VU VRIJE UNIVERSITEIT AMSTERDAM

Suburbanites:

Analysing the Evolution of Commuting Dynamics in The Netherlands

---

Group 2b

Author: Andrés Guzmán Cordero

June 28, 2022

Research Paper

Introduction

Background Literature

Two main focuses

- The influence of agent's characteristics in commuting behaviour
- The influence of spatial structure in commuting behaviour

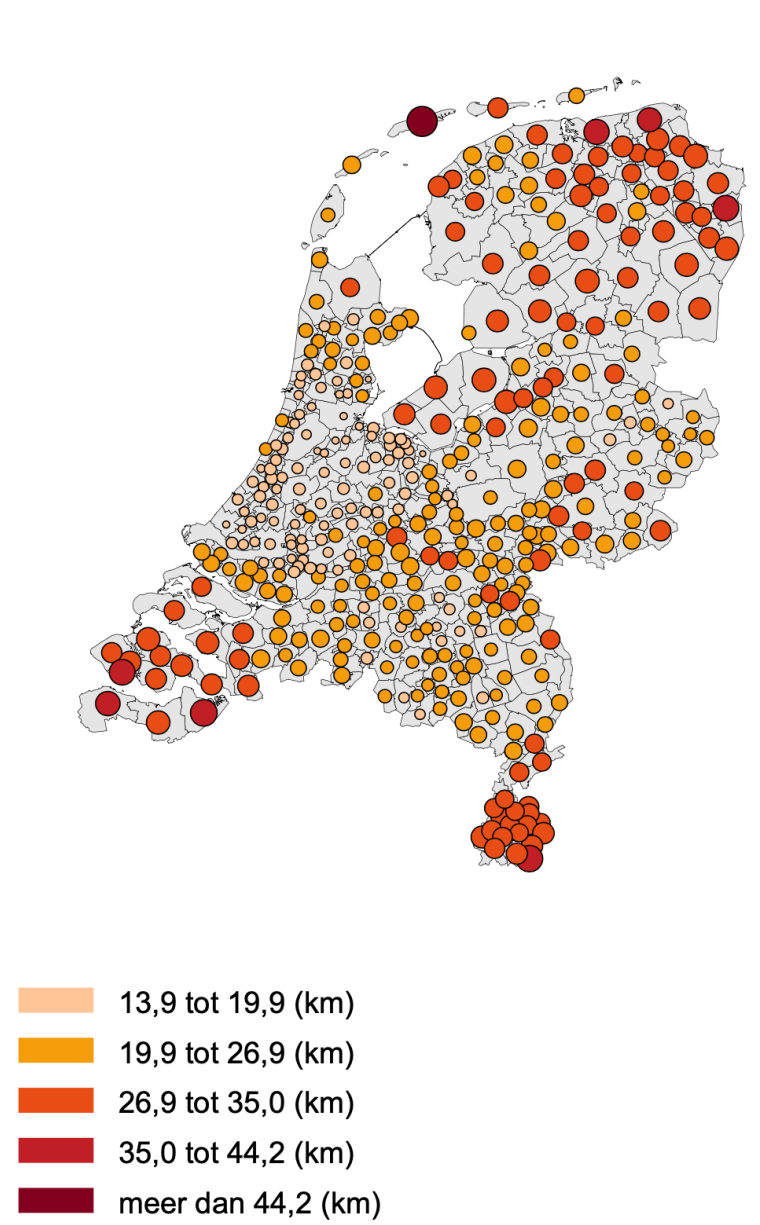
Methodology

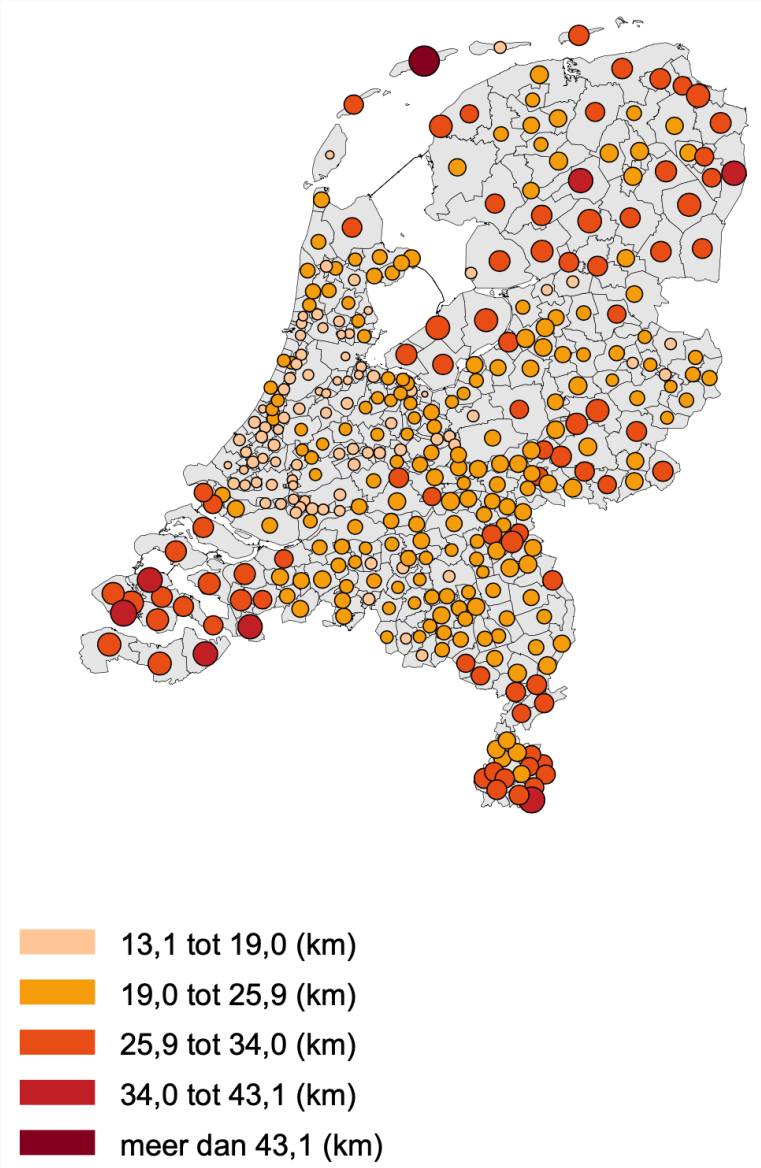
Data - Transport Choice

Transport Mode	**Distance** (*km*)			**Time** (*min*)		
Year	2018	2019	2020	2018	2019	2020
Auto (Driver)	25,05	25,22	22,81	30,76	30,88	27,83
Auto (Passenger)	22,74	25,41	18,59	30,47	31,99	26,82
Bicycle	4,74	4,85	4,43	18,99	19,34	18,65
Walking	2,47	2,91	1,79	11,89	13,97	12,21
Other	24,76	21,58	16,97	32,83	30,16	24,59
Private Transport	15,95	15,99	12,92	24,99	25,27	22,02
Train	40,75	41,16	38,40	66,75	67,07	65,66
Bus/Tram/Metro	15,32	15,21	14,29	42,96	42,42	43,99
Public Transport	28,04	28,19	26,35	54,86	54,75	54,83
Total	19,23	19,26	16,66	29,60	29,92	26,13

