Economy-wide rebound effects from an increase in efficiency in the use of energy: the Italian case

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The International Energy Agency (IEA, 2009) suggests the importance of efficiency improvement to reduce energy use and, within the European Union, one of the targets for member states is to reduce energy consumption by 20% through increased energy efficiency (European Commission, 2009). Energy efficiency improvement has the unquestionable benefits to reduce the price of energy services. However, it is still under debate the extent to which, improvement in the productivity of energy, is effective in terms of reducing the consumption of energy and thus the associated negative externalities (e.g., carbon dioxide emissions, CO_2, see e.g. Allan et al, (2007) and Turner (2009)). Thus policy makers are particularly interested to determine the size of the energy rebound effect.

In this paper we attempt to quantify the magnitude of the general equilibrium rebound effects from an increase in energy efficiency in the industrial use of energy in Italy. To this end, we use a large scale numerical dynamic general equilibrium model calibrated using the Italian Social Accounting Matrix for the year 2006.

A number of authors have examined the impacts of increased energy efficiency within the demand and the production side of the economy using CGE models (Semboja, 1994; Grepperud and Rasmussen, 2004; Glomsrød and Taojuan, 2005; Hanley et al, 2006 and 2009; Allan et al, 2007; Turner, 2009). For instance, the works of Allan et al, (2007) and Turner (2009) for the UK, and Anson and Turner (2009) and Hanley et al, (2006; 2009) for Scotland evaluate the impact of an increase in energy efficiency in the industrial use of energy. From this literature, rebound effects are the more common finding.

While there is an increasing interest in US and UK to identify and quantify the rebound effects, it seems there is still a little interest in the rest of Europe and especially in Italy. To the best of our knowledge, do not exist in the energy economic literature estimates of energy rebound related to Italy. We then propose to fill the gap and take Italy as a case study. We believe it would be useful to compare rebound estimates with those of the existing literature. Furthermore the estimation of the rebound would eventually provide a useful indicator to policymakers that are compelled to reduce carbon emission and transform the Country in a highly energy-efficient, low-carbon economy through policy aimed to increase energy efficiency (European Commission, 2009).