The increase in the Brazilian household income and the impact on CO2 emissions: evidence for 2003 and 2009 from input-output tables

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Increases in levels of greenhouse gases emissions (GHG) caused by human activities have occurred since the beginning of industrialization, and as a result, it has been observed an increase in the concentration of these gases in the atmosphere. The problems surrounding the GHG and climate change are increasingly in focus. In this context, there is an extensive literature discussing, e.g., issues related to responsibility for emissions. This discussion has been focused in two different principles, a first that assigns the responsibility for emissions to producers, and a second, to consumers. In line with the discussion on the allocation of responsibility for GHG emissions, much has also debated the issues inherent in the relationship between household consumption and emissions. Recently, many studies have made the link between consumption choices of households and energy through integrated input-output models. The contributions are the most diverse possible, however advance in the literature in terms of empirical evidence is needed. Explain how the structural change of income (variation in income levels), impacts GHG emissions is important for the formulation of public policies. In recent years, Brazil has experienced a process of economic growth and recovery of income. This increase in income has a positive impact on the consumption of goods. Furthermore, this increase in consumption has positive multiplier effects on the economy. Thus, given the evident variation in income levels in Brazil and to those related to household consumption and emissions, this study aims to assess the impact of household consumption on CO2 emissions. The households will be divided into eight consumption intervals based on the data from POF and eight income class from PNAD. These data will provide the basis to disaggregate the consumption vector of the household and the vector of wages in the input-output table.

We use two input-output tables for Brazil, 2003 and 2009, from the WIOD. Furthermore, we used atmospheric emissions of CO2 for the same country and the same range of time. We aggregated the sectors into 15 new sectors. This new aggregation has as intention to allow us to have a further and better discussion around the household consumption structure. Furthermore, we use income data for Brazil from PNAD for 2003 and 2009, and consumption data for Brazil from POF for 2000-2003 and 2008-2009. As we seek to assess the impact of household consumption on GHG levels, we will use the hypothetical extraction method on the expenditure structure. The use of such a method is justified for allowing quantify the interdependence between sectors of the economy in terms of pollution (CO2 emissions). The main idea of the method is as follows: extracting hypothetically one of household group of income will be possible to check how products change, therefore, how emissions change. Since we have different income classes and therefore different preferences of consumption in a time horizon, the extraction of each one of them will show the relative importance of each consumption structure for the process of emissions in Brazil. We find some interesting results: a) the transport sector behavior, which evidenced the relative importance of this sector in the emissions scenario and the greatest negative impact over period analyzed for all household income groups; b) the food industry behavior, where you can see, like most other sectors, a decrease in the emission process (more pronounced in the lower consumption classes); and c) the behavior of service sector that is the less impacted sector. The results are in line with the arguments that consider important the evaluation of emissions with particular attention to household consumption. This, in most countries, is the most important component of the final demand and therefore plays an important role in the growth multiplier effect. In this paper we report the logic of consumption (or not consumption - given the extraction of consumption vectors) to account for the effects of the influence of lower consumption in favor of emissions evaluation. Therefore, the study

contributes to the research agenda in the area of emissions since it mapping a recent behavior of the Brazilian economy in terms of increased income, changes in consumption structure and impact on emissions. Furthermore, as the paper shows aggregated results by income and by consuming structure and verifies that the results are partly due to the intensity of emissions and the systemic effects, it is possible to addressed discussions about less polluting production processes, more conscious consumption of goods, more rational use of energy and transport system.