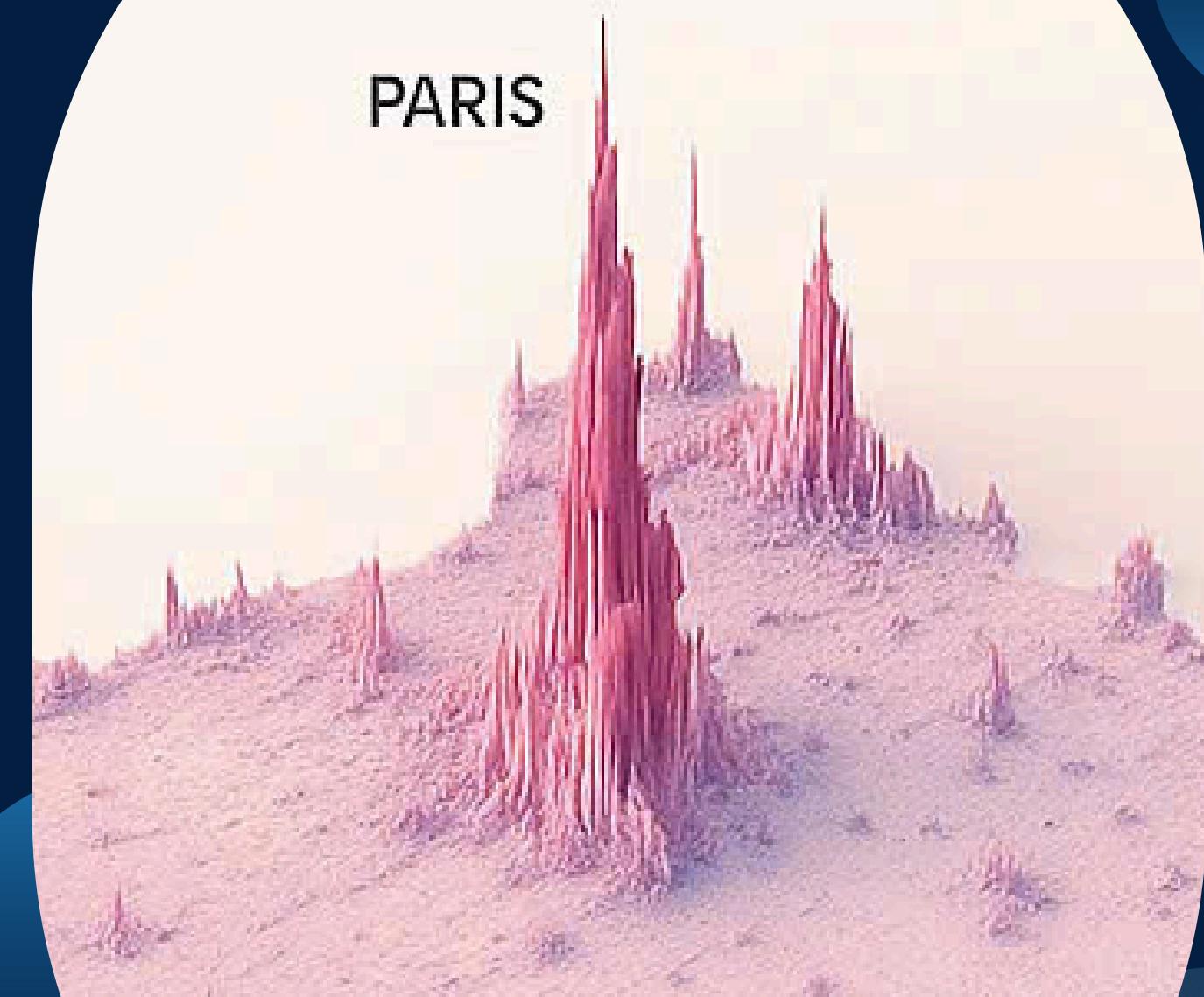


BIG DATA PROJECT

Professor: Sylvain Barthélémy

*Analyse the INSEE municipal data and
visualization of geographic disparities
and specificities*

Presented by:
NGOC LIEN - DUC TOAN



INTRODUCTION



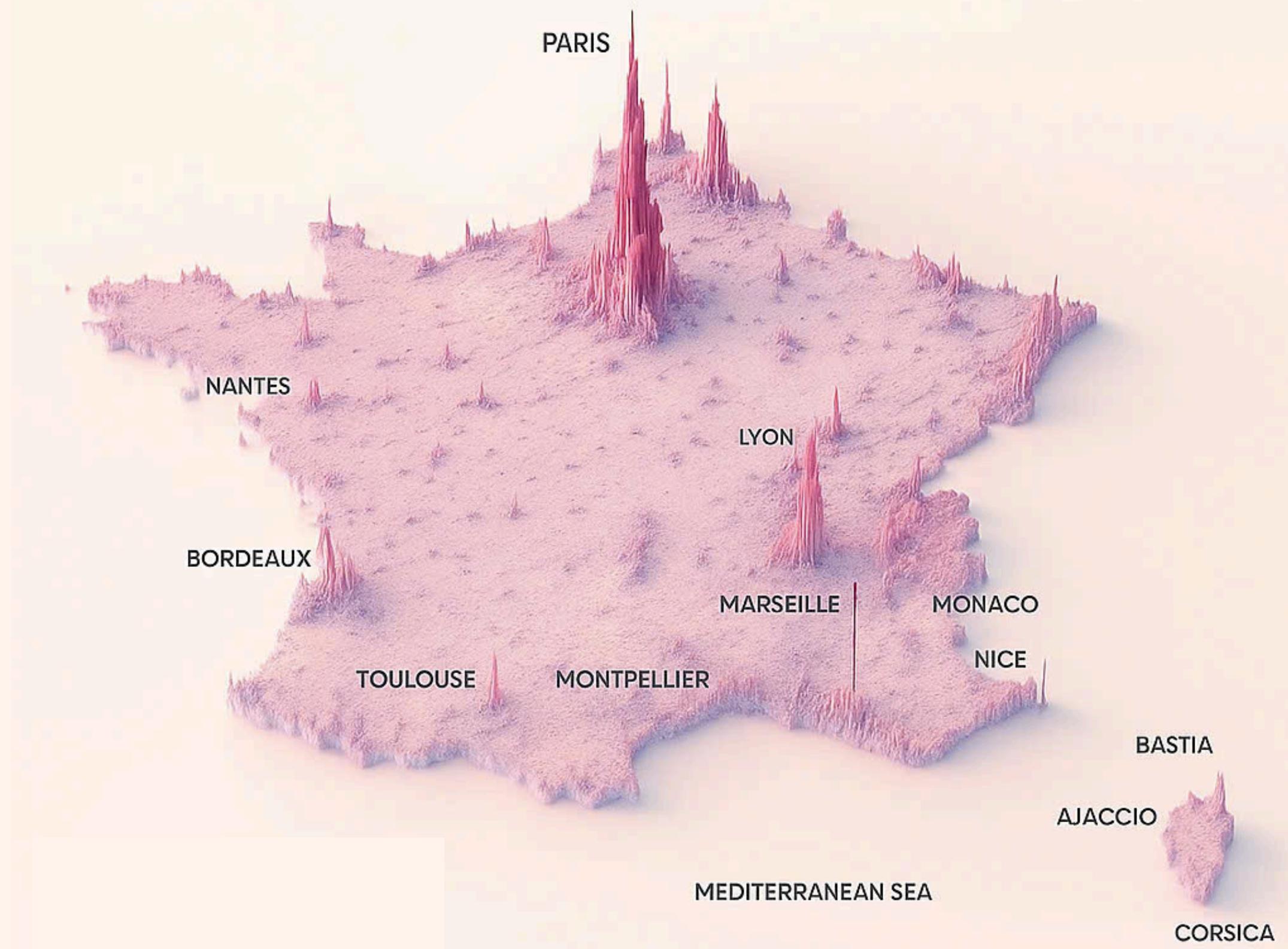
Why we decided to analyze Paris:

- Paris serves as the **economic and demographic center** of France.
- The city shows **significant socio-economic contrasts** between its districts.
- Its **diverse economic and social structure** helps illustrate inequality within Île-de-France.

