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Urban Economics
Quantitative Assignment
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Urban Economics Project:

"In France, are larger cities better places to live in?"

1. Motivation

As urban populations continue to expand, the balance between economic opportunities, housing affordability, and overall quality of life in densely populated areas becomes increasingly complex. While large cities often serve as engines of economic growth by concentrating human capital and fostering innovation, they also introduce significant trade-offs. Higher wages and diverse job opportunities attract workers, yet these benefits are countered by rising living costs, congestion, and environmental pressure. In France, this dynamic is especially evident given the country's highly centralized economy, where Paris holds a disproportionate share of jobs, economic activity, and population density.

Debates surrounding urban policy in France increasingly focus on whether economic activity should be decentralized to alleviate pressure on major metropolitan areas. While larger cities undeniably offer superior infrastructure, cultural amenities, and professional networking opportunities, their high population densities can generate negative externalities, including high housing prices among others. Conversely, smaller cities might provide a more affordable and less stressful environment, but they often struggle to retain talent and attract investment. Understanding whether urbanization continues to enhance well-being or whether its diminishing returns call for a more regionally balanced approach is crucial in shaping future policy.

To assess whether larger cities offer superior living conditions, this study examines three critical factors: income levels, housing costs, and access to amenities. While higher wages in urban areas may suggest greater economic well-being, the real impact of income depends on the cost of living, particularly in the housing market. Additionally, cities offer intangible yet valuable benefits such as cultural institutions, efficient public transportation, and professional networks that enhance daily life beyond financial considerations. By analyzing these dimensions in the context of France's urban hierarchy, we aim to provide a

nuanced understanding of whether larger cities genuinely offer a better standard of living or if their perceived advantages are offset by structural challenges.

2. Data and Definitions

This study relies on multiple data sources to assess whether larger cities in France provide better living conditions. The primary datasets include population estimates from INSEE, specifically the "Estimation de la population par département, sexe, et grande classe d'âge" for 2025. Density data is derived from INSEE's "Densité de population" statistics for 2021. Income levels are analyzed using INSEE's 2022 dataset on net hourly wages, while housing rent data is taken from Data.gouv.fr, which provides estimates for apartments with one or two rooms. Additionally, various INSEE sources supply information on amenities such as crime rates and pollution levels. These datasets form a robust foundation for evaluating economic and social conditions across different French regions. One limitation of this approach is the temporal inconsistency between data sources, as they originate from different years.

For the purposes of this study, we define cities based on administrative units known as départements. These geographical divisions serve as standardized entities for statistical analysis, facilitating comparisons across regions. While communes offer more localized insights, their sheer number (over 35,000) makes them impractical for large-scale analysis. Metropolitan areas, although useful for capturing urban agglomerations, lack uniformity in dataset availability. Départements strike a balance between administrative consistency and manageable granularity, making them the preferred choice for this research.

Several key measures are utilized in this study. Density is defined as the number of individuals per square kilometer, providing a meaningful indicator of urban concentration. Income is calculated as the monthly nominal labor income, assuming a 35-hour workweek. Housing cost is measured as the average rent per square meter for a 50m² apartment. These indicators help determine the relationship between city size and quality of life, forming the basis for evaluating the advantages and disadvantages of living in more densely populated areas.

3.   Main Results

3.1 Definition of Large Cities: Population vs. Density

This study examines both population and density data to define large cities. The average population of a département and its average density provide crucial insights into regional variations. Certain départements, such as Paris, Nord, and Bouches-du-Rhône, have the highest population figures, while others like Lozère, Creuse, and Cantal are among the least populated. Similarly, Paris exhibits the highest density, whereas rural areas such as Lozère have the lowest population density. While both measures—population and density—offer valuable perspectives, density is more relevant for this analysis as it better captures the intensity of urbanization and its associated economic and social dynamics.

To improve the accuracy and interpretability of the analysis, log density will be used instead of raw density values. Given that population density varies significantly across départements, taking the natural logarithm helps normalize the data distribution, making comparisons more meaningful. This transformation enhances the clarity of regression models by reducing skewness and allows for percentage-based interpretations, which are particularly useful in economic and policy-related analyses.

3.2 Nominal Labor Income

Income by Department

To estimate the monthly nominal labor income, data on hourly wages by department was obtained from the Institut National de la Statistique et des Études Économiques (INSEE). The monthly income was calculated under the assumption that individuals work 35 hours per week for four weeks per month. The results (see Table 1, Annex) indicate that income inequality across departments is relatively low, with most observations clustered between €2,000 and €2,100 per month. However, three departments (Paris, Hauts-de-Seine, and Yvelines) stand out as clear outliers, with significantly higher average incomes of €3,903, €3,750, and €3,309 per month, respectively.