Table 1: Descriptive Statistics 2018-2020

Data - Work/Home distance





Data - Commuting Network

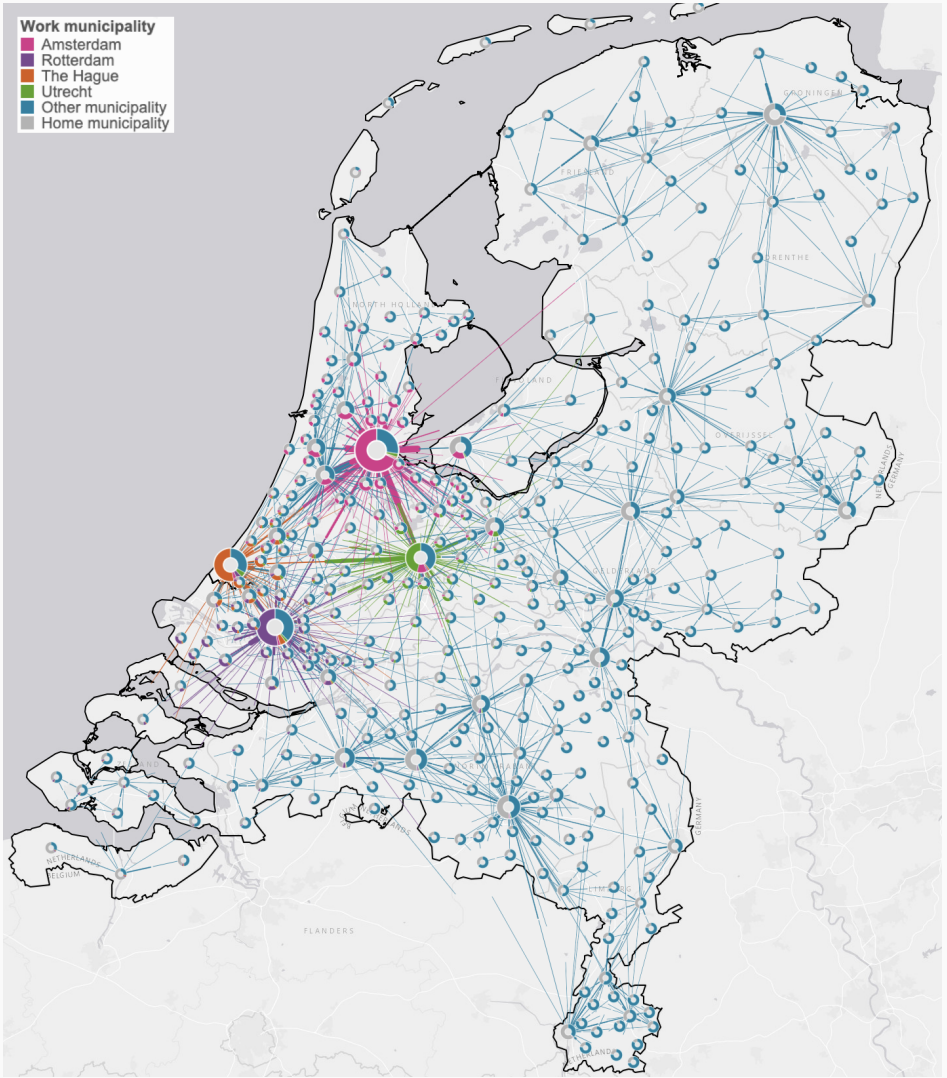


Figure 3: Commuting trends in Netherlands - 2019

Gravity Model of Migration

$$G_{ij} = A\frac{m_i^{\alpha} n_j^{\beta}}{r_{ij}^{\gamma}} \tag{1}$$

$$\ln G_{ij} = A + \alpha \ln m_i + \beta \ln n_j - \gamma \ln r_{ij} + \varepsilon_{ij} \tag{2}$$

