

Developing an environmentally extended IO-CGE model for the Danish municipalities

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Abstract: There are ongoing political and scientific debates regarding pollution from the economic activities and its negative consequences on the global environment. However, despite more than two decades of diplomacy, global greenhouse gas (GHG) emissions continues to increase. One of the reasons may be that we focus on national commitments despite the fact that the local policy can play an important role in the transition toward a less polluting global economy. Secondly, there has been much focus on reducing the GHG emissions in the transport and energy sector despite the fact that the agriculture sector is globally one of the main drivers of environmental pollution. Given this background, the present study aims at analysing the GHG emissions for all 98 municipalities in Denmark with specific focus on the agriculture sector both from a production and consumption-based approach. The methodology is based on the Danish interregional economic model SAM-K/LINE, which is an IO-CGE model with 117 industries. In this study, we disaggregate the agriculture sector into 7 industries (for instance, production of cereals, breeding of cattle, etc.) and integrate environmental data into the model. In this mode, we can study the GHG emissions for 123 industries for each 98 municipalities in Denmark both from a production and consumption-based approach. Furthermore, we can test how changes in the production at one side or the consumption on the other side can support the reduction of GHG emissions. We argue that this study provides important inputs for local-specific climate policies that will ensure a sustainable production and consumption in Denmark (specifically for the agriculture sector). This study contributes to the small but growing literature on the environmental impact at a local level. However, to our knowledge, only few studies have analysed on such small spatial areas like this study, and those studies have not specifically focused on the agricultural sector.

Keywords: environmentally multiregional IO-CGE analysis, GHG emissions embodied, local assessment