At first glance, this data might suggest that residing in one of these three high-income departments would be preferable. However, it is essential to consider the role of population density, as it can influence both agglomeration benefits and congestion costs

Median	€2.084,60
Average	€2.167,28
Average (without outliers)	€2.121,29
Min (Creuse)	€1.862,00
Max (Paris)	€3.903,20

Population Density by Department Monthly Income

To analyze the relationship between income and population density, density data was also sourced from INSEE. The logarithm of density was used to improve comparability, and the data was then plotted, with log(density) on the x-axis and income on the y-axis. The resulting scatter plot suggests a positive correlation between income and density, supporting the notion that higher-density areas tend to exhibit higher wages.
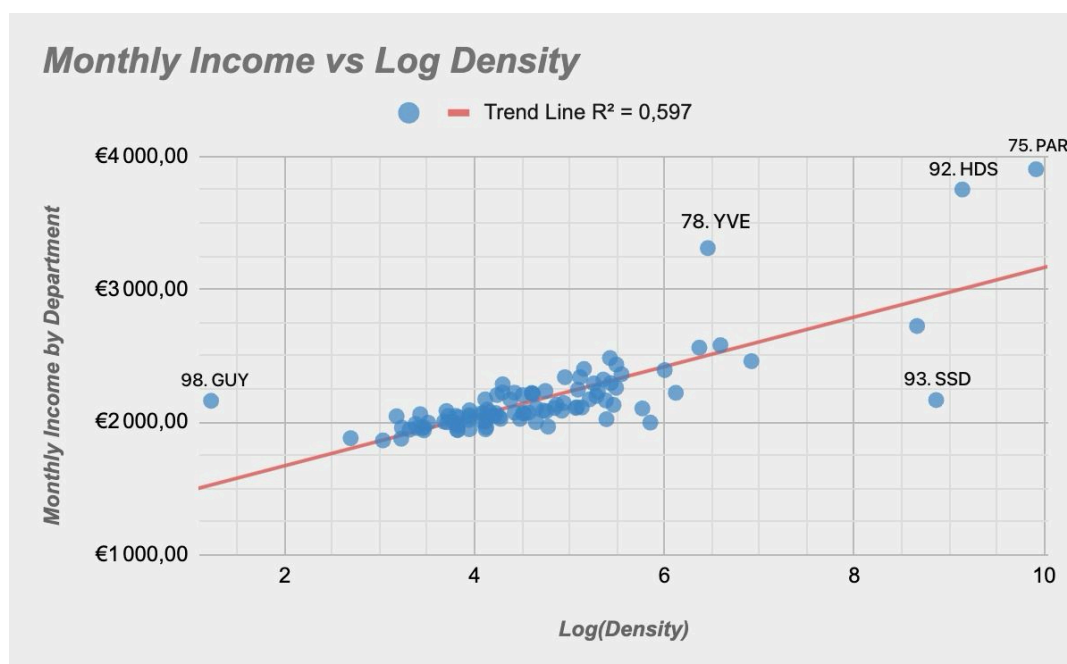
Departments that lie close to the trend line reflect a balance between agglomeration economies, which enhance productivity and wages, and congestion forces, which can limit these benefits through higher living costs, traffic congestion, and pollution. Also, Guyane (98) and Yvelines (78) emerge as particularly advantageous cases. Despite their relatively low population densities, they exhibit incomes comparable to the national average or higher, making them attractive alternatives to highly dense urban centers. In contrast, Seine-Saint-Denis (93) deviates negatively from the trend. Its income level is lower than expected given its population density, suggesting that congestion forces outweigh potential agglomeration benefits, making it a less desirable location from an economic perspective. Lastly, despite their exceptionally high population densities and wages, Paris and Hauts-de-Seine appear to achieve a relative equilibrium between agglomeration and congestion forces, making them neither clearly superior nor inferior living choices compared to other departments.

Factors Driving the Relationship

The positive correlation between income and population density can be explained by several key mechanisms. First of all, larger urban areas facilitate knowledge spillovers, enhance worker-firm matching, and enable shared infrastructure and supplier networks, all of which contribute to higher productivity and wages. Additionally, through sorting mechanisms, more productive firms and skilled workers tend to self-select into denser cities, reinforcing the concentration of economic activity and further driving income disparities. It could also be explained by selection mechanisms such as competitive pressures in larger cities which push less productive firms out of the market, leading to a higher overall productivity level among those that remain.

3.3 Housing Costs

In order to estimate the relationship between density and housing costs, we find the data for average price of 50 m2 housing in France by departments. We also find an estimated value for each department. Later on, we go on to estimate the relationship between these two, the results can be seen below. All of the data has been gathered from Institut National de la Statistique et des Études Économiques (INSEE).