Distance Decay

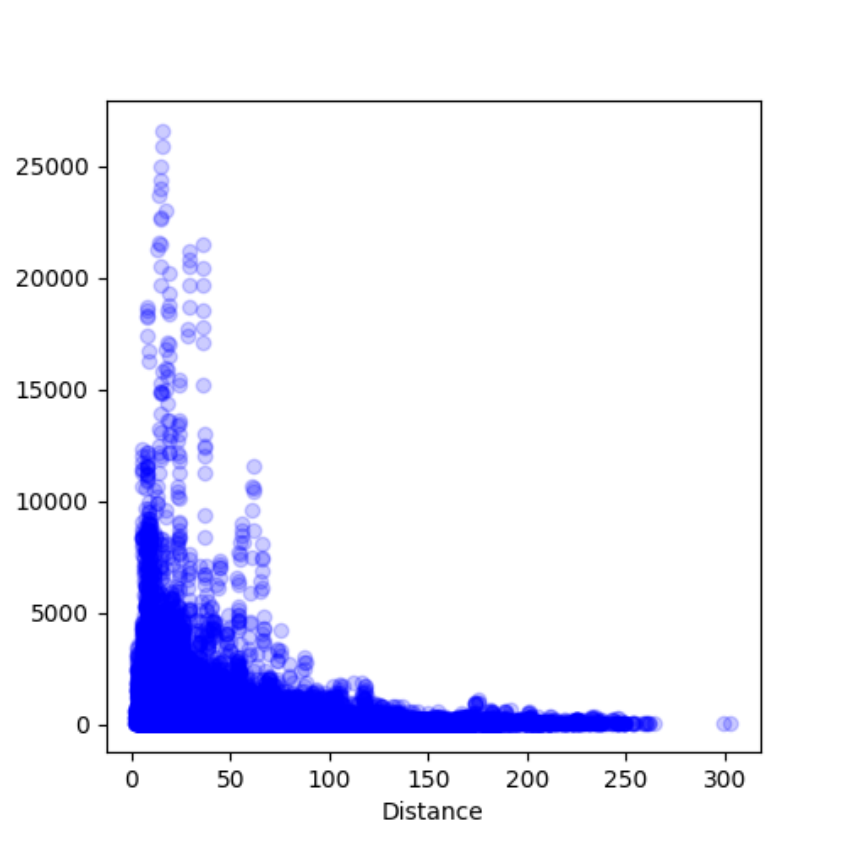


Figure 4: Distance Decay - Empirical Results

Results

Linear Regression

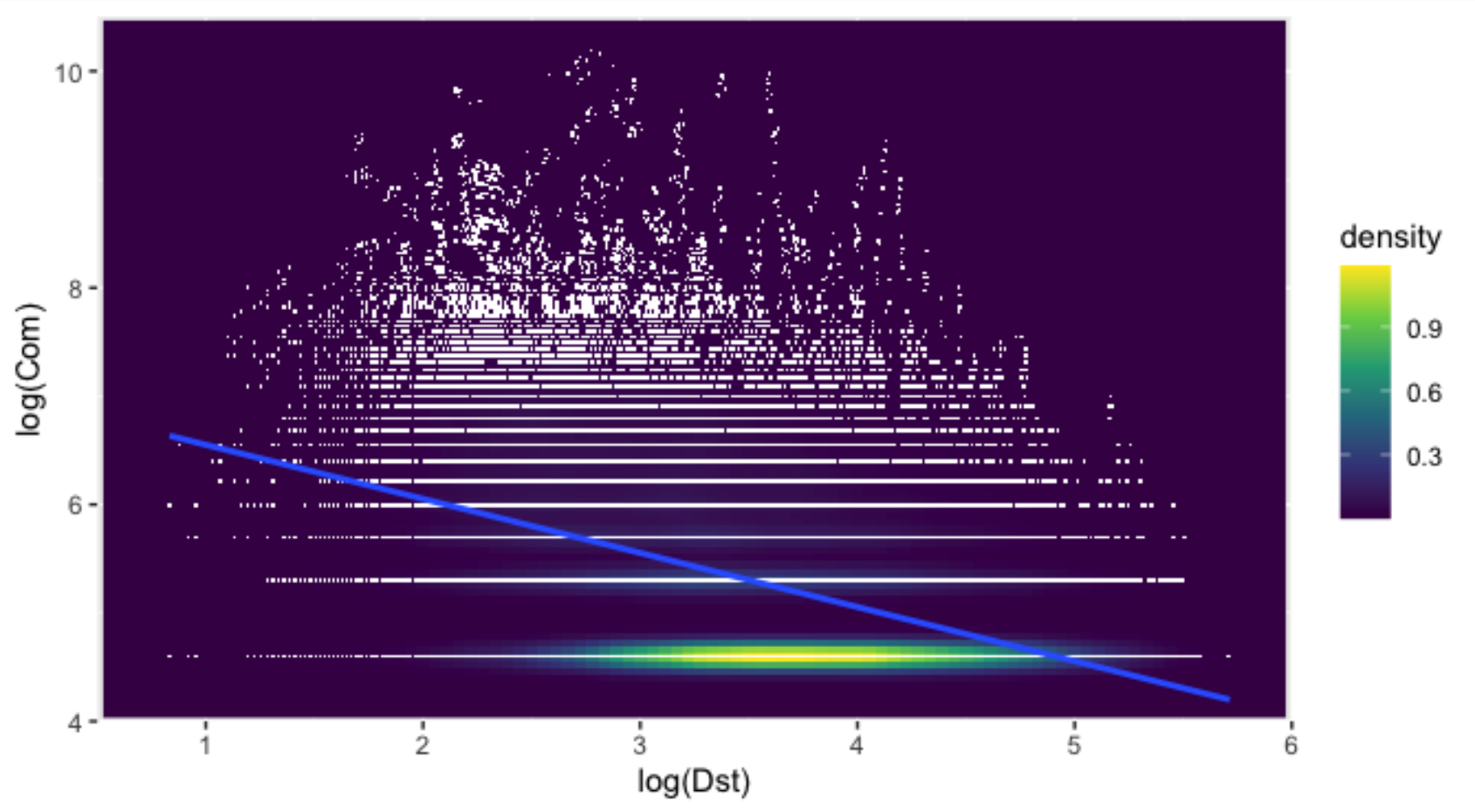


Figure 5: OLS Results - General Model

Regression Results

	Dependent variable:		
	(1)	(2)	RLM
Destination Pop	0.559***	0.556***	0.538***
	(0.003)	(0.003)	(004)
Distance	-0.981***	-0.974***	-0.964***
	(0.004)	(0.004)	(0.003)
Origin Pop	0.392***	0.391***	0.373***
	(0.003)	(0.003)	(0.003)
const	-1.671***	-1.662***	-1.400***
	(0.040)	(0.043)	(0.041)
Observations	79,427	68,273	79427
R^2	0.509	0.519	0.508 -
Adjusted R^2	0.509	0.519	0.508 -
Residual Std. Error	0.664	0.670	0.663
F Statistic	27495.553***	4012.458***	23483.397*** -
Notes:	*p<0.1; **p<0.05; ***p<0.01		