=> It clearly reflects the rich-poor divide, which directly affects the overall quality of urban life

POPULATION DENSITY MAP

FRANCE



OBJECTIVE

The Île-de-France region is the center of development in France, with Paris as the economic and cultural core. However, when looking at the whole region, we can see the **differences in living conditions and social development between regions.**

? From that observation, our team asked the question:

“Are these disparities just perceptions, or can they be proven by concrete data?”

● The familiar saying “**Rich West – Poor East**”

For example, the French newspaper Le Figaro once had an article with the title:

“Pourquoi les quartiers riches se situent souvent à l’ouest des villes” - **“Why wealthy neighborhoods are often located in the west of cities?”**

=> We wanted to calculate a social index (Score socio-économique par commune) analyze the data to visualize and verify whether there are just **common sayings** or **if it actually reflects a reality that can be visualized through data.**

⌚ Research Objectives

- Calculate and visualize the social index for each area within Île-de-France.
- Verify and illustrate, in a clear visual way, the level of social disparity between different zones.

=> **From there, we can gain a deeper understanding of the spatial social inequalities across the Paris & Île-de-France region.**

RESEARCH DATA

Data source:

- Official open data portal of the French government - data.gouv.fr

with the dataset entitled: “Caractéristiques socio-économiques des communes d’Île-de-France”

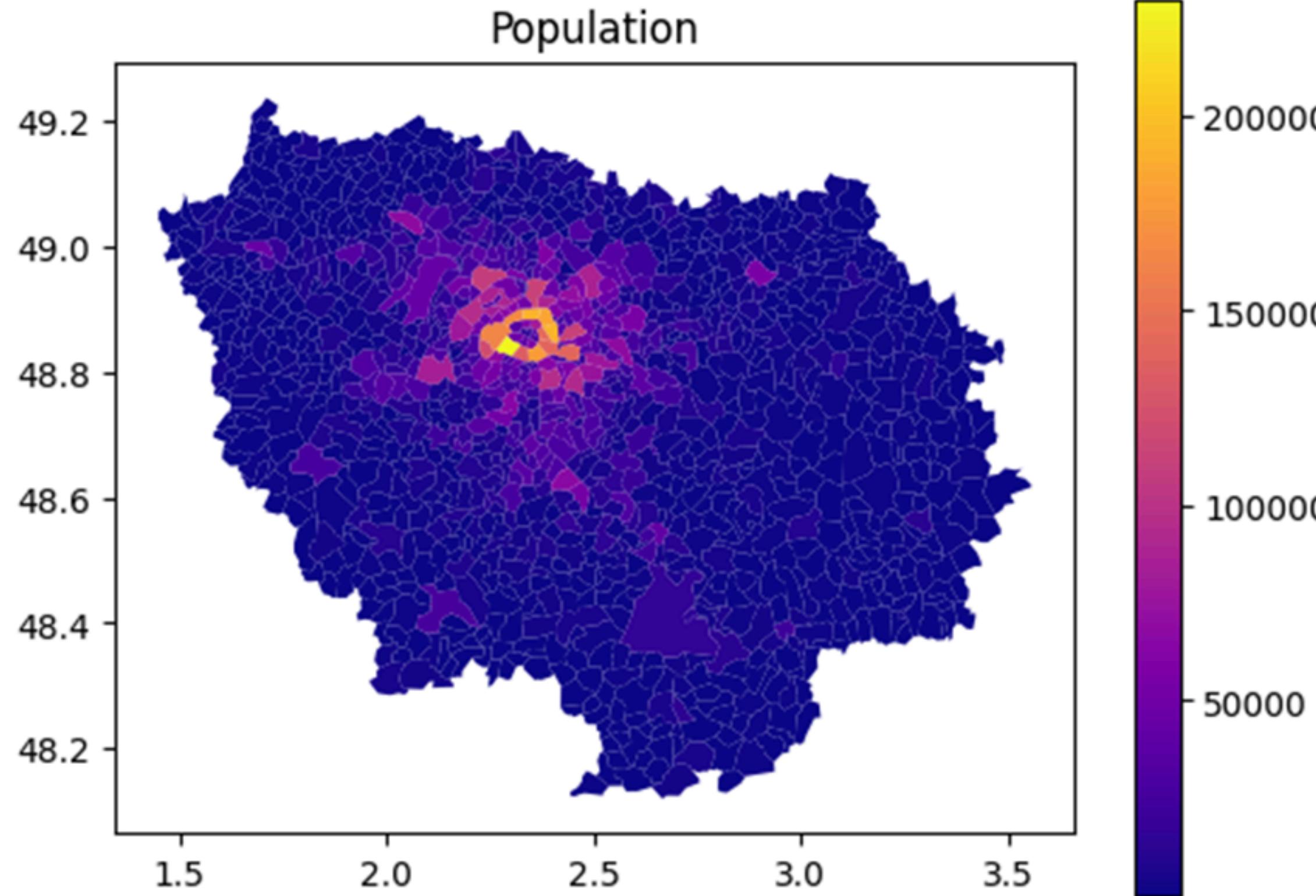
- INSEE (Institut national de la statistique et des études économiques).
- EUROSTAT: GDP per Capital

Time: 2000-2025

Content and data structure

- Population
- Median disposable income
- High school graduation rate
- Unemployment rate

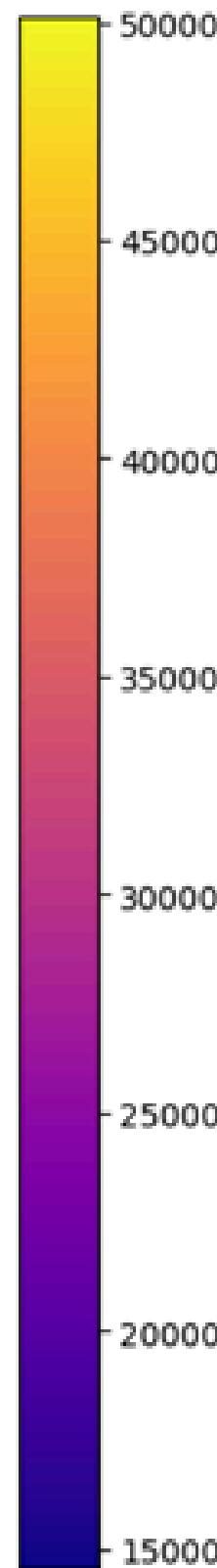
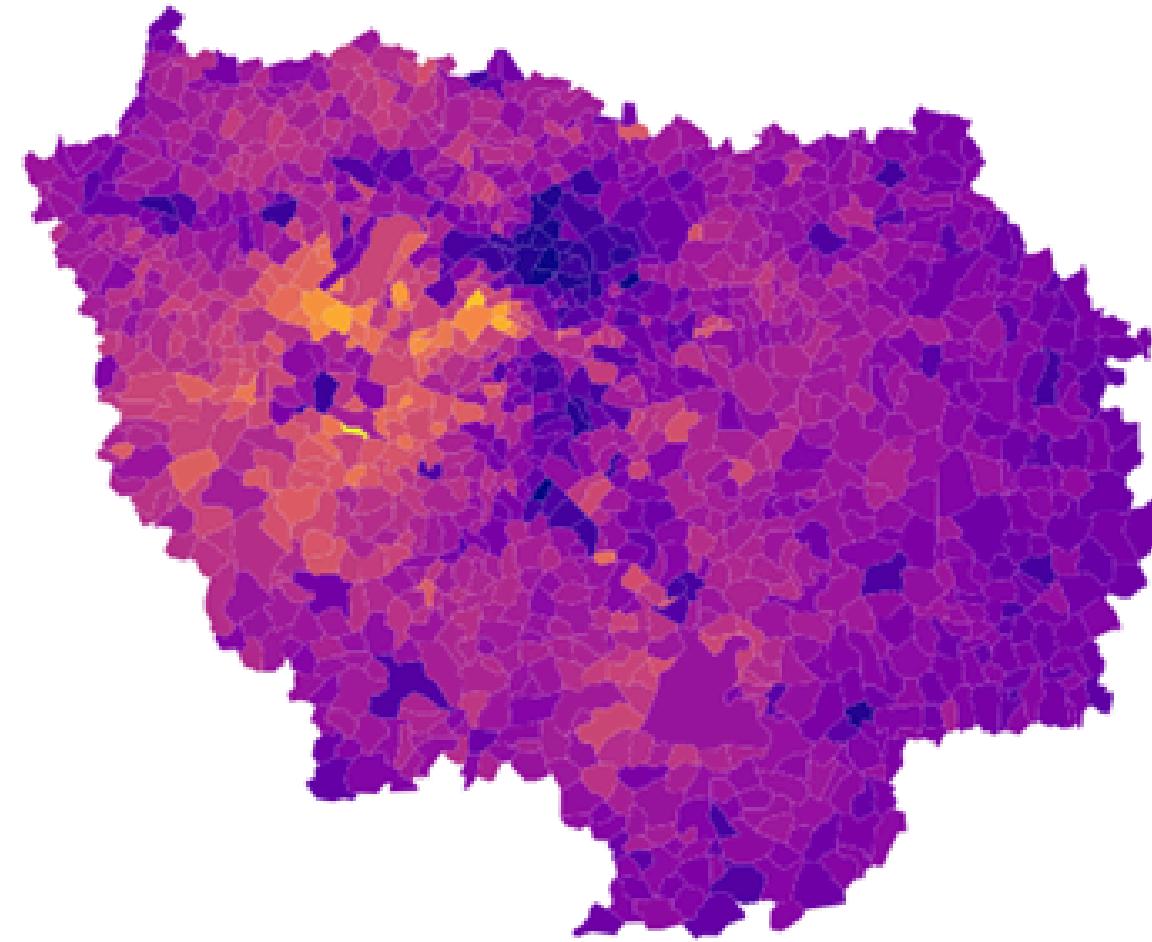
Population choropleth map of the Île-de-France region, centered on Paris