Housing Prices vs. Log Density
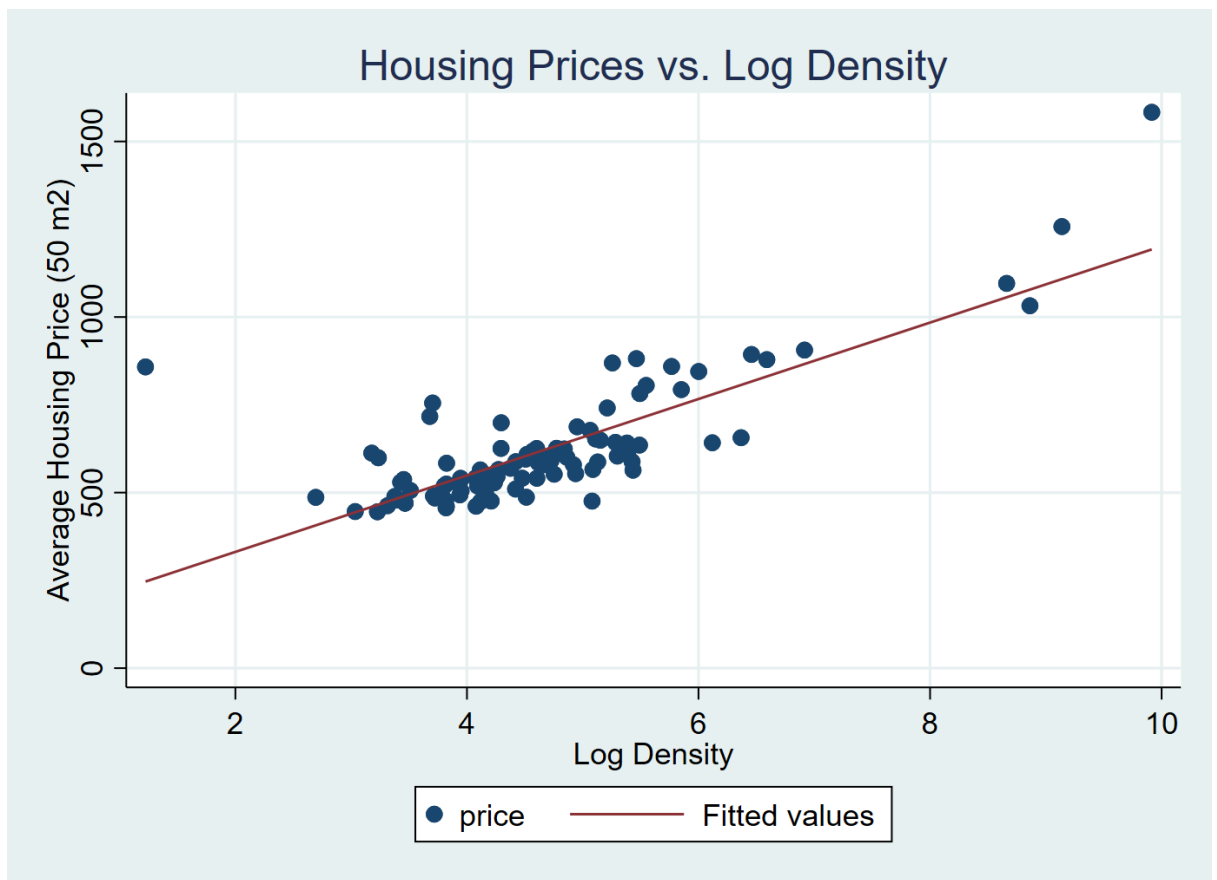
From the scatterplot, we see a clear relationship between density and housing prices where the prices increase as the department gets denser. This means that the same housing will be more expensive in a denser area. Denser area housing will be way more costly.

This can be explained by the fact that denser departments have a lot more people and therefore a lot more demand for housing which clearly drives the housing prices in big cities and denser departments up. This results in the same housing and same m2 being way more expensive in a denser department like Paris area departments than it would be in rural France. There is also the fact that as denser areas have a higher average income per capita, this allows people living in these areas to afford more expensive housing which also contributed to the price discrepancies between dense and not dense departments.

3.4 Disposable Income

To better understand how affordable life is across different regions of France, we computed disposable income, which is the amount of monthly income available to residents after paying for housing. Specifically, we estimated the rent for a 50 m² apartment and subtracted it from average monthly income in each department. Monthly income was calculated by multiplying the average hourly wage by the typical number of monthly working hours in France (approximately 151.67 hours per month).

