

A CGE model for the Spanish electricity sector: Testing some possible change scenarios

Topic: CGE & energy-economy

Author: Raquel Langarita

Co-Authors: Geoffrey J.D. HEWINGS, Julio SÃ¡nchez ChÃ¡liz, Rosa DUARTE

While Spanish external energy dependence is high, in terms of electricity, Spain is not so dependent. However, given the importance of the electricity for the functioning of any economy as well as concerns about the energy dependence, in the Spanish electricity system there exist some critical issues, such as the low competition among the firms in this sector, the tariff deficit or several changes in the legal framework. In combination, analysts have shown that they have resulted in high prices of electricity, higher than the average of the European Union. In addition, another important characteristic of the electricity sector in Spain is that imports and exports are really low. In this paper, we develop a static computable general equilibrium (CGE) model for Spain for 2013. The model has 72 productive sectors, ten of which are energy sectors, three consumers and two productive factors, labor and capital. Using a nested production function that characterizes the current structure of the electricity sector in Spain, we also distinguish between electricity and non-electric energy. The electricity sector is divided into generation, transmission, distribution, commercialization and related activities, with the generation activity further disaggregated into wind, nuclear, conventional thermal, solar and other types and hydropower. The non-electric energy is also divided into gas and coke and petroleum. On the demand side, we also distinguish between energy and non-energy goods, as well as energy for households, for transport and electricity. The CGE model is calibrated on a previously developed social accounting matrix (SAM) with this detailed disaggregation for Spain for 2013.

Several scenarios are developed to explore some of the challenges: (1) increasing the integration with the European network to increase the competition among electricity utilities; (2) increasing of the use of renewable energy sources, while decreasing the use of brown energy sources; (3) increasing the competitiveness of the Spanish electricity sector. Preliminary results suggest that the electricity subsectors are heterogeneous because not all the sectors are affected in the same way nor in the same sense. Preliminary results also suggest that there exists a great interaction between imports and exports and total production; they three change in the same direction for almost all the cases. In the three scenarios planned, the welfare of the representative agent increases, which could be explained because, except for the electricity generation from nuclear, the price paid by the final consumer decreases.