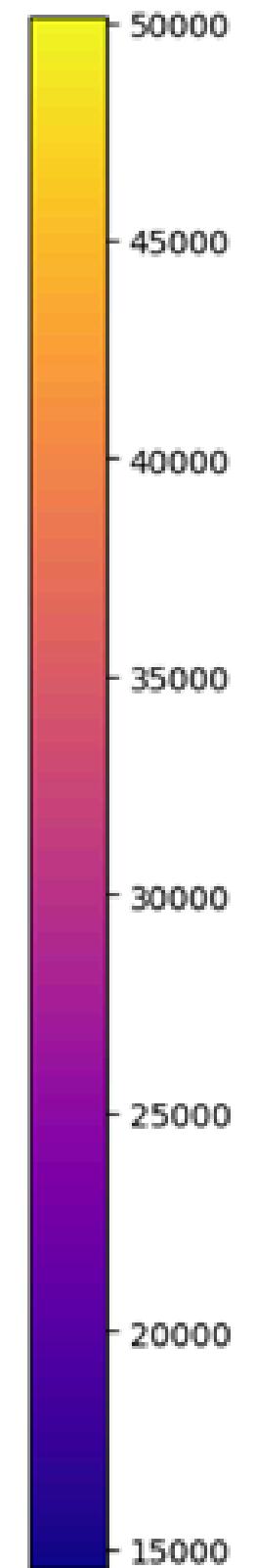
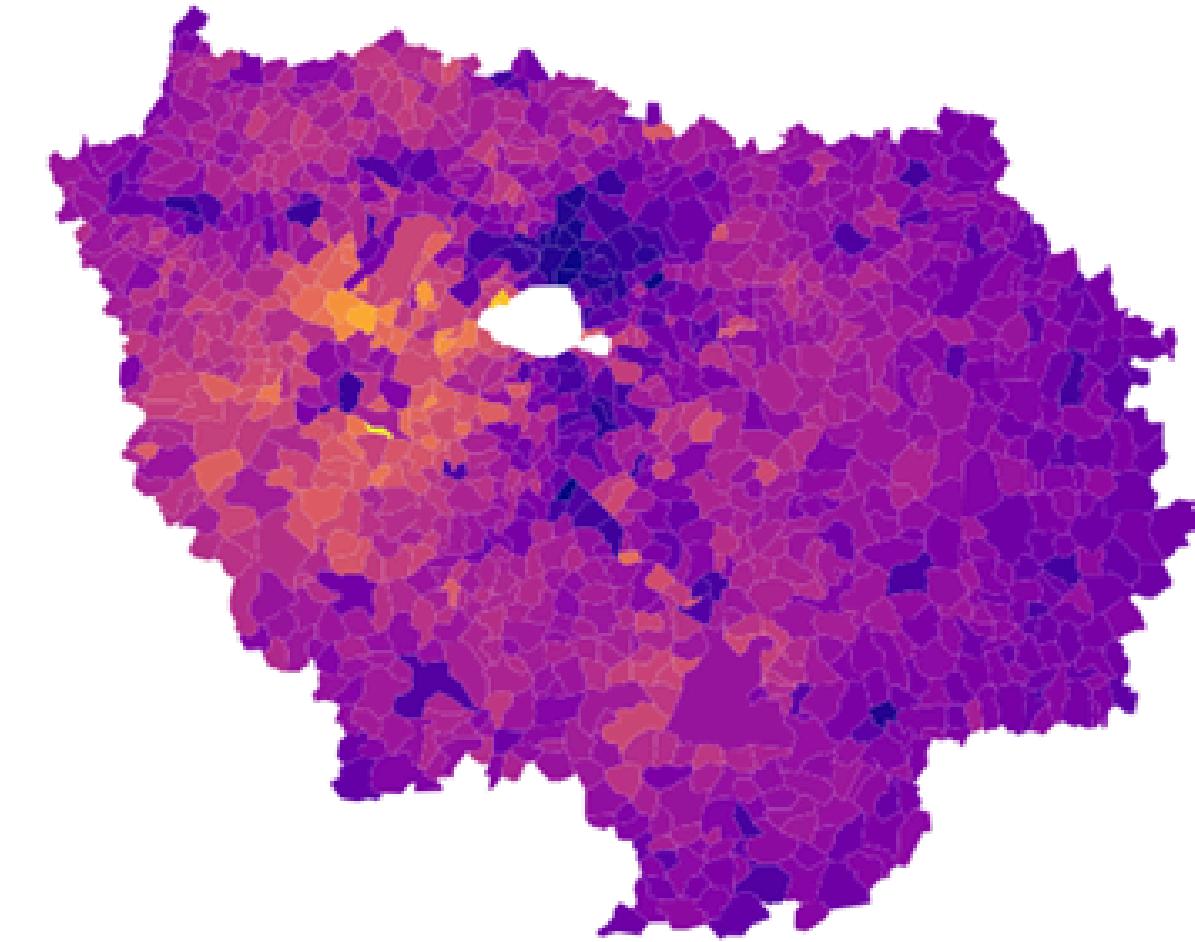
This clearly demonstrates the phenomenon of population concentration in the urban core, which also creates strong pressure on infrastructure, transportation, and housing in the inner city.

