Application of Green Net Metropolitan Product to Measure Urban Sustainability: Preliminary Exploration for the Chicago Metropolitan Area

The U.S. Environmental Protection Agency (USEPA) has been increasingly incorporating the concept of sustainability in its research programs. One facet of this research is the quantitative assessment of the sustainability of urban systems in light of several multidisciplinary sustainability metrics. In this work, we explore the estimation of economic measure of sustainability for Chicago Metropolitan Area (CMA) based on Green Net Metropolitan Product (GNMP), by adapting the economic models of sustainability at the macroeconomic level to regional sustainability. GNMP aims at amending the limitations of Net Domestic Product (NDP), a classical indicator of economic wellbeing, which fails to account for the degradation of environmental and natural resources caused by economic activities. We collect data for computing GNMP from publicly available secondary sources on variables such as gross metropolitan product, net income, emissions, solid waste, etc. In estimating GNMP for CMA, we have accounted for the damage costs associated with pollution emissions based on marginal damage values obtained from the literature using benefit transfers method. In addition, we attempt at accounting for the marginal value of depletion of natural resources in the CMA in terms of water depletion and changes in urban ecosystems such as green spaces. We account for the marginal damage cost associated with solid waste generation. It is expected the preliminary results of this exploration serve as guidance for formulating a refined GNMP estimation model for CMA that could be extended for the sustainability assessment of comparable urban systems elsewhere.