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Impact simulations with the multiregional matrix of Colombia 2018

Abstract

Based on official information from Colombia's national accounts, mainly from the 2018 supply and use table (SUT), and a set of complementary secondary information for the city of Bogotá, other regions of Colombia, and the rest of the country (aggregate), it was assembled an interconnected multiregional input-product matrix of 9 regions and 30 economic sectors.

The approach followed was that of a multiregional matrix, a methodological approach that allows the evaluation of the socioeconomic and environmental interrelationships that occur at the subnational level in Colombia. The proposed approach allows the connection of intraregional and interregional flows of the city of Bogotá, and 8 additional regions of Colombia -Antioquia, Valle, Santander, Cundinamarca, Atlántico, Bolívar, Meta, and the Rest of the regions of the country (RRP)- The 8 regions considered generate 74% of the GDP, 77% of the national cargo of goods, and more than 90% of the country's foreign trade.

Since the construction of an input-output matrix that includes several regions of a country encounters in most of them the lack of data on intra- and interregional trade (especially for services), in the case of Colombia we follow the Miller and Blair (2009, 2022) approach, call multiregional approach or Multiregional Input-Output (MRIO). In this model, the interrelationships between regions are estimated in a different way from the model (Interregional Input-Output -IRIO) and require less detailed information than in the IRIO. In both models, intra- and interregional trade is key to developing the input-output table for two or more regions.

A notable feature of the matrix lies in the opening of the transport services sector, which is broken down into urban public passenger transport with internal combustion vehicles, public passenger transport with electric vehicles, public interurban transport with combustion vehicles, other types of public transportation (freight, pipeline, etc.), and air and water transportation.

Starting from the sectoral opening of public transport, the identification of urban passenger transport with electric vehicles, and the decomposition of the cost structure of the said sector, much more intensive in electrical energy on the one hand, and the identification of the electromobility policy of the city of Bogotá, on the other hand, especially in investments, the effects of the implementation of a reconversion plan for electric vehicles and the adaptation of the charging infrastructure were simulated, as main measures to achieve the decarbonization of the city.

Simulated increases in infrastructure investment of between 12 and 16 billion dollars, as well as the replacement of 50% of the fleet of combustion vehicles with electric vehicles, urban public transport with electric mobility in Bogotá, generates an increase in GDP regional 5.8% and 0.5%, respectively, this is approximately 6.3% for the city or 1.4% of national GDP. The most benefited sectors are, in addition to public urban transportation with electric vehicles,

the construction of infrastructure works, electric power generation, chemicals, rubber, and plastics, which appear as the most interconnected sectors.

Some multirregional matrices were constructed before MRIO Colombia 2018, but the topic of this research addresses a new aspect; that is, an impact analysis of the energy transition of urban public transport in 30 sectors of the regions of Colombia. It is worth noting that, although the vehicle fleet other than internal combustion engines (ICM) is still small in Colombia, Bogotá is the second city in Latin America and the Caribbean with the largest number of EV vehicles and the country has a subsector of intermediate inputs used in the automotive industry (bodies and parts) relatively developed.

Finally, it is worth mentioning that preliminary results of the study in the motor vehicle manufacturing and public urban passenger transportation sectors show not only the effects of applying electromobility in the city of Bogotá but also the greater interrelation between the most diversified and largest economies: Bogotá, Cundinamarca, Antioquia, and Valle.

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