

Spatial Autoregressive Models: Associations of Internal Migration with Local Labor Market Outcomes

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Objective

We investigate the associations between internal migration and income of all working-age population.

We also examine the associations between internal migration and income of low-educated population.

Data

2016-2021 American Community Survey

2016-2021 Cost of Living Index

Methods

PUMA level (N=2,351)

People with 16-64 years of age

Separated models for all working-age population and low-educated population.

Spatial Autoregressive (SAR) models, specifically spatial lag of X model or SLX.

- SAR models indicate the direct association of internal migration on income in current PUMA, the indirect association of surrounding areas in the current PUMA, and the total association of both the local and surrounding areas on income.

- Models using different subsets of the population:

- All / US-born working-age population
- Low-educated / Low-educated US-born working-age population

Ordinary least squares (OLS) models for log income

- Models using different subsets of the population

- All / US-born working-age population
- Low-educated / Low-educated US-born working-age population

Dependent variables

Log income for non-migrants

- Income of all working-age population
- Income of U.S. born working-age population
- Income of low-educated working-age population
- Income of low-educated U.S. born population

**Low-educated population refers to population with high school degree or less.

Independent variables

Working-age population:

Independent variables:

- Proportion of internal migration
- Cost of Living Index scores
- Proportion of non-migrant College+ population
- Proportion of non-migrant married population
- Proportion of non-migrant White population
- Proportion of non-migrant prime working-age population

**College+ refers to college degree or more; prime working-age refers to 25-54 years of age.

- Low-educated working-age population:

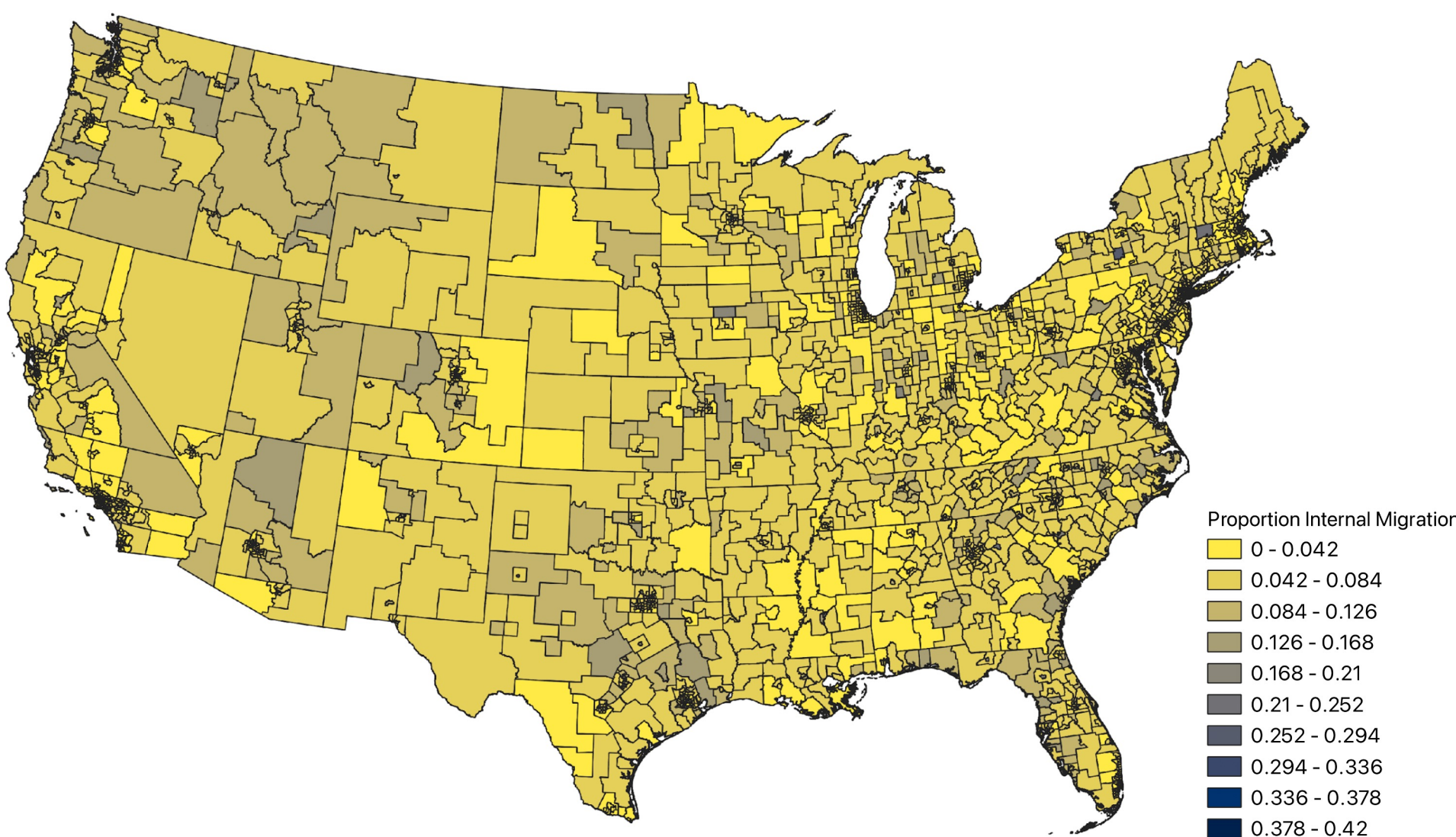
Independent variables: all of the above except for college+.

