Measuring Regional Inequality With Used Car Prices

Bamberg Summer Institute in Computational Social Science

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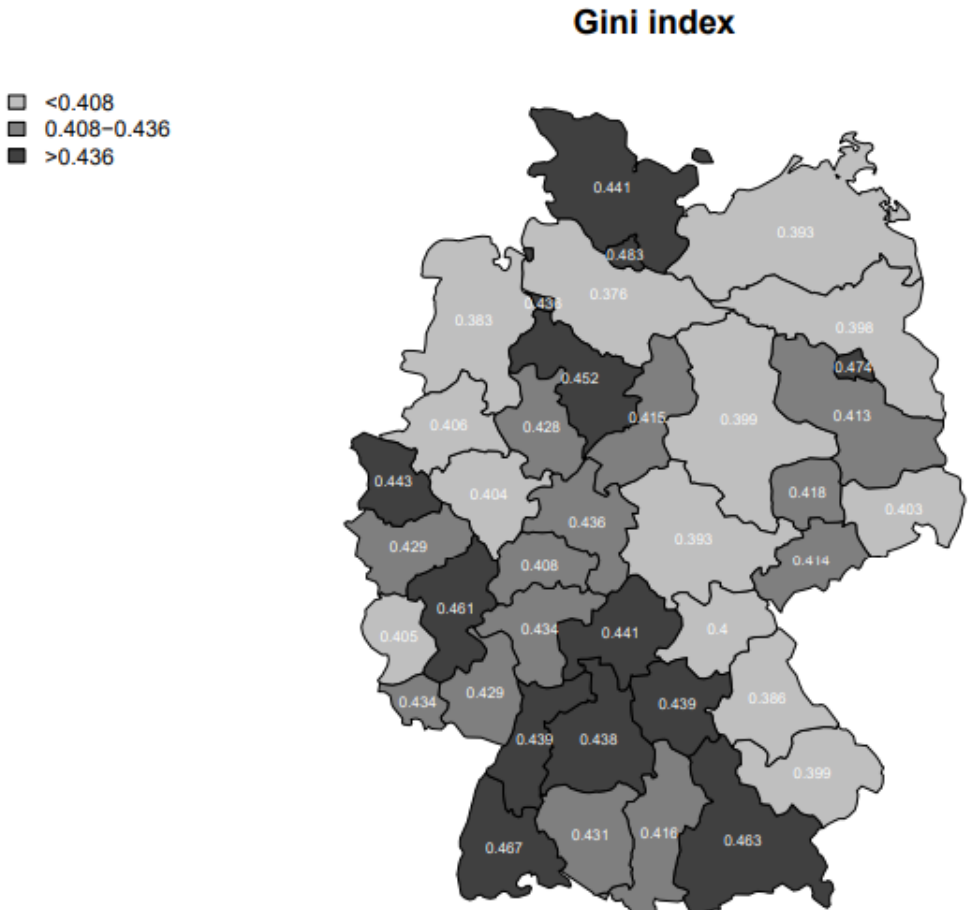
Inspiration

Kholodilin, K. & Siliverstovs, B. (2012) Measuring Regional Inequality by Internet Car Price Advertisements: Evidence for Germany.

