Environmental targets and fiscal policies for sustainable growth: a general multisectoralÂ approach

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Author: Stefano Deriu
Co-Authors: Claudio SOCCI, Rosita PRETAROLI, Francesca SEVERINI, Giancarlo Infantino, Silvia DAndrea, Ludovica Almonti

As a member of the European Union (EU), Italy is obligated to adhere to the binding targets established by the EU Effort Sharing Regulation, which aims to reduce the total amount of greenhouse gas emissions by 55% by the year 2030 and to achieve net zero emissions by the year 2050. The Italian-specific commitment entails a reduction of greenhouse gases from designated sectors, including road transport, buildings, agriculture, waste management, and non-energy industries. In this regard, the National Recovery and Resilience Programme (NRRP) and the Integrated National Energy and Climate Plan (PNIEC) have been devised to implement comprehensive structural and sectoral reforms and investments, with the objective of attaining these targets by the year 2030. Despite the notable advancements in terms of reducing greenhouse gas emissions, additional measures are essential to achieve the established targets by the year 2030.
Indeed, the processes of energy and climate transition represent a significant challenge, for which substantial investment will be required, thereby generating considerable tax impacts. The transition will entail a substantial shift in employment between production sectors, and the government will be charged with the implementation of policies to facilitate this structural transformation and protect vulnerable households. In this context, the selection of the most appropriate environmental policy instrument or set of instruments requires an ex-ante assessment of the potential disaggregated economic and environmental impacts of each proposal.
The development of multisectoral general equilibrium models based on national accounts is of particular relevance in this regard, as they are capable of delineating the functioning of economic systems in both aggregated and disaggregated terms. Consequently, they ensure the accurate identification of the transmission mechanisms of policy measures. Dynamic Computable General Equilibrium (DyCGE) models calibrated on Social Accounting Matrices (SAM) are widely applied to inform policy maker decision-making processes across various domains. These models can be extended to evaluate the effectiveness of environmental policies, as they facilitate the incorporation of interactions between environmental and economic variables.
The purpose of this paper is to propose a dynamic extension of the Multisector Applied Computable General Equilibrium Model for Italy (MACGEM-IT) to include the environmental module. The objective of this extension is to provide policymakers with an analytical instrument capable of evaluating the economic and environmental disaggregated direct, indirect and induced impacts of policy measures on the circular flow of income. The environmentally extended dynamic MACGEM-IT model is a SAM-based DyCGE model in which environmental variables are endogenous. These environmental variables are related not only to total production (or consumption) of goods, but also to the abatement capital demanded by production processes to achieve the energy transition target. Indeed, the demand for abatement capital would drive a technological advancement towards less polluting production processes. This can be regarded as a potential avenue for mitigating CO2 emissions, and by extension, the associated carbon taxes incurred by production activities.
In essence, the model incorporates a mechanism that enables production processes to substitute the utilization of polluting capacity with new capital investment, thereby reducing the burden associated with environmental taxes and enhancing the abatement of emissions. In this regard, the CO2 emissions would be positively impacted by total production and negatively impacted by the amount of abatement capital employed in each production process, thus overcoming the supposed trade-off between environmental protection and economic growth. Based on the Italian SAM integrated with environmental flows (E-SAM), the dynamic environmental MACGEM-IT model will be

implemented to assess the impacts of hypothetical scenarios of technological transition to greener processes coupled with environmental fiscal policies.