The variables only include low-educated population.

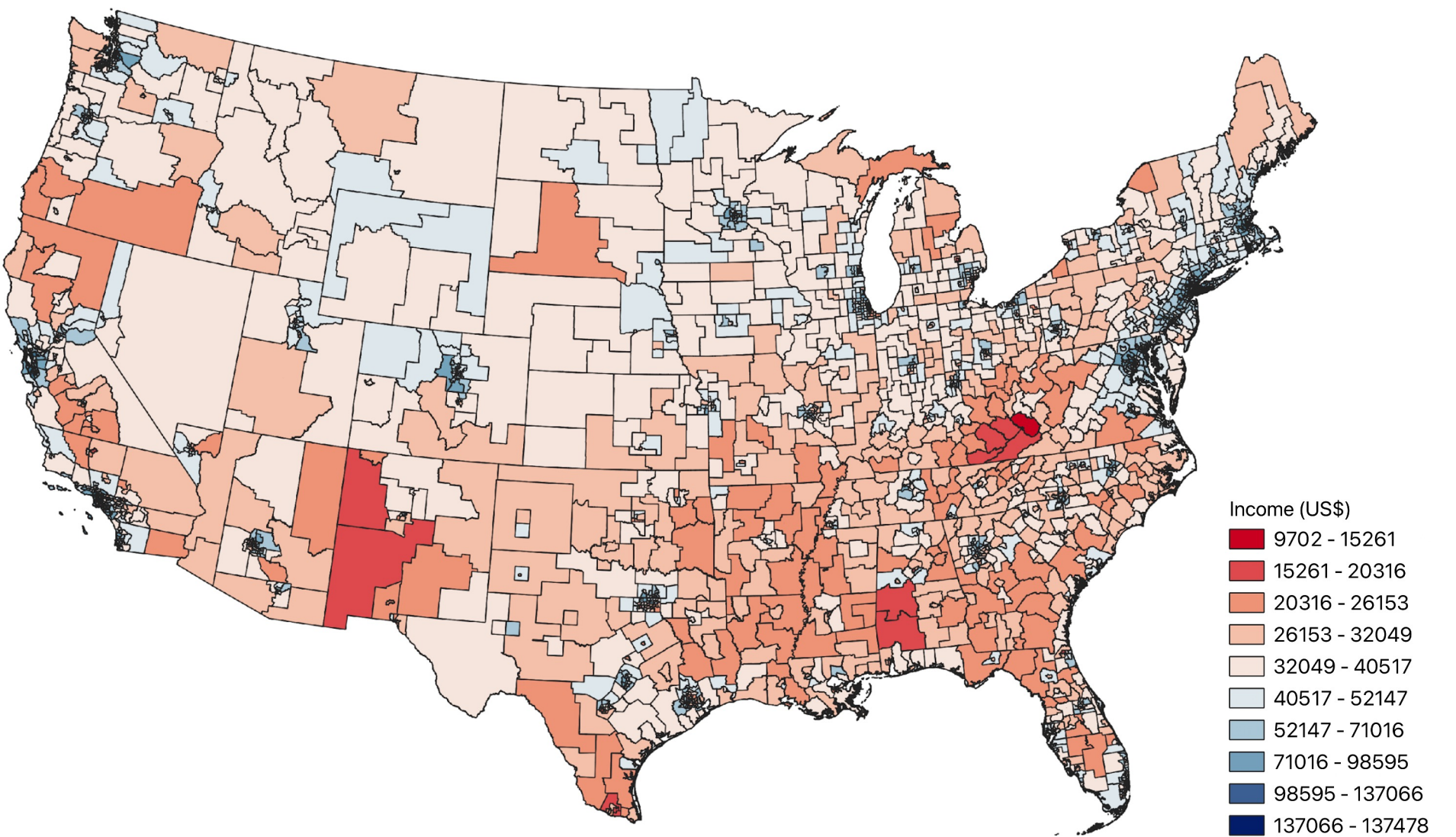
Ordinary least squares (OLS) models for log income