Income polarization in Île-de-France

Revenu disponible médian (€/an) - avec Paris



Revenu disponible médian (€/an) - sans Paris

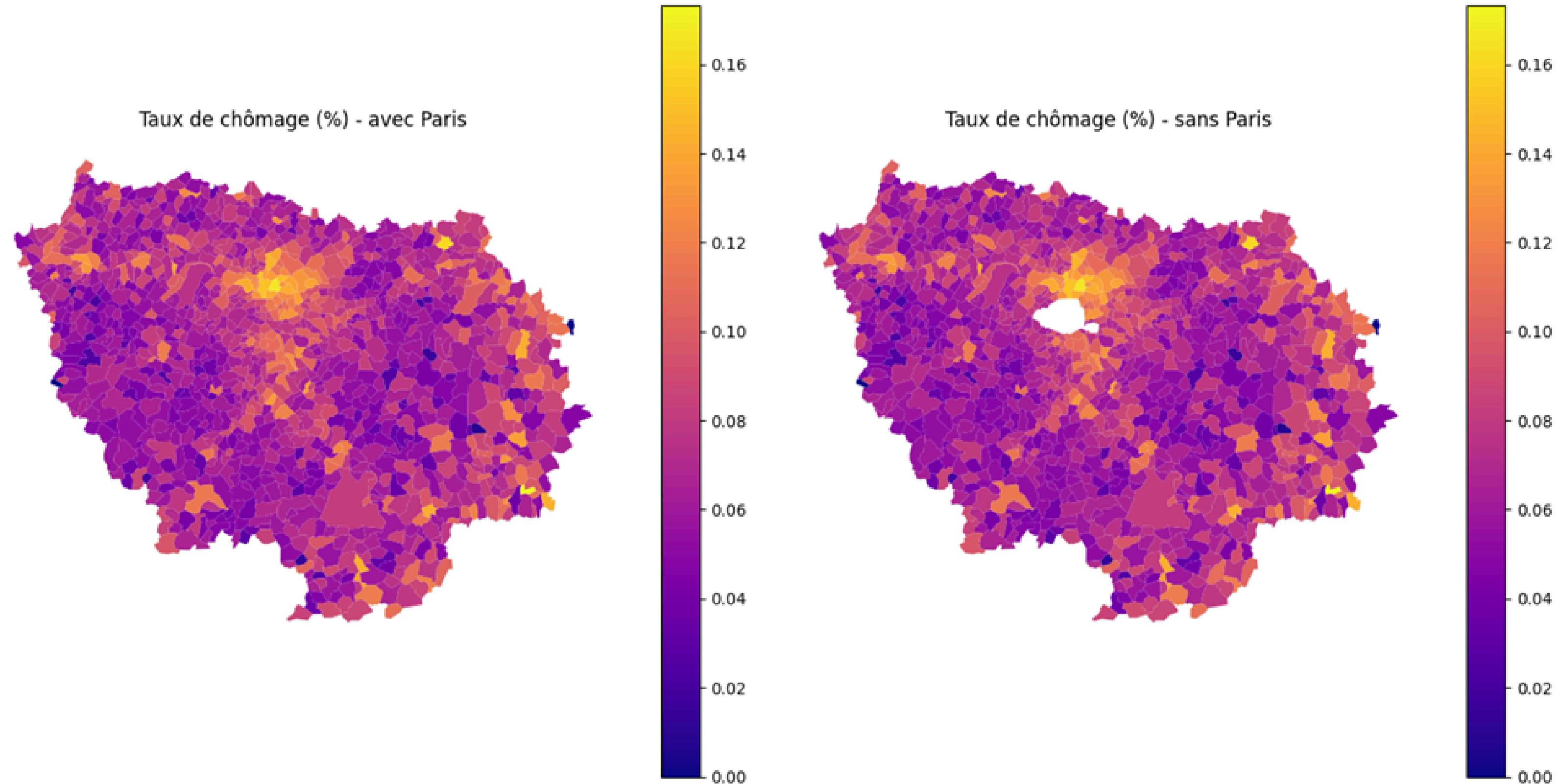


In Île-de-France, the income is polarized.

The rich are concentrated in the west and south - The north and east have lower incomes.

=> This shows clear economic inequality in the Paris region.

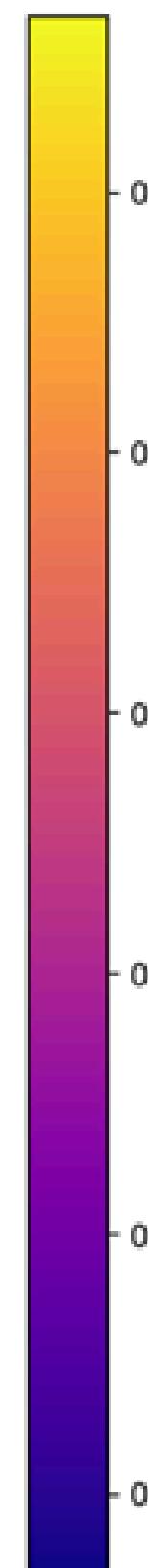
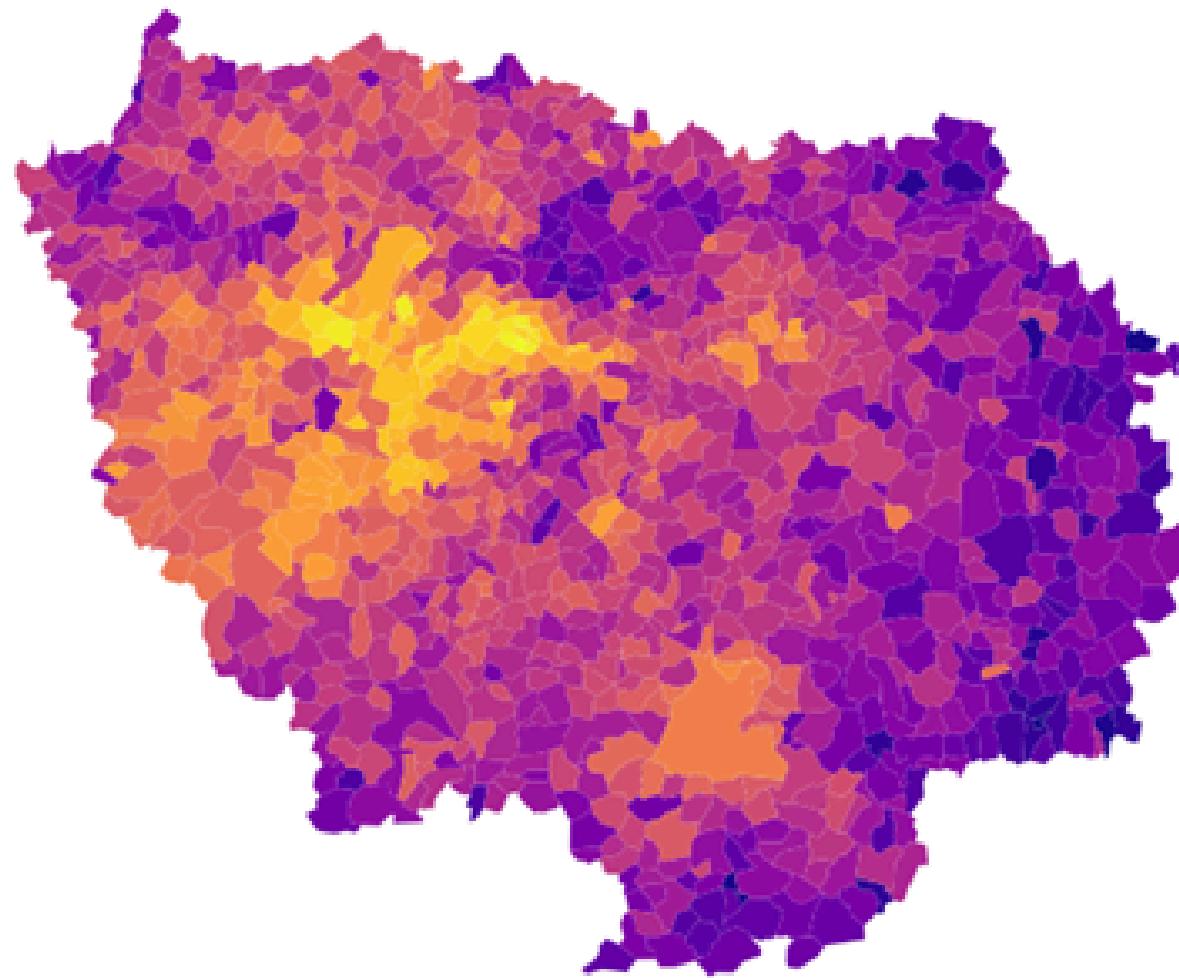
Uneven distribution of unemployment