The scatterplot below displays the relationship between log population density and disposable income. A fitted trend line helps visualize the overall pattern.

Relationship Between Population Density and Disposable Income
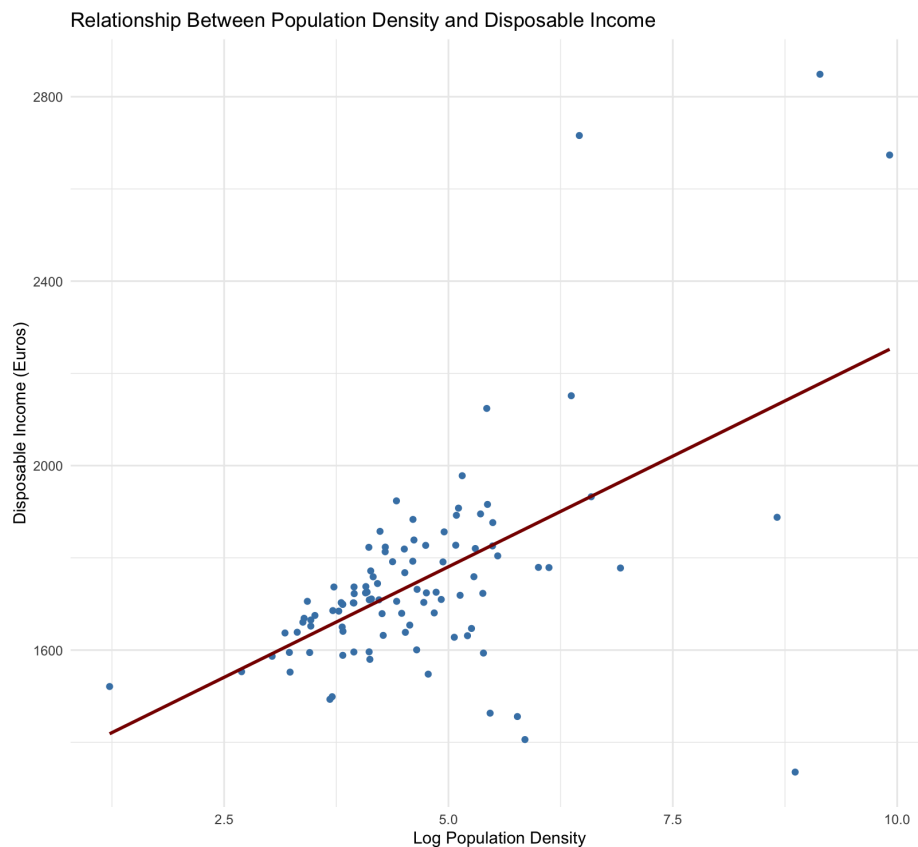
The plot shows a clear negative relationship between population density and disposable income. In areas with higher population density, people tend to have lower disposable incomes, even though nominal wages are often higher. This pattern highlights the trade-off residents face—cities provide better access to jobs, amenities, and services, but these

advantages are offset by significantly higher housing costs, which reduce the amount of income left after rent.

We can see high variation in disposable income across French departments. Generally, areas with lower rents have higher disposable income, even if average wages are lower. In contrast, in wealthier urban areas with high nominal wages, income is often offset by high housing costs, leaving residents with lower disposable income.

Comparing inequality in nominal income and disposable income, while nominal income is much higher in metropolitan regions like Paris and Lyon, these differences shrink significantly once rent is deducted. In fact, some less densely populated rural departments have higher disposable incomes than larger cities, even though they have lower nominal wages. This highlights the powerful role housing costs play in compressing disposable income and reducing effective purchasing power in large cities. This results in regional inequality in disposable income being lower than regional inequality in nominal income. High wages in cities are partially or fully offset by housing costs, creating a form of spatial equilibrium across regions.

If people choose where to live based solely on disposable income, we would expect them to move to less dense areas where housing is cheaper, leaving them with more income after rent. However, the data reveals that many people choose to live in denser areas despite having lower disposable income. This reflects a key insight from urban economics: cities offer benefits beyond just wages and housing costs. In dense urban areas, people and firms benefit from being close to each other—they exchange knowledge, access better job opportunities, and take advantage of shared infrastructure. These agglomeration forces help explain why people are willing to accept higher costs and lower disposable income in cities.

3.5 Amenities

Amenities are characteristics of a location which affect the welfare of the agent present in the location such as firms or individuals. These amenities may be categorized as positive or negative amenities where positive amenities attract agents to the location whilst the negative amenities repulse the agents from the location. Examples of positive amenities may be low crime and clean air for urban workers, and examples of negative amenities may be high levels of pollution or crime.