- Working-age population
- Low-educated working-age population

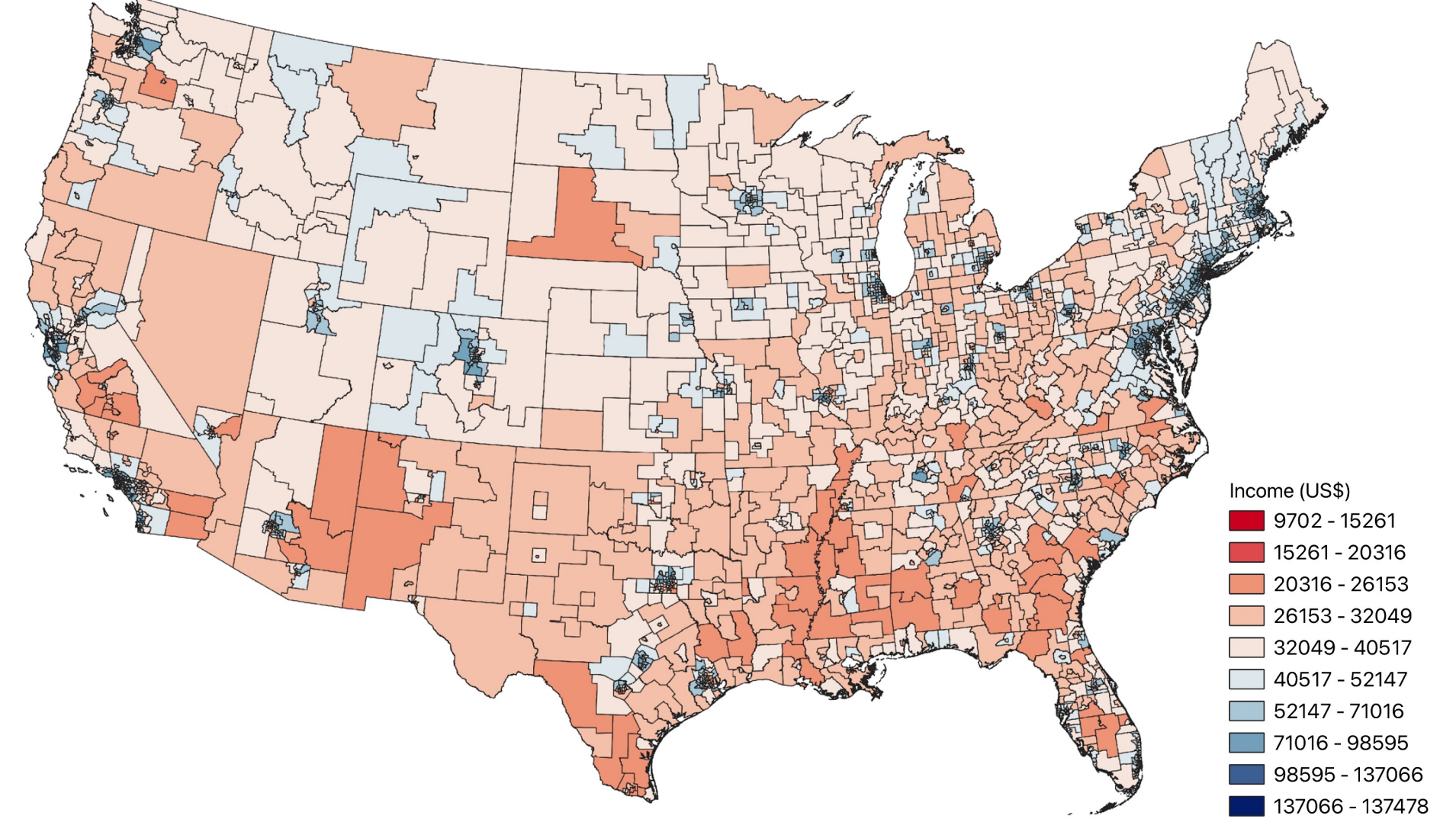
Proportion of Internal Migrants, 2021