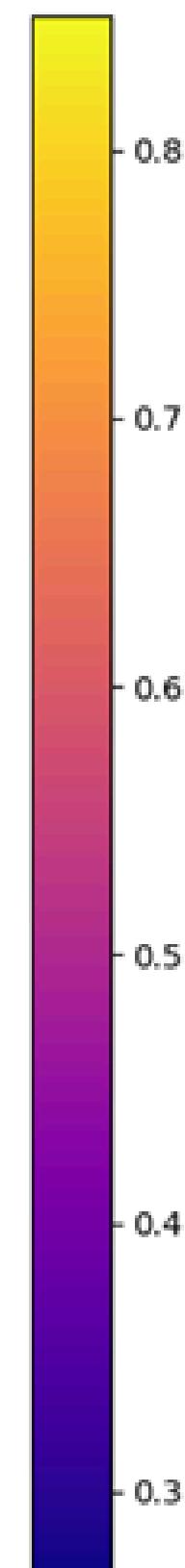
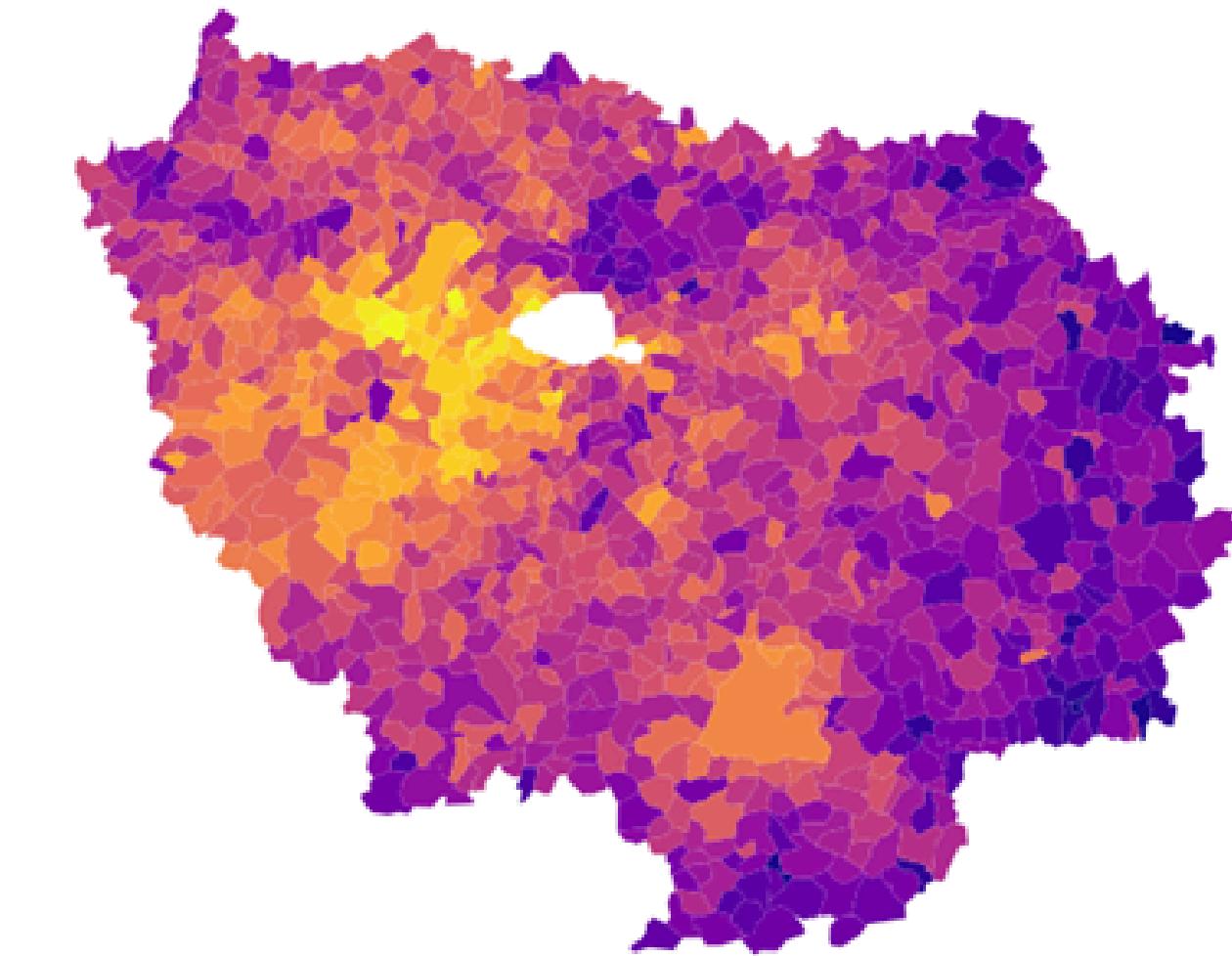
Unemployment in Île-de-France is spatially polarized.
It is closely linked to economic and social inequalities between areas.

High school graduation rate in Île-de-France

Taux de diplômés du baccalauréat (%) - avec Paris

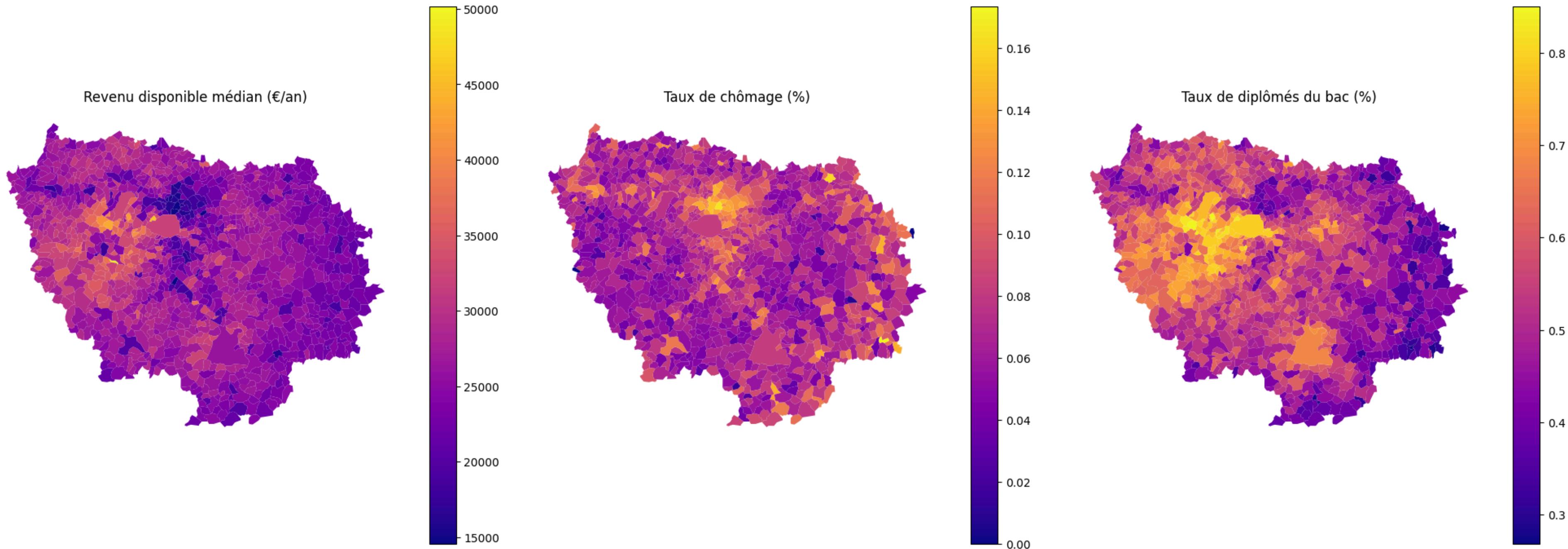


Taux de diplômés du baccalauréat (%) - sans Paris



University graduation rates in Île-de-France are closely linked to socio-economic conditions:
Richer areas → higher graduation rates.

Economic, social, and educational polarization in Île-de-France



The maps show a strong polarization of economy, society, and education in Île-de-France. Education level is closely linked to job opportunities and income.

SCORING SECTION

z-score normalization

$$z_i = \frac{x_i - \bar{x}}{s}$$

xi is each individual value,
̄x is the mean value of the column,
s is the standard deviation of the column.

