TD) to Gross Domestic Product (GDP) and government debt to GDP ratios for the CEEC-7 states over the 2000 Q1 to 2011 Q2 period; (b) to study the evolution of these fiscal variables, considering structural changes in their level and trend over the sample period.

Previous works on the fiscal convergence process of the CEECs have employed models incorporating only one structural break (e.g. Kočenda et al., 2008; Hanousek and Kočenda, 2010). We consider unit root tests without structural breaks, with one structural break and with two structural breaks, and select the best performing model to determine the number and date(s) of structural break(s) in fiscal variables. Moreover, we use breaking trend regression models, which estimate the level and trend of fiscal ratios, for the periods before and after the breakpoint date(s).

Compared to previous studies, the data set covers an extended time period and additional CEECs. By considering data series until 2011 Q2, we study the evolution of fiscal variables before and after the beginning of the global economic meltdown of 2008. We provide a context for the results by stating international circumstances and specific policies and measures in individual countries from 2000 Q1 until 2011 Q2.

We also perform the following robustness analysis: (a) we extend the two-structural break model of L Lee and Strazicich, 2003 (LS hereafter) by including a third breakpoint to validate the methodology considering up to two breakpoints; (b) we estimate the unit root tests for the period before 2008 to see if there is more than one structural change before the crisis; (c) we estimate all unit root tests and the breaking trend regression model for the total EMU17[5] and compare the results with those for the CEEC-7s.

The remaining part of this article is organised as follows. The fiscal data set is presented in Section 2. The econometric models are summarised in Section 3. In Section 4, the empirical results are reviewed, and a robustness analysis is presented in Section 5. Finally, a summary and conclusions are given in Section 6.

2. Fiscal data set

Quarterly fiscal data were obtained from the Eurostat Statistics Database of the European Commission (henceforth Eurostat).[6] We collected data for each CEEC-7 and also for the total EMU17. The data set includes government TD to GDP and government debt to GDP over the period 2000 Q1 to 2011 Q2. The TD to GDP time series exhibit unstable behaviour. Therefore, we use the Holt–Winters exponential smoothing technique (Holt, 1959; Winters, 1960) to remove part of the noise from this variable. The evolution of the smoothed TD to GDP time series and the debt to GDP ratio are presented in Figs. 1 and 2 for each CEEC-7 and total EMU17, respectively. Some descriptive statistics for TD to GDP and debt to GDP are presented in Table 1. We use the mathematical notation, y_t, for both fiscal ratios in the remaining part of this article.

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[2] The Treaty is available at: http://eur-lex.europa.eu (accessed 3 January 2012).

[3] See Buiter (2004), Afonso et al. (2005), Brücker et al. (2005), De Grauwe and Schnabl (2005), Kattai and Lewis (2005), Kočenda et al. (2005), Koukouritakis and Michelis (2005), Kutan (2006), Berger et al. (2007), Hallett and Lewis (2007), Mikek (2008), Salsecci and Pesce (2008), and Staehr (2008).

[4] See Lewis (2010) and Staehr (2010).

[5] EMU17 represents the 17 member states of the EMU in 2011.

[6] The data set has been downloaded from the following website: http://epp.eurostat.ec.europa.eu/portal/page/portal/statistics/search_database (accessed 3 January 2012).

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