While we do not have an outright way to make an estimation of amenities due to practical reasons (such as amenities being subjective, not standard and nor clearly defined), we can estimate the relative level of amenities through the Rosen-Roback method. A_i is an amenity.

$$A_i = \beta 1 \log (\text{wages}) + \beta 2 \log (\text{housing price})$$

Where the relative levels of housing prices and wages in an area allow us to estimate a level of amenities for the said area. This is because housing prices and wages are an indicator of amenities so there is a reverse causality we use where the housing prices and wages are high because of high amenities but we use them to estimate amenities.

From the worker's perspective, individuals aim to maximize their utility, which depends on factors such as income, housing costs, and the availability of amenities. Positive amenities, such as low crime rates and clean air, make a location more desirable. This increased demand for housing leads to higher housing costs. On the other hand, negative amenities, like pollution and high crime, decrease the desirability of an area, lowering housing demand and reducing housing costs. If amenities are highly valued, workers may be willing to accept lower wages in exchange for living in areas with better living conditions.

From the firm's perspective, firms factor in labor costs and productivity when choosing a location. In areas with poor amenities, higher wages are necessary to attract workers. In contrast, firms may pay lower wages in locations with high amenities, as workers are willing to trade off some wages for improved living conditions.

In equilibrium, wages, housing costs, and amenities are set in such a way that both individuals and firms are indifferent between locations. Cities with higher amenities typically experience higher housing prices compared to cities with fewer amenities.

When we create a scatter plot, we have the following:

Amenities vs. Log Density
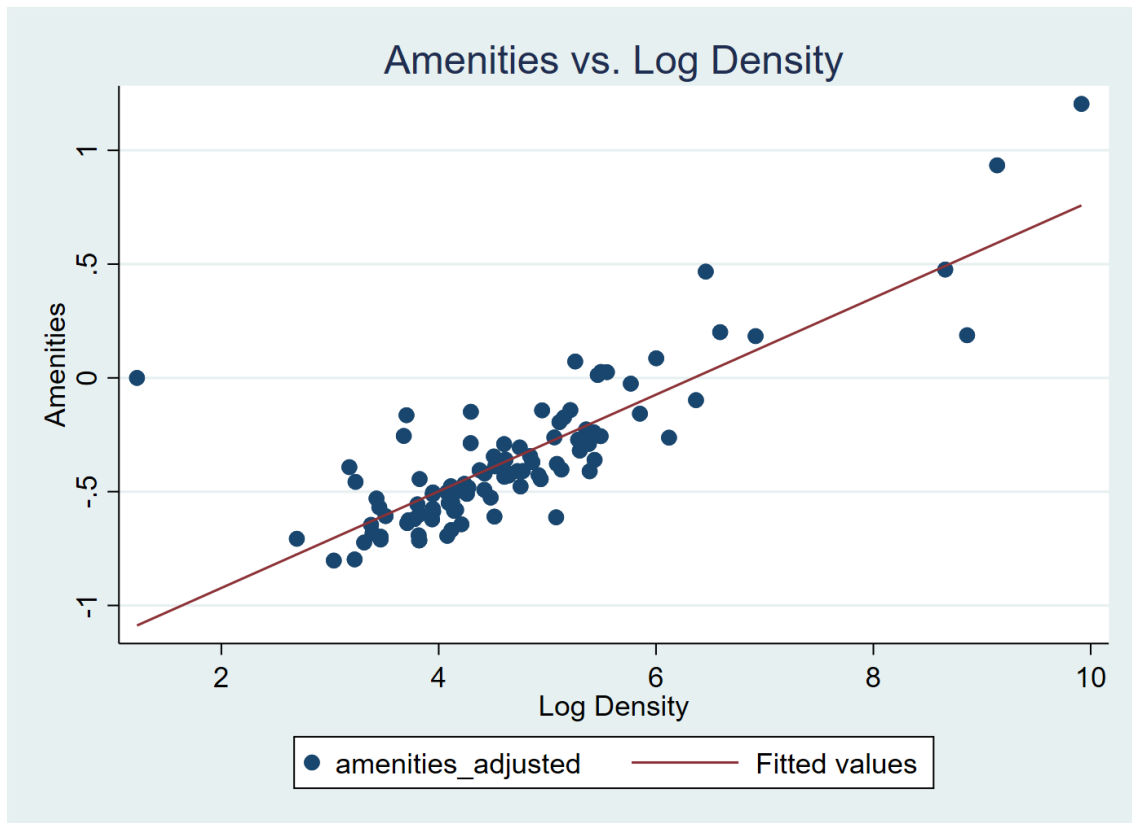
We see that larger cities have more amenities as amenities tend to clearly increase as density increases. However, we also see that when normalized, most departments have negative amenities while only few have positive. This tells us that in France, a few metropolitan areas with very high density tend to create the most amenities and attract domestic migration while the rest of the departments repulse people due to these metropolitan areas and their attractiveness. We see this when we look at the graph that the majority of the departments tend to have low amenities and lower density while only a handful like Paris area departments have positive amenities. All of the departments with positive amenities are also denser than the average department.