	NOM	Income_median	Rate of high school graduates	Unemployment rate
0	Paris 1er Arrondissement	33960	0.812463	0.078516
1	Paris 2e Arrondissement	32380	0.840394	0.081152
2	Paris 3e Arrondissement	33180	0.836094	0.080416
3	Paris 4e Arrondissement	31790	0.830495	0.089306
4	Paris 5e Arrondissement	34650	0.852723	0.061617
...
1282	Villers-en-Arthies	28010	0.551221	0.075488
1283	Villiers-Adam	30770	0.637219	0.057848
1284	Villiers-le-Bel	15950	0.388662	0.139074
1285	Villiers-le-Sec	24730	0.593985	0.066116
1286	Wy-dit-Joli-Village	31200	0.643889	0.048695

INCOME MEDIAN'S SCORE + RATE OF HIGH SCHOOL'S SCORE - UNEMPLOYMENT RATE'S SCORE

TOTAL SOCIAL-ECONOMIC SCORE

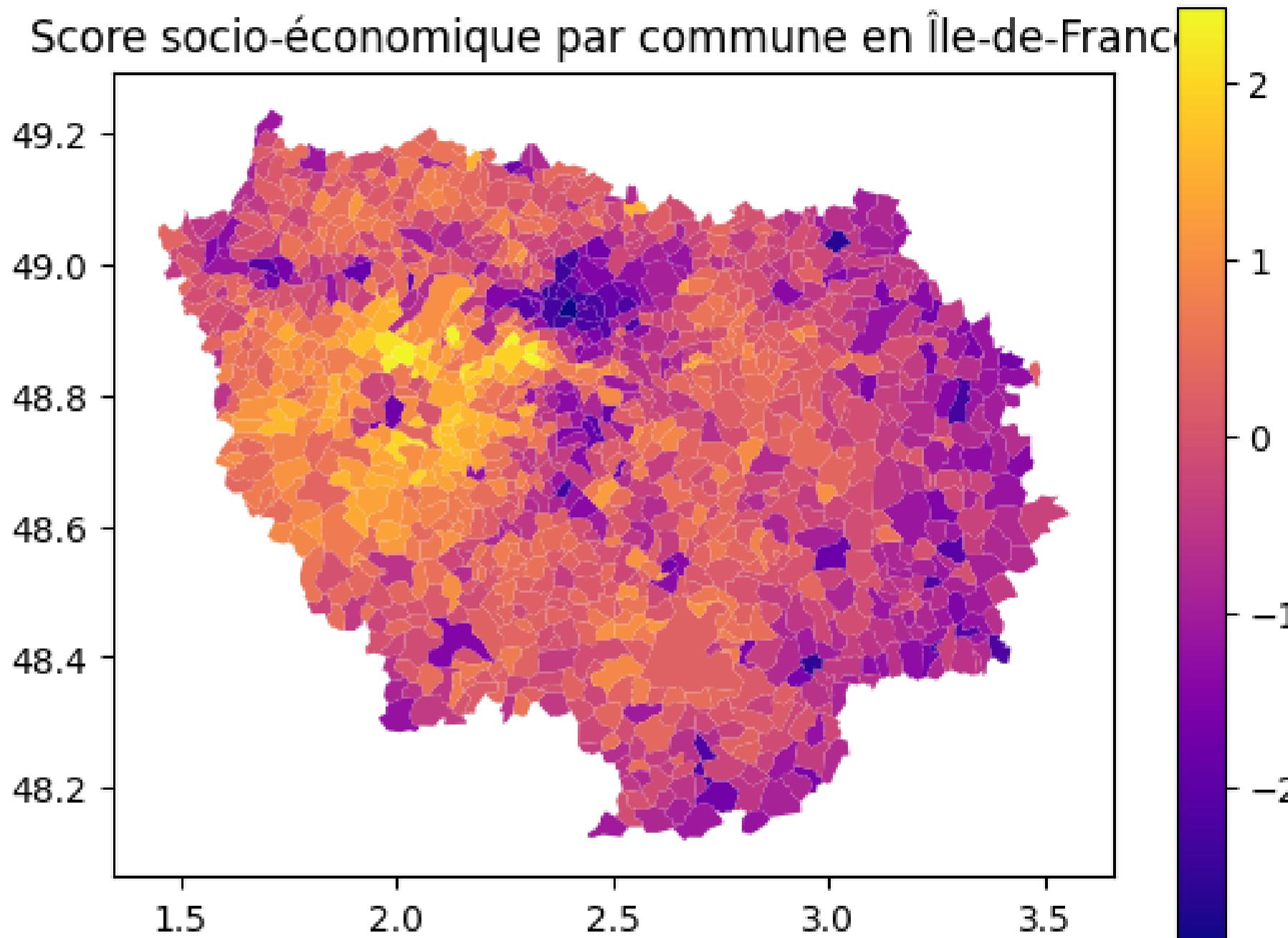
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Income_median's score	Rate of high school graduates's score	Unemployment rate's score	Score_total
1.688659	2.388545	0.294698	1.260835
1.319885	2.639972	0.406546	1.184437
1.506606	2.601270	0.375295	1.244194
1.182178	2.550861	0.752488	0.993517
1.849706	2.750954	-0.422322	1.674327
...
0.299921	0.036886	0.166226	0.056860
0.944109	0.811025	-0.582229	0.779121
-2.514897	-1.426435	2.864052	-2.268461
-0.465635	0.421844	-0.231429	0.062546
1.044471	0.871075	-0.970575	0.962040

Ranking

	NOM	Income_median	Rate of high school graduates	Unemployment rate	Score_total	Rank
6	Paris 7e Arrondissement	44110	0.855623	0.061383	2.422327	Top 10 High
748	Saint-Nom-la-Bretèche	43360	0.849916	0.059025	2.380194	Top 10 High
1004	Neuilly-sur-Seine	45580	0.834563	0.069731	2.355438	Top 10 High
775	Le Vésinet	41900	0.849763	0.053773	2.340428	Top 10 High
685	Milon-la-Chapelle	50140	0.661069	0.062645	2.289839	Top 10 High
581	Chavenay	40000	0.824877	0.042632	2.275499	Top 10 High
7	Paris 8e Arrondissement	42680	0.836218	0.063638	2.220952	Top 10 High
727	Rennemoulin	38090	0.829268	0.041667	2.153729	Top 10 High
609	Feucherolles	41260	0.828422	0.059450	2.146313	Top 10 High
1013	Vaucresson	40220	0.834964	0.056465	2.127243	Top 10 High
1025	La Courneuve	14740	0.351005	0.166759	-2.867145	Top 10 Low
264	Lizy-sur-Ourcq	18560	0.300796	0.160749	-2.635609	Top 10 Low
311	Montereau-Fault-Yonne	16080	0.311191	0.142993	-2.546234	Top 10 Low
1055	Villetaneuse	16140	0.391379	0.151128	-2.416016	Top 10 Low
1261	Sarcelles	16380	0.375527	0.145453	-2.364642	Top 10 Low
868	Grigny	14570	0.366196	0.132729	-2.353504	Top 10 Low
1016	Aubervilliers	14910	0.408117	0.141500	-2.325307	Top 10 Low
1047	Saint-Denis	16200	0.434144	0.151462	-2.287743	Top 10 Low
1042	Pierrefitte-sur-Seine	15720	0.368788	0.134750	-2.284843	Top 10 Low
191	La Ferté-Gaucher	18730	0.332682	0.142723	-2.271766	Top 10 Low