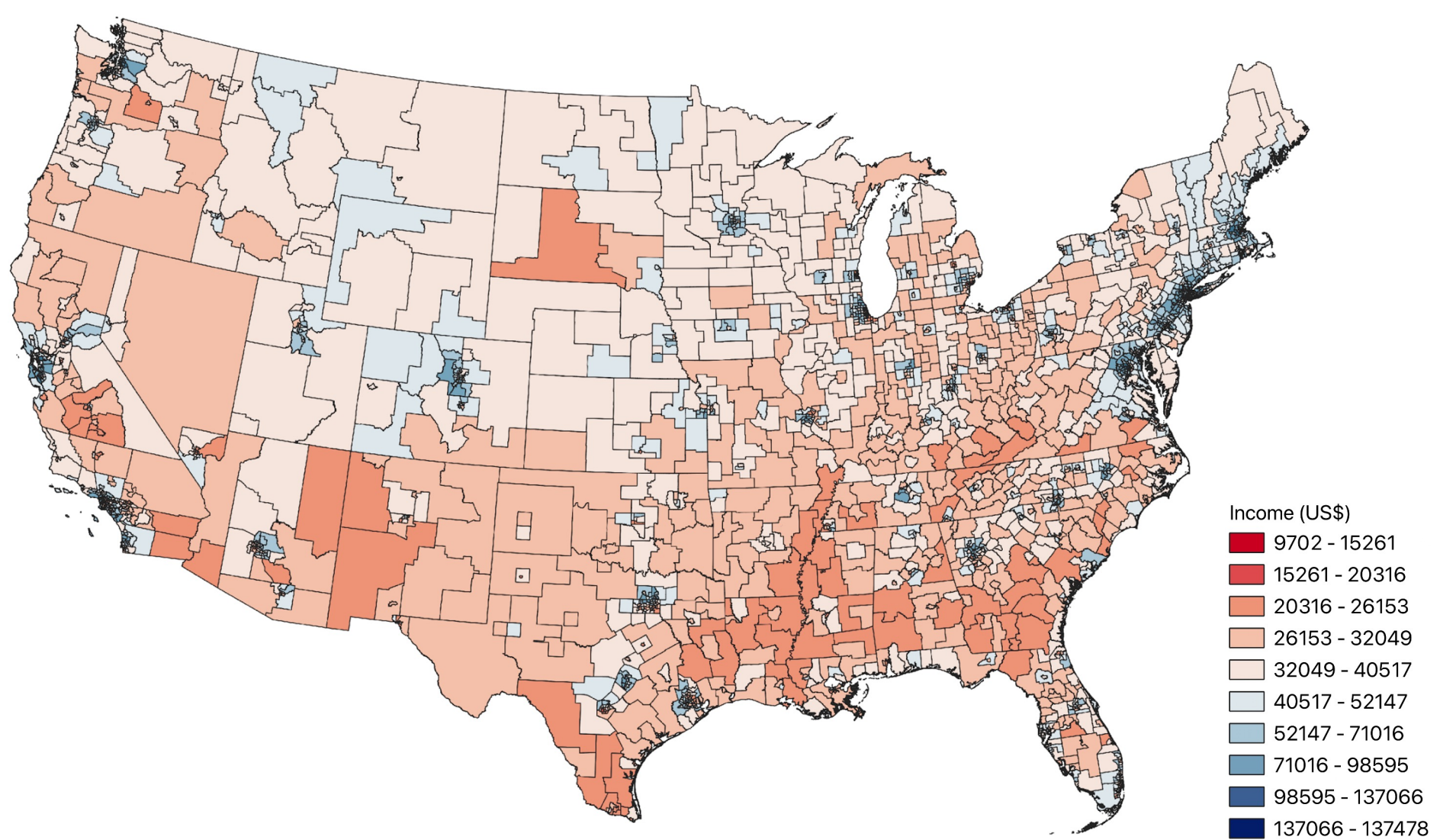
Income for Non-migrants, 2021



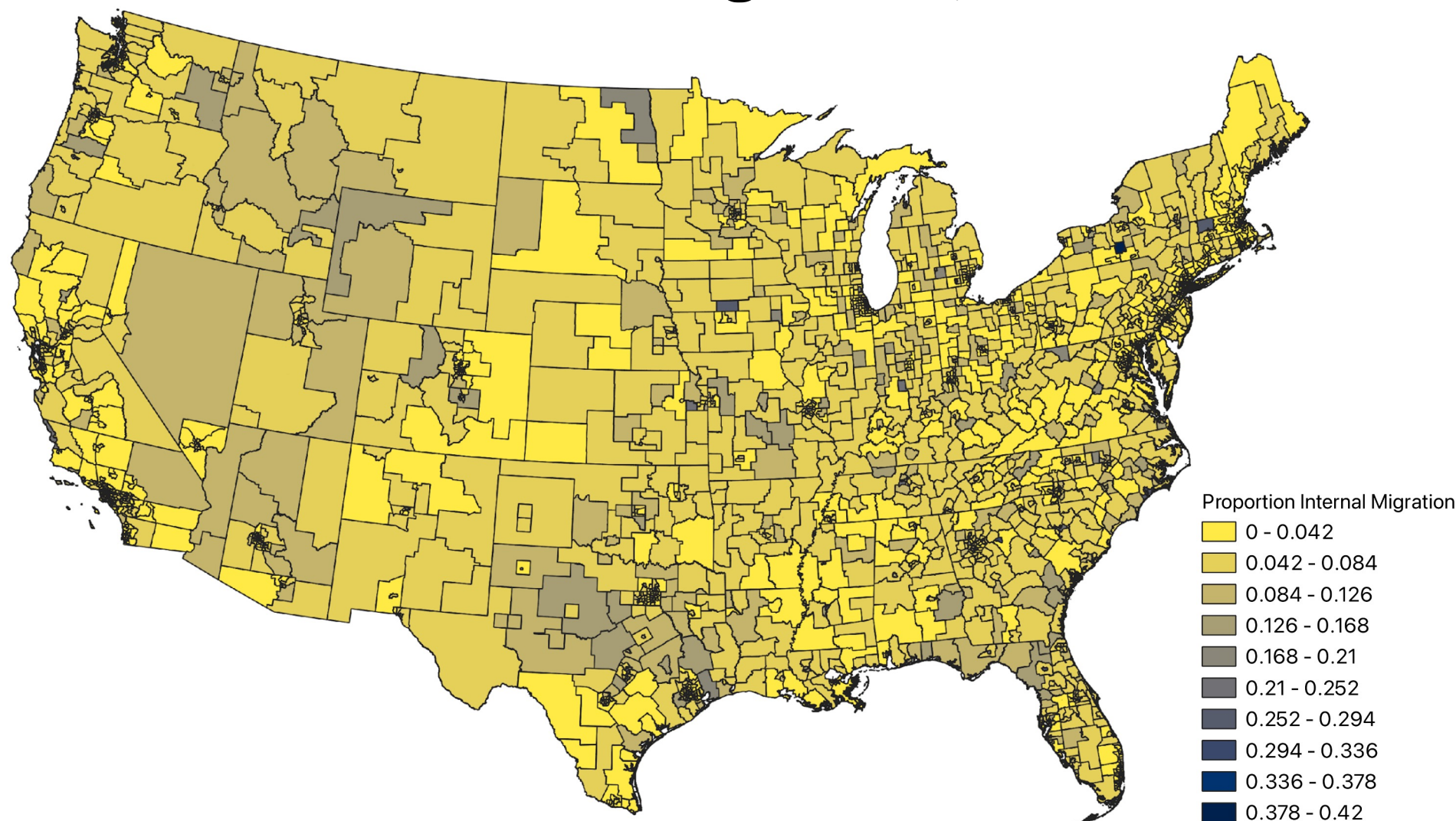
Predicted values for Income of Non-migrants, 2021 (SAR)



