Executive Summary

This paper focuses on the role of energy policy aimed at boosting deployment of renewable energy sources (RES). Possible energy policy measures, carbon tax and RES price subsidy, are simulated in the E.U.15 group of countries, the United States (U.S.) and China at a time of technological shocks. We model the RES and fossil fuels sectors in a dynamic stochastic general equilibrium (DSGE) model, using Bayesian techniques for the three economies considered. The inferential procedure adopted is based on Markov Chain Monte Carlo (MCMC) methods, which are able to estimate the model parameters and the dynamics of some relevant variables (i.e., fossil fuels and RES prices).

In addition, we simulate a path for fossil fuel and RES prices and the corresponding grid parity between them. Hence, we are able to show which country will likely first reach a RES price lower than a fossil fuels price and when this phenomenon will occur.

Our findings show that, in the presence of a total factor productivity shock in fossil fuels (RES), the energy policy involving a carbon tax and a RES subsidy smooths the reduction (or increase) of RES in the energy market. Thus, the implementation of the proposed policy mix represents a kind of automatic stabilizer to the cyclic fluctuations generated by the supply shocks. A shock in RES, instead, produces a higher RES growth in the E.U.15 than in the U.S. and China, confirming the validity of the favorable policy attitude towards RES in the E.U.15.

Further, our simulation results over the period 1987-2044 reveal that monetary subsidy to RES producers has different effects for RES long-run development. In particular, in the countries considered, there is a faster RES cost reduction in the E.U.15 compared with China and the U.S., and therefore grid parity is achieved earlier in the E.U.15. There are several possible explanations for our findings. First, the EU has heavily invested in alternative energy sources ever since the oil crisis of the early 1970s, building global leadership in RES with its ambitious policies. This has not occurred in China and US. The Chinese government has supported the RES sector since 1980s, but only from the late 1990s has there been a shift to industrialization and development of RES. The U.S. has

experienced a ‘stagnation era’ that lasted until around 1997, caused by several factor such as the cutting of federal and state incentives and lower natural gas prices. The situation changed after 1997, with the implementation of new energy policies. Second, the E.U.15 has a complex set of support regimes for RES: each member country has different RES potential and operates different support schemes at domestic level, and the E.U.15 coordinate national efforts to reach the overall E.U. RES target. In China and the U.S., RES policies have suffered from inconsistency as incentives have been repeatedly enacted for short periods of time and then suspended. Third, as a region, the E.U.15 accounted for the largest proportion of aggregate capital raised by RES infrastructure funds in 2014. The group is adapting its grid capacity to the growth of electricity production capacity, thus attracting RES investments.

An important policy implication arises from our findings: that is, a sluggish response to the economic growth of a country can signal the need for subsidies. These can have the form of a price decrease but other policy options would be tax relief, interest free loans or relaxation of regulatory burdens. Subsidies in this case can act as a positive externality, playing a transitional role in further revitalizing a weak or decaying economic environment by providing actors with tools to increase their productivity. Thus, policy might see actors subsidized up to a threshold that enables them to recoup sunk costs to the extent that the system is not completely distorted, as artificial pricing can lead to chronic waste of money and goods.