Score socio-économique par commune en Île-de-France



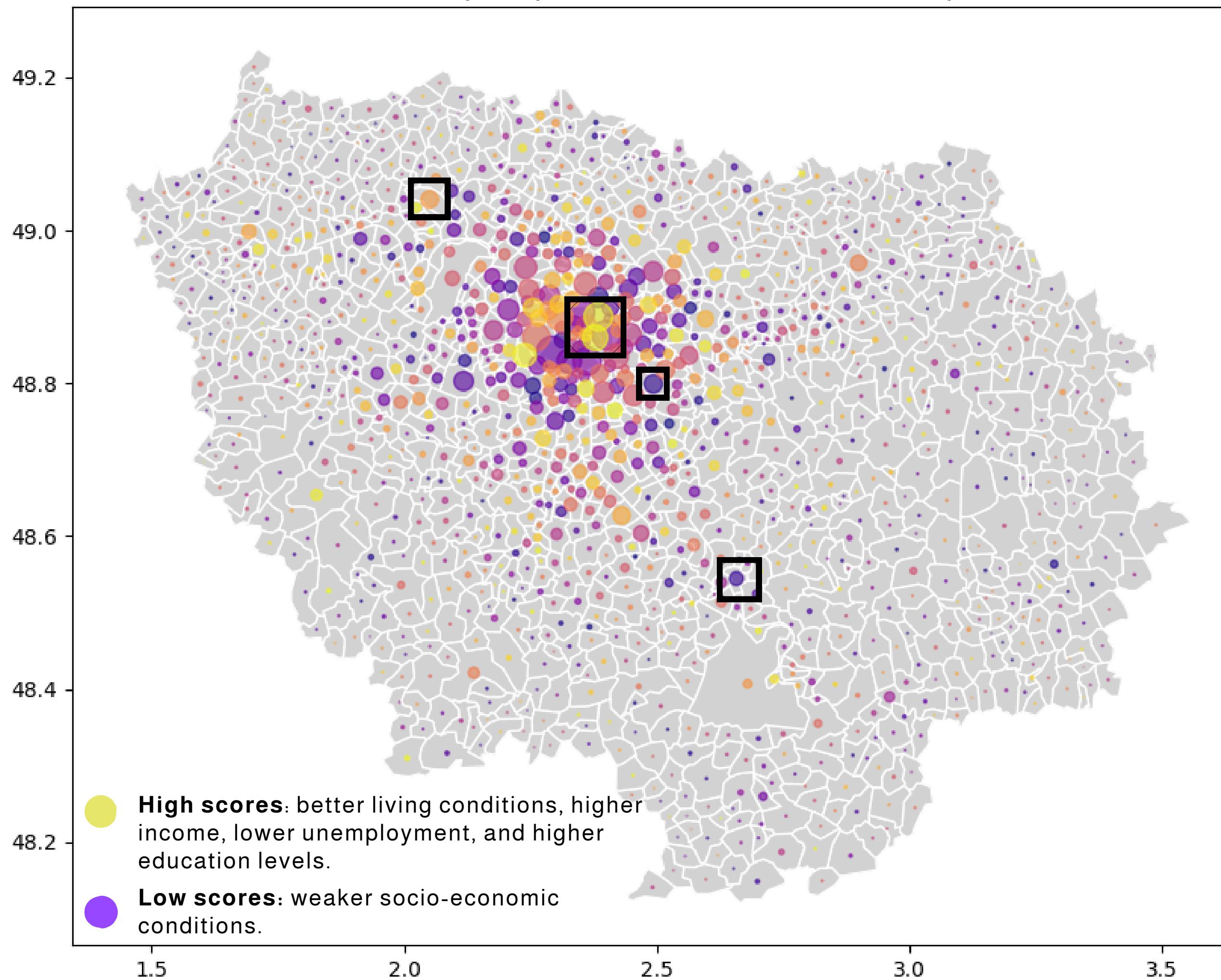
This table clearly illustrates the strong socio-economic disparities within the Île-de-France region.

The wealthy areas — mainly the west of Paris and the upscale suburbs — have the highest scores.

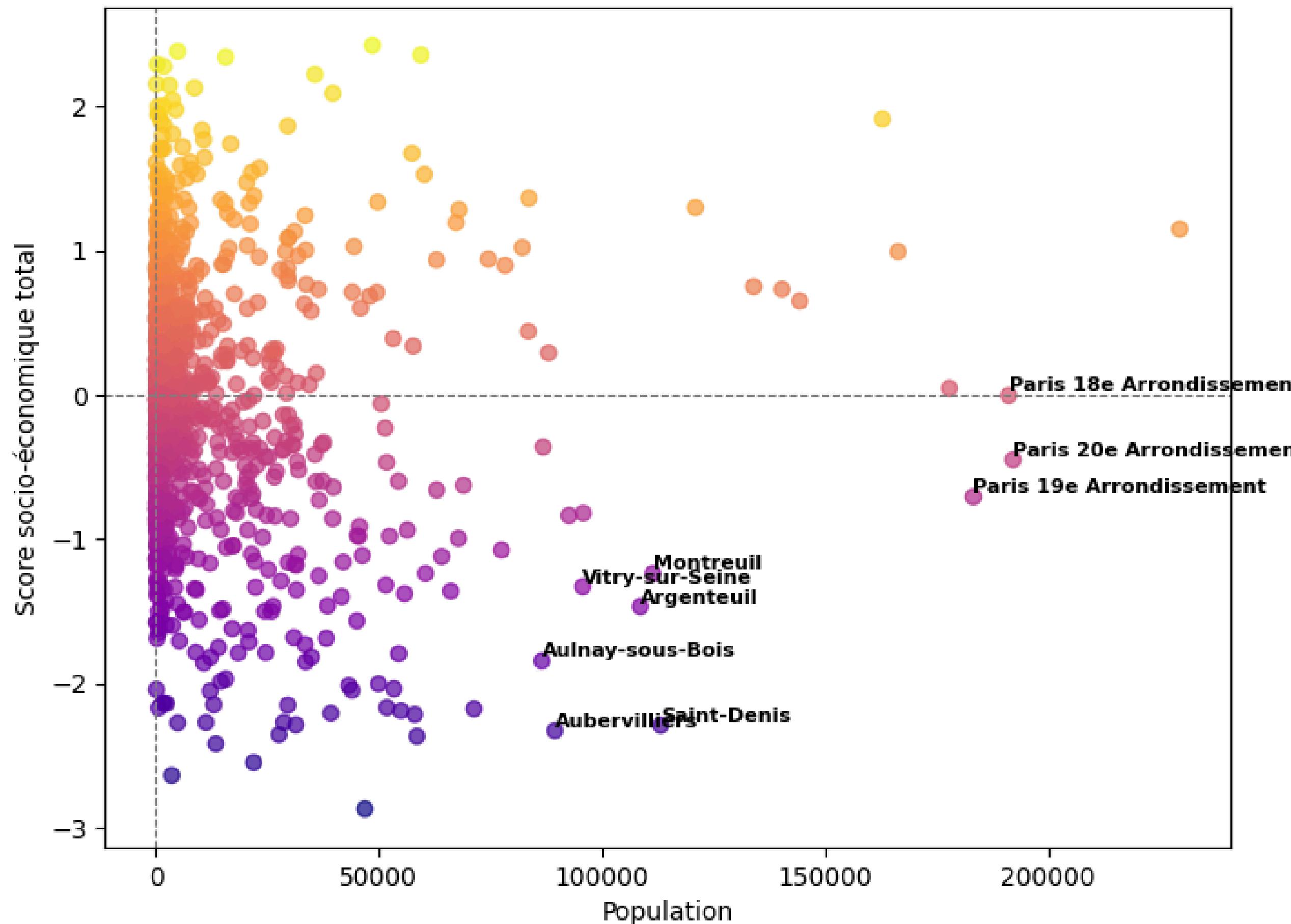
In contrast, **the poorer areas**, especially in the north and east of Paris, show the lowest values.

👉 This provides quantitative evidence supporting the previous map, highlighting the strong polarization between rich and poor in the Paris metropolitan area.