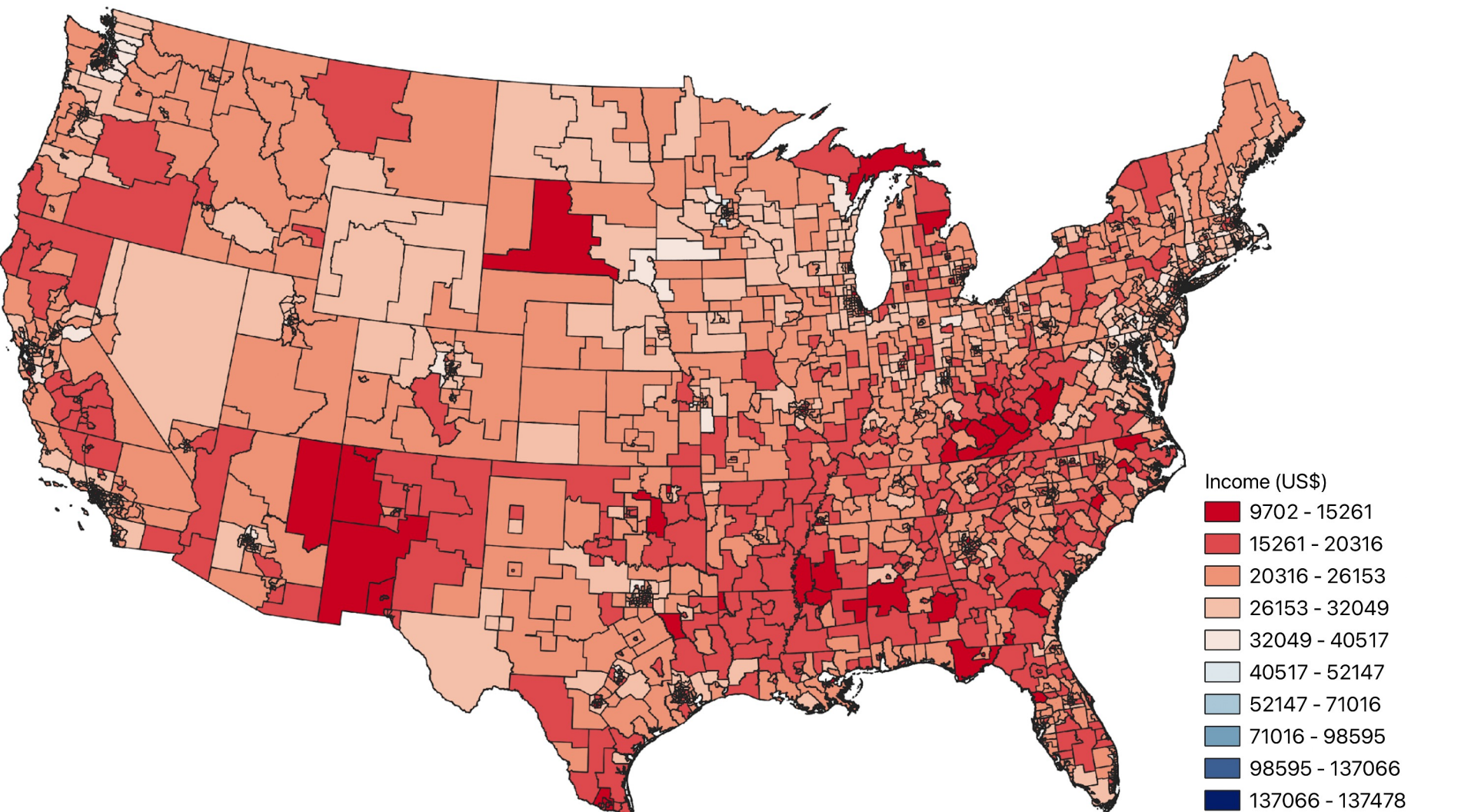
Predicted values for Income of Non-migrants, 2021 (OLS)