3.6 Decomposing Amenities

Education is a key urban amenity, especially in denser areas where schools and cultural institutions are more accessible. Our analysis shows a positive correlation between population density and the number of public secondary schools, suggesting that denser areas tend to offer better educational opportunities. This supports the concept of agglomeration benefits,

where a skilled workforce attracts businesses, creating a cycle of growth, even in the face of the higher cost of living.

Relationship Between Density and Public School
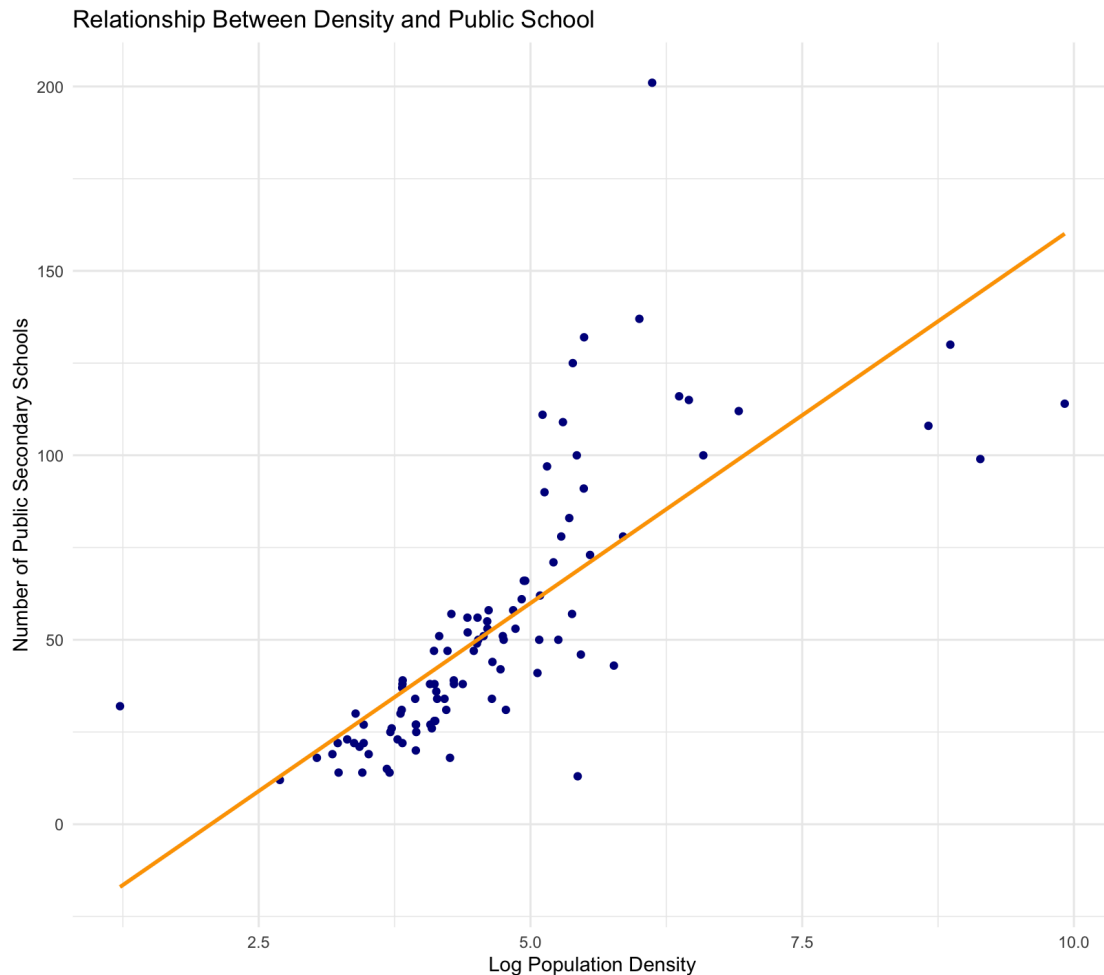
The scatterplot above demonstrates the positive correlation between population density and the number of public secondary schools in French departments. It highlights how denser areas are likely to provide better access to educational amenities, which supports that education is a critical urban asset. This relationship reinforces the idea that agglomeration—where both skilled workers and businesses are concentrated in the same areas—contributes to higher educational attainment, even as the cost of living increases. The plot effectively illustrates this dynamic by showing how densely populated areas may foster educational development and greater opportunities for economic growth.