Bubble map : Population et Score socio-économique



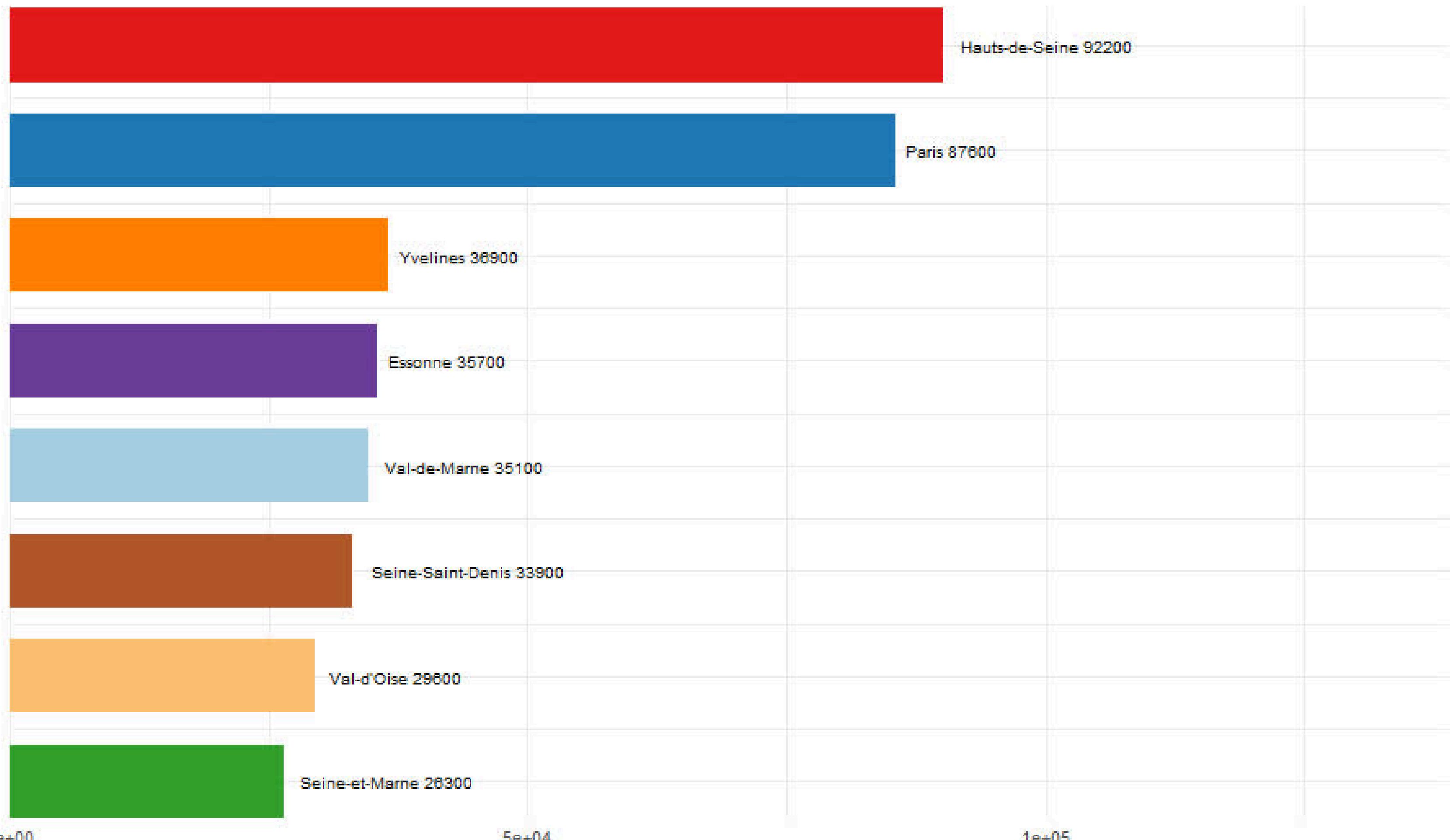
Corrélation entre la Population et le Score socio-économique – Île-de-France



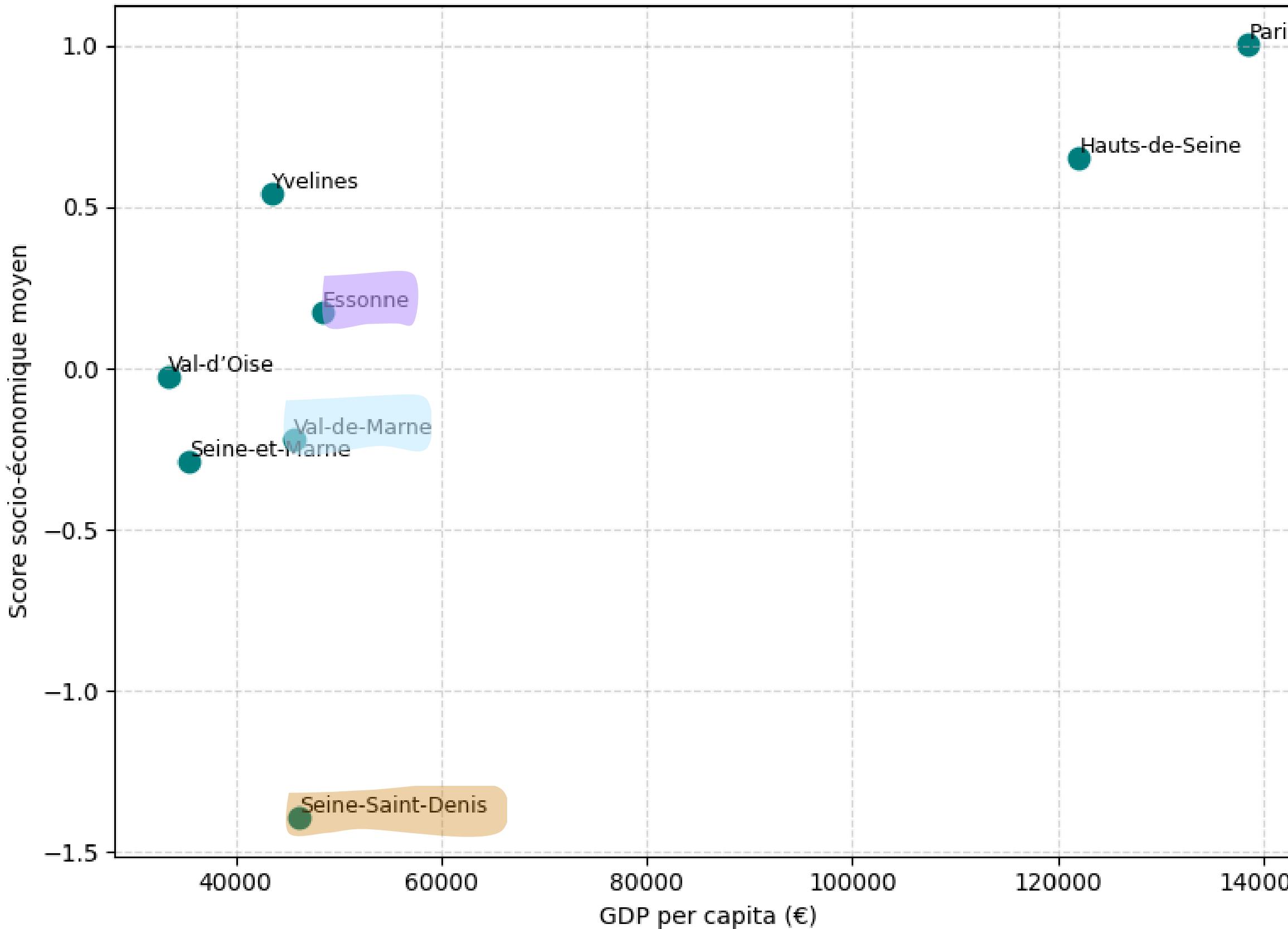
TIME SERIES ANALYSIS

GDP per capita (€) en Ile-de-France

Année: 2009-01-01



Relation entre GDP per capita et Score socio-économique (Île-de-France)



Key insights – GDP vs Socio-economic score

- **Val-de-Marne**, **Essonne**, and **Seine-Saint-Denis** have **similar GDP per capita** but **very different socio-economic outcomes**.
- **Seine-Saint-Denis** shows the **lowest social score**, reflecting **higher unemployment** and **lower education levels**.
- **Essonne** performs **better socially** despite **similar GDP**, showing **higher living standards and stability**.
- This highlights the spatial and social polarization in Île-de-France, where comparable economies can have **contrasting social realities**.

“Paris is not only the ‘City of Light,’ but also a mirror reflecting the growing economic inequality.”

“Paris n'est pas seulement la ‘Ville Lumière’,
mais aussi le miroir des inégalités économiques de plus en plus marquées.”

----- THE END -----

THANK YOU FOR YOUR ATTENTION !!!