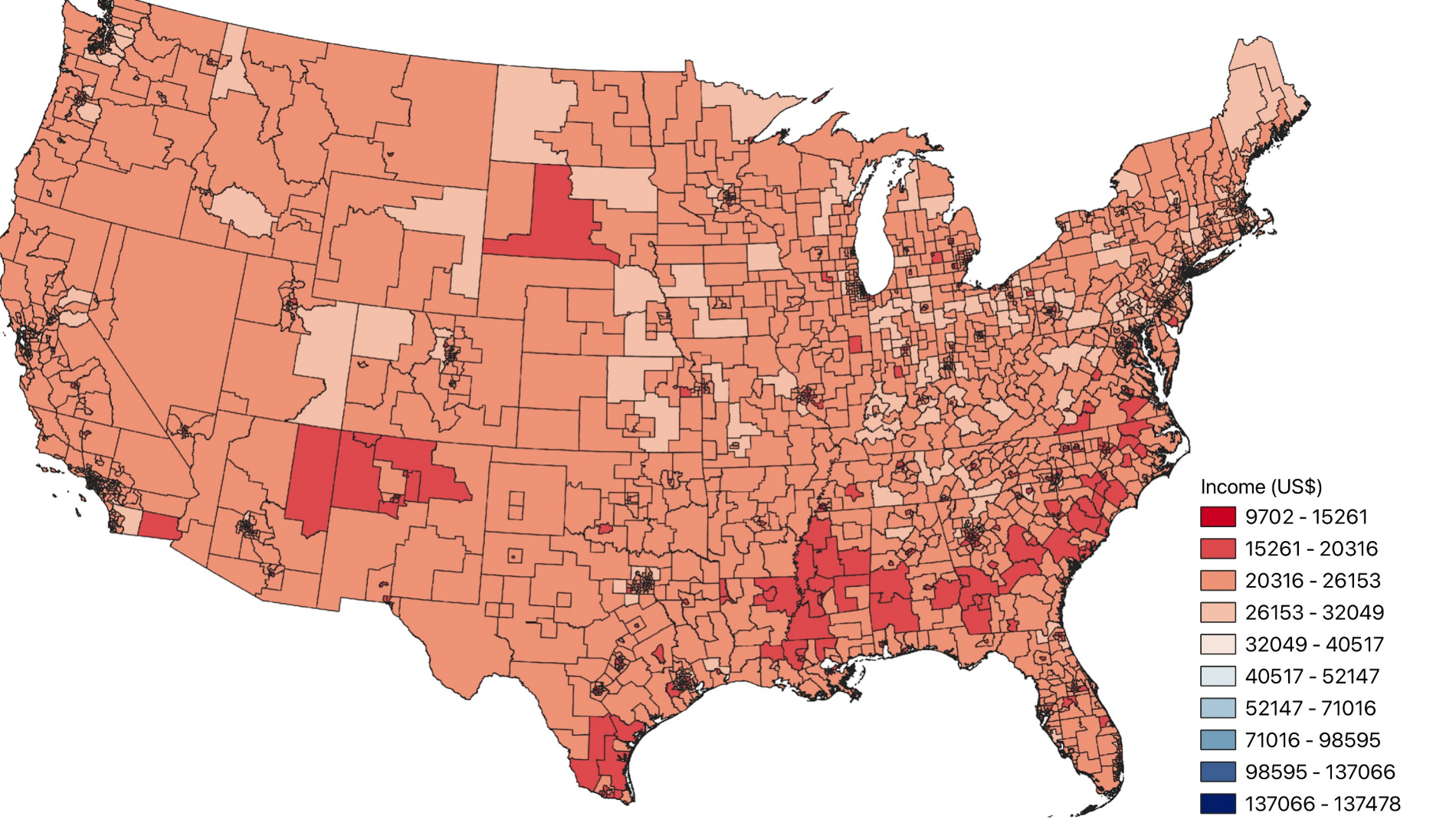
Proportion of Low-educated Internal Migrants, 2021