Conclusion

This project aims to examine whether larger cities in France are better places to live by analyzing the relationship between population density, income, housing costs, disposable income, and amenities.

Our findings show that income tends to be higher in denser areas, reflecting agglomeration forces, which allow firms and workers in larger cities to be more productive. However, these wage gains are often offset by considerably higher housing costs in larger cities, resulting in lower disposable income.

In terms of amenities, our analysis reveals that only a small number of very high-density metropolitan areas generate the majority of positive amenities, while most less dense areas offer far fewer amenities since people are drawn to the economic and social opportunities concentrated in France's largest cities. This highlights how the spatial concentration of economic activity is driven not just by wages, but by the powerful draw of urban amenities, a key feature of agglomeration economies.

Additionally, this analysis focuses primarily on economic factors and does not successfully incorporate subjective measures of well-being, such as happiness or quality of life indices. Including such measures will further enrich the understanding of what makes a place desirable to live, providing a more comprehensive view of urban desirability beyond income and amenities alone.

In conclusion, larger cities in France can be seen as better places to live for those who value economic opportunities and productivity advantages, but they also come with significant costs, especially in terms of housing affordability. This balance between economic advantages and congestion costs is the core issue for determining what makes a place better to live, and it makes the decision process more complex since personal preferences must be taken into account. In particular, if you prefer to live in cities with high productivity and abundant amenities specifically, it is best to choose one of the very high density areas, as only a small number of large cities offer both strong economic opportunities and a wide range of amenities.

ANNEX

Table.1

Code	Libellé	Salaire net horaire moyen 2022	Monthly income	Density	Log(Density)
1	Ain	15,96	€2.234,40	115,1	4,745801316
2	Aisne	14,46	€2.024,40	71,7	4,272490748
3	Allier	14,19	€1.986,60	45,6	3,819907717
4	Alpes-de-Haute-Provence	14,6	€2.044,00	24	3,17805383
5	Hautes-Alpes	13,99	€1.958,60	25,4	3,234749174
6	Alpes-Maritimes	16,86	€2.360,40	256,8	5,548297572
7	Ardèche	14,73	€2.062,20	59,9	4,092676505
8	Ardennes	14,4	€2.016,00	51,4	3,939638172
9	Ariège	13,95	€1.953,00	31,6	3,453157121
10	Aube	14,58	€2.041,20	51,9	3,94931879
11	Aude	13,9	€1.946,00	61,3	4,115779843
12	Aveyron	14,02	€1.962,80	32	3,465735903
13	Bouches-du-Rhône	17,08	€2.391,20	404,3	6,002157177
14	Calvados	15,04	€2.105,60	126,6	4,84103251
15	Cantal	13,39	€1.874,60	25,2	3,226843995
16	Charente	14,77	€2.067,80	58,9	4,075841091
17	Charente-Maritime	14,81	€2.073,40	96,4	4,568506202

18	Cher	14,62	€2.046,80	41,4	3,723280881
19	Corrèze	14,27	€1.997,80	40,9	3,711130063
21	Côte-d'Or	15,51	€2.171,40	61,1	4,112511866
22	Côtes-d'Armor	14,46	€2.024,40	88,1	4,478472533
23	Creuse	13,3	€1.862,00	20,8	3,034952987
24	Dordogne	13,85	€1.939,00	45,7	3,822098298
25	Doubs	15,03	€2.104,20	104,6	4,650143552
26	Drôme	15,5	€2.170,00	79,6	4,377014093
27	Eure	15,82	€2.214,80	99,7	4,602165677
28	Eure-et-Loir	15,88	€2.223,20	73,3	4,294560609
29	Finistère	14,9	€2.086,00	136,9	4,919250732
30	Gard	15,22	€2.130,80	129,3	4,862135286
31	Haute-Garonne	17,73	€2.482,20	227,3	5,426270731
32	Gers	14,71	€2.059,40	30,8	3,42751469
33	Gironde	16,7	€2.338,00	165,9	5,111385197
34	Hérault	15,69	€2.196,60	197	5,283203729
35	Ille-et-Vilaine	16,03	€2.244,20	162,1	5,088213429
36	Indre	13,84	€1.937,60	32	3,465735903
37	Indre-et-Loire	15,85	€2.219,00	99,9	4,604169686
38	Isère	17,14	€2.399,60	172,9	5,152713393
39	Jura	14,67	€2.053,80	51,7	3,945457782
40	Landes	14,54	€2.035,60	45,8	3,824284091

