Carbon Footprint Analysis of Bilateral International Migration Flow to the U.S.A.

Topic: Regional analysis
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The United Nations reported that the proportion of international migrants in the total population increased from 2.8 percent in 2000 to 3.5 percent in 2019. It also highlighted that the largest number of international migrants (51 million) resided in the United States, accounting for 19 percent of the worldâ€™s total.

On the other hand, UNEP reported that per capita consumption-based GHG emissions are highly unequal between and within countries. In addition, since GHG emissions from household consumption account for more than two-thirds of total global GHG emissions (Ivanova et al., 2016, Hertwich and Peters, 2009), transitioning to a low-carbon lifestyle is necessary to achieve the 1.5â„*f* goals of the Paris Agreement. Especially, the U.S. has extremely high per capita CO2 emissions and one of the most carbon-intensive lifestyles in the world, while attracting large numbers of immigrants from around the world.

An important research question is how the lifestyle of immigrants changes before and after migration and the extent to which these changes affect the net change in CO2 emissions. While some studies estimated the carbon footprint of international migration and found that the United States contributed the most to the increase in carbon footprint, no study has yet focused on the U.S. and analyzed its impact in detail.

The novelties of this study are as follows: Firstly, we constructed a new dataset by combining the U.S. immigration flow database with an environmentally-extended multi-regional input-output table. Secondly, we estimated the net change in consumption-based CO2 emissions associated with immigration between specific regions of the world and U.S. states (i.e., the difference in the consumption-based emissions of immigrants before and after migration). In doing so, we used Global-MRIO (Eora26), US-MRIO, immigrant stock data provided by the United States Census Bureau and world population data (World Bank).

To the best of our knowledge, this study is the first attempt to estimate the state-by-state impact of the net carbon footprint, with a focus on differences in lifestyle, industrial structure, and immigrantsâ€™ structure (i.e., how much of the immigrants come from which regions) in each U.S. state. We found that immigrants to the U.S. contributed to an increase in the net change in carbon footprint in 35 states in 2017, with an overall increase of about 15 Mt-CO2. Texas contributed to the increase in the net carbon footprint the most (+2,375 kt-CO2), followed by Florida (+2,235 kt-CO2). The impact of this increase accounted for 27% of the total increase in the carbon footprint.

There were also differences in characteristics. In Texas, more than half of the increase in carbon footprint was generated by immigrants from Central America and South-Central Asia to the U.S., whereas in Florida, the increase was mainly caused by immigrants from South America and the Caribbean.

On the other hand, some states contributed to a decrease in carbon footprint, with California having the most significant negative impact on the net carbon footprint (-754 kt-CO2). This result can be explained by the substantial outflow of immigrants from Mexico, influenced by policy changes associated with the shift in government in 2017. Thus, even within the U.S., different states have markedly different situations in terms of the number of immigrants they receive (or outflow) and their

places of origin, significantly impacting the differences in the carbon footprint of each state. This fact is crucial for reducing consumption-based emissions by immigration.

Finally, based on the findings, this study suggests a more comprehensive and sustainable immigration policy, including a carbon tax policy that focuses on the lifestyle of immigrants, rather than a simple limit on the number of immigrants.