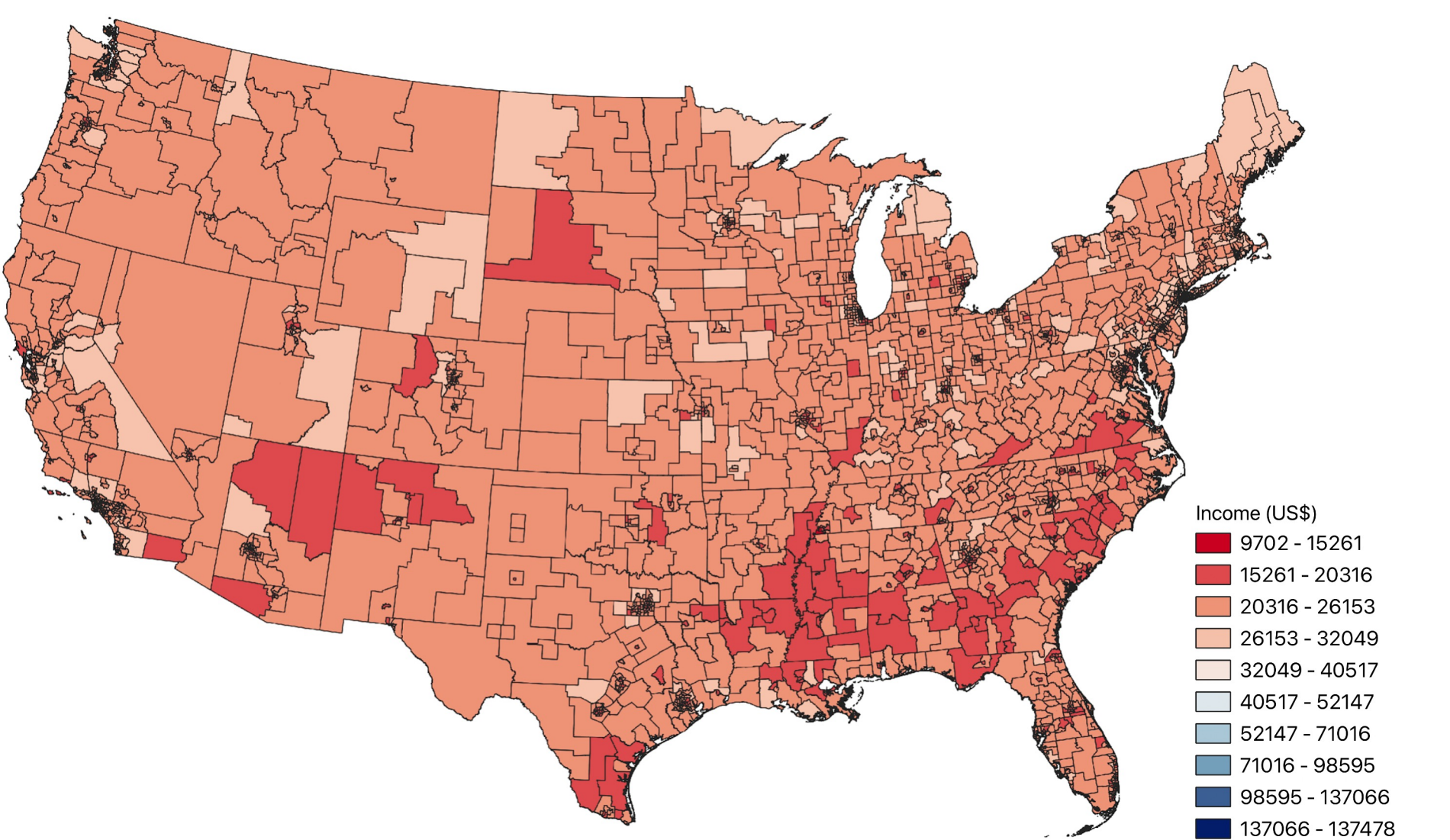
Income for Low-educated Non-migrants, 2021