Figure 7: Gini coefficient (based on car prices, mobile.de); NUTS2

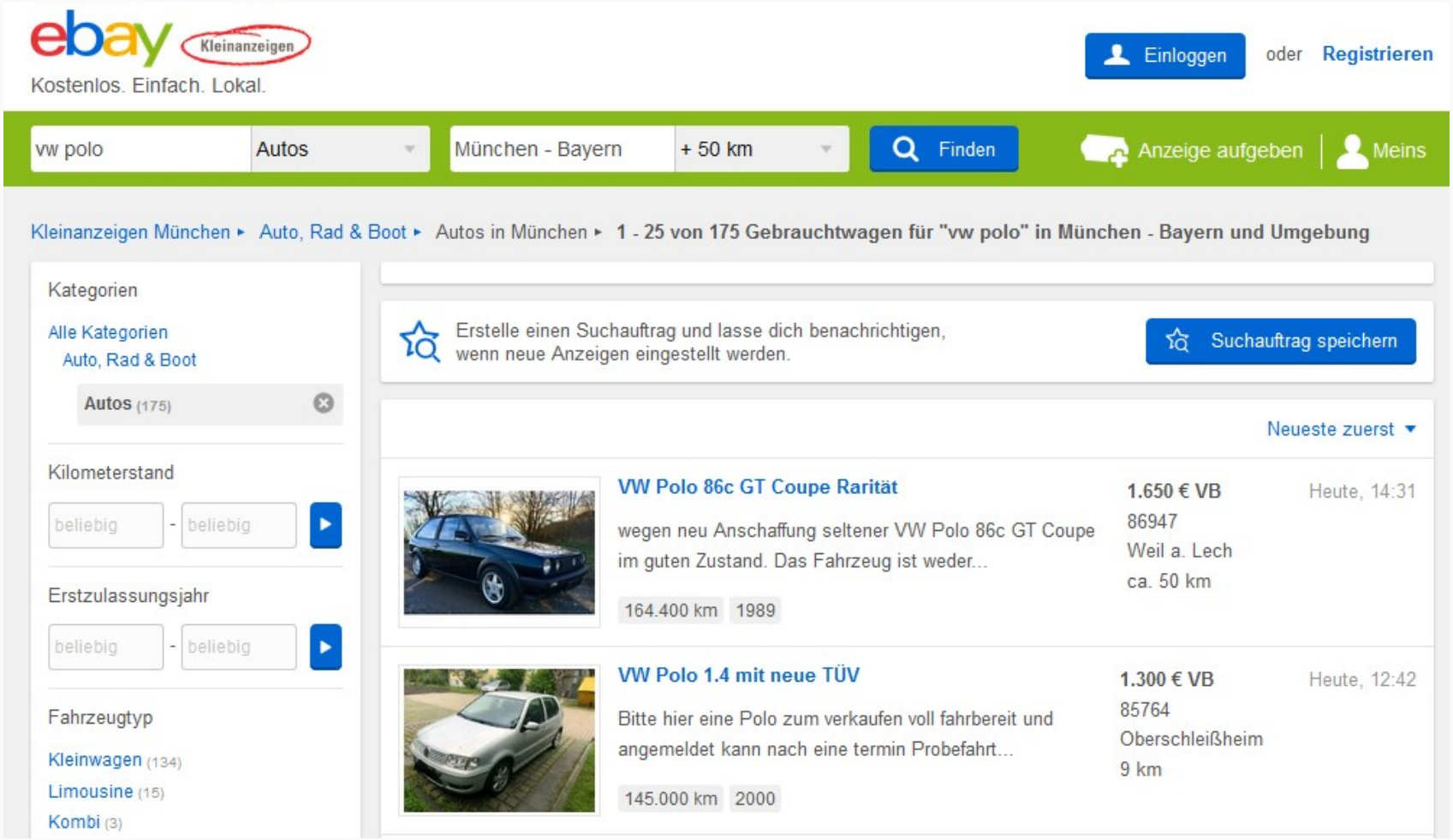


Question and Hypotheses

Research Question
Do economic disparities between German cities/regions influence the prices of used cars?

Hypothesis:
The higher a city's GDP per capita, the higher is the expected price of used automobiles.

Data Scraping



Sample

Five cities (+50km): Munich, Jena, Düsseldorf, Stuttgart, and Deggendorf

Sample

24 representative car models (top registrations per class in 2010)

Car model	Car class	Car model	Car class
Smart-Fortwo	minis	Mercedes-Benz-E	upper middle class car
Fiat-Panda	minis	BMW-5er	upper middle class car
Renault-Twingo	minis	Audi-A6	upper middle class car
VW-Polo	small	Mercedes-Benz-S	upper class car
Opel-Corsa	small	BMW-7er	upper class car
Ford-Fiesta	small	Audi-A8	upper class car
Opel-Astra	compact class	Mercedes-Benz-E	sports-car
Audi-A3	compact class	BMW-Z4	sports-car
VW-Golf	compact class	Porsche-911	sports-car
Mercedes-Benz-C	middle class car	VW-Tiguan	SUV
BMW-3er	middle class car	BMW-X1	SUV
VW-Passat	middle class car	Audi-Q5	SUV

(source: Kraftfahrtbundesamt)

Data