Table 2: OLS Estimation Results - Gravity Models

Error Grid

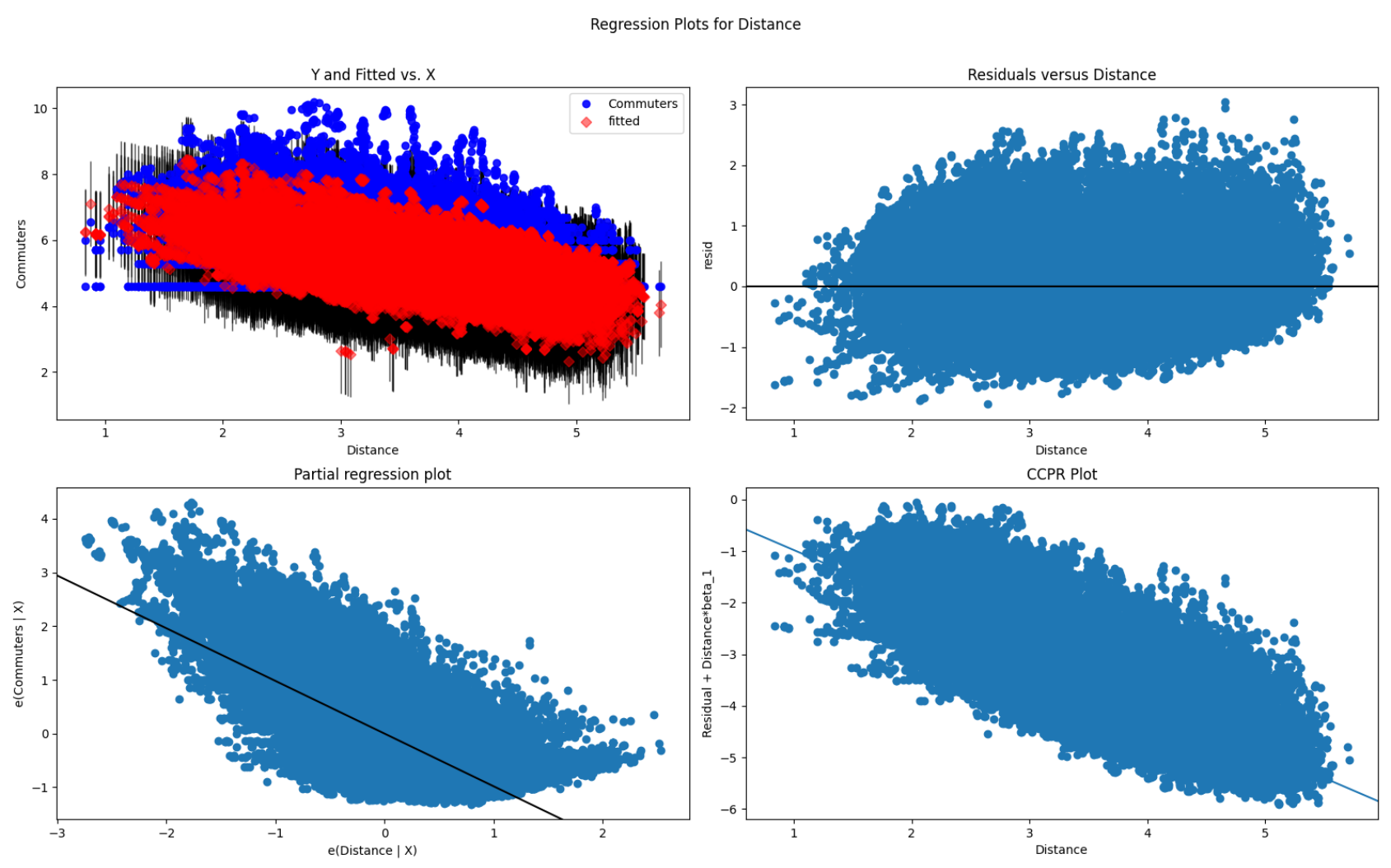


Figure 6: Error Grid - General Gravity Model

Diagnostics

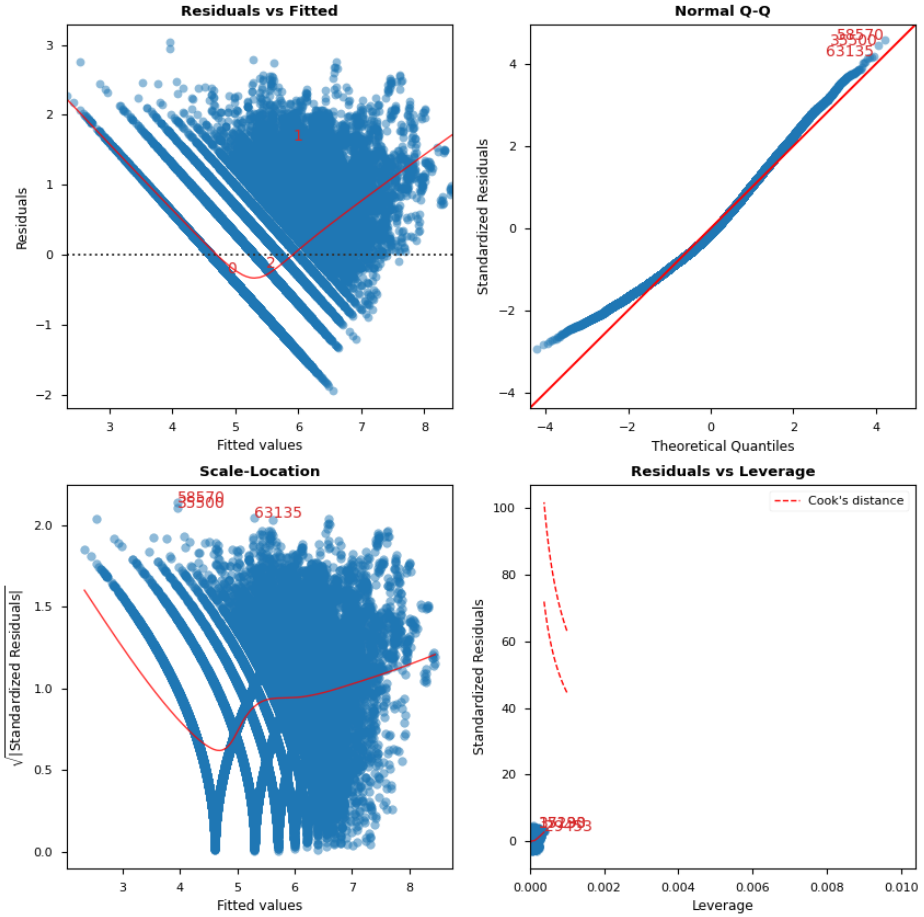


Figure 7: Diagnostics - General Gravity Model

Discussion

Commuting Behaviour

- Continuous trends - Choice in transportation and disperssion
- Expanding on agent's characteristics - Education Income
- Mobility trend and optimal road pricing
- IV estimation when incorporating road pricing
- Comparative analysis with the radiation model
- Spatial autocorrelation and time-series approach
- Changing municipalities
- Heteroskedasticity and RLM

Conclusion

Main takeaways

- Dispersion
- Increase in Distance decay
- No significant effects of COVID-19
- Other approaches for further research