Predicted values for Income of Low-educated Non-migrants, 2021 (SAR)



Predicted values for Income of Low-educated Non-migrants, 2021 (OLS)



SAR models, 2021 Coefficients for log of income

Independent variables	Working-age population			Income for non-migrant US-born workers		
	Income for non-migrant workers	Direct effects	Indirect effects	Total effects	Direct effects	Indirect effects
Internal migration	-0.310*** (0.087)	0.201 (0.146)	-0.109 (0.1364)	-0.326*** (0.097)	0.281* (0.162)	-0.044 (0.152)

Model includes control variables: education level, cost of living, race, marital status and age

Independent Variables	Low-educated working-age population			Income for non-migrant US-born workers		
	Income for non-migrant workers	Direct effects	Indirect effects	Total effects	Direct effects	Indirect effects
Internal migration	-0.2050** (0.0980)	0.7450*** (0.1842)	0.5401*** (0.1858)	-0.1808 (0.1127)	0.7797*** (0.2118)	0.5989*** (0.2137)

Model includes control variables: cost of living, race, marital status and age. Only low-educated population considered in both the dependent and independent variables.

OLS models, 2021 Coefficients for log of income

Independent variables	Working-age population		Low-educated working-age population	
	Income for Non-migrant Workers	Income for Non-migrant U.S. born Workers	Income for Non-migrant All Workers	Income for Non-migrant U.S. born Workers
Internal migration	-0.265*** (0.0829)	-0.287*** (0.0902)	-0.147 (0.118)	-0.109 (0.127)
R-squared	0.891	0.867	0.281	0.277

Models for working-age population include control variables: education level, cost of living, race, marital status and age. Models for low-educated population include control variables: cost of living, race, marital status and age. Only low-educated population considered in both the dependent and independent variables.

Findings

SAR

- The direct effect is negative and statistically significant ($p < 0.01$) for both the overall and low-educated population.
 - A 1-percentage-point increase in the proportion of internal migration has an own-PUMA direct effect that leads to a reduction in income of 0.30 and 0.20 percentage points for the overall population and low-educated population, respectively.
- The indirect effect is stronger (magnitude and significance) for the income of the low-educated population.
 - On average, a 1-percentage-point increase in the proportion of low-educated migration has an across-PUMA spillover effect that is associated with a 0.75-percentage-point increase in income for the low-educated population.
 - The across-PUMA spillover effect for the overall population is barely significant.
- The direct effect is negative and insignificant.
 - The dynamic between local and surrounding areas offset the negative association between internal migration and income.

OLS

- All else equal, there is a negative association between internal migration and income.

Final considerations

The comparison between OLS and SAR highlights the complexity of the relationship between internal migration and income, and the importance of space in this relationship.

The negative association between internal migration and income might be an indication of two things: 1) lower income where the proportion of internal migration is higher, and/or 2) higher internal migration in low-income areas.