41	Loir-et-Cher	14,92	€2.088,80	51,8	3,947390149
42	Loire	15,08	€2.111,20	160,9	5,080783054
43	Haute-Loire	14,08	€1.971,20	45,7	3,822098298
44	Loire-Atlantique	16,57	€2.319,80	212,1	5,357057862
45	Loiret	15,8	€2.212,00	101	4,615120517
46	Lot	14,25	€1.995,00	33,5	3,511545439
47	Lot-et-Garonne	14,01	€1.961,40	61,8	4,123903364
48	Lozère	13,42	€1.878,80	14,8	2,694627181
49	Maine-et-Loire	14,87	€2.081,80	116	4,753590191
50	Manche	14,79	€2.070,60	83,3	4,422448549
51	Marne	15,74	€2.203,60	69,2	4,237000863
52	Haute-Marne	13,88	€1.943,20	27,5	3,314186005
53	Mayenne	14,34	€2.007,60	59,1	4,079230924
54	Meurthe-et-Moselle	15,31	€2.143,40	139,6	4,93878119
55	Meuse	14,19	€1.986,60	29,3	3,377587516
56	Morbihan	14,9	€2.086,00	112,7	4,724729421
57	Moselle	15,07	€2.109,80	168,9	5,129306824
58	Nièvre	13,97	€1.955,80	29,7	3,391147046
59	Nord	15,86	€2.220,40	454,7	6,119637861
60	Oise	16,7	€2.338,00	141,4	4,951592753
61	Orne	13,88	€1.943,20	45,4	3,815512105
62	Pas-de-Calais	14,44	€2.021,60	219,1	5,389528247

63	Puy-de-Dôme	15,87	€2.221,80	83,1	4,420044702
64	Pyrénées-Atlantiques	15,74	€2.203,60	90,7	4,507557357
65	Hautes-Pyrénées	13,9	€1.946,00	51,7	3,945457782
66	Pyrénées-Orientales	14,04	€1.965,60	118,4	4,774068722
67	Bas-Rhin	16,13	€2.258,20	242,4	5,490589254
68	Haut-Rhin	15,45	€2.163,00	217,6	5,382658515
69	Rhône	18,29	€2.560,60	582,8	6,367844074
70	Haute-Saône	14,29	€2.000,60	43,7	3,777348102
71	Saône-et-Loire	14,82	€2.074,80	64,1	4,160444364
72	Sarthe	14,78	€2.069,20	91,2	4,513054897
73	Savoie	16,32	€2.284,80	73,4	4,295923936
74	Haute-Savoie	16,37	€2.291,80	191,8	5,256453162
75	Paris	27,88	€3.903,20	20238,2	9,915327187
76	Seine-Maritime	15,92	€2.228,80	200,1	5,298817242
77	Seine-et-Marne	17,38	€2.433,20	243,1	5,493472881
78	Yvelines	23,64	€3.309,60	637,5	6,457554277
79	Deux-Sèvres	14,96	€2.094,40	62,4	4,133565275
80	Somme	14,74	€2.063,60	91,8	4,519612298
81	Tarn	14,77	€2.067,80	68,4	4,225372825

82	Tarn-et-Garonne	14,58	€2.041,20	70,8	4,259859001
83	Var	15,51	€2.171,40	183,4	5,21166956
84	Vaucluse	15,05	€2.107,00	158,3	5,064491967
85	Vendée	14,28	€1.999,20	104,1	4,645351976
86	Vienne	14,56	€2.038,40	62,9	4,141546164
87	Haute-Vienne	14,62	€2.046,80	67,3	4,209160237
88	Vosges	14,31	€2.003,40	61,4	4,117409835
89	Yonne	14,62	€2.046,80	44,9	3,804437795
90	Territoire de Belfort	16,38	€2.293,20	229,2	5,434594985
91	Essonne	18,42	€2.578,80	728,1	6,590438401
92	Hauts-de-Seine	26,79	€3.750,60	9312,1	9,139069909
93	Seine-Saint-Denis	15,47	€2.165,80	7064,6	8,862851676
94	Val-de-Marne	19,45	€2.723,00	5776,3	8,661518618
95	Val-d'Oise	17,56	€2.458,40	1008,6	6,91631851
96	Guadeloupe	15,21	€2.129,40	236	5,463831805
97	Martinique	15,02	€2.102,80	319,8	5,7676958
98	Guyane	15,43	€2.160,20	3,4	1,223775432
99	La Réunion	14,26	€1.996,40	347,9	5,851915082
101	Mayotte				
2A	Corse-du-Sud	14,88	€2.083,20	40,6	3,703768067

| 2B | Haute-Corse | 14,31 | €2.003,40 | 39,6 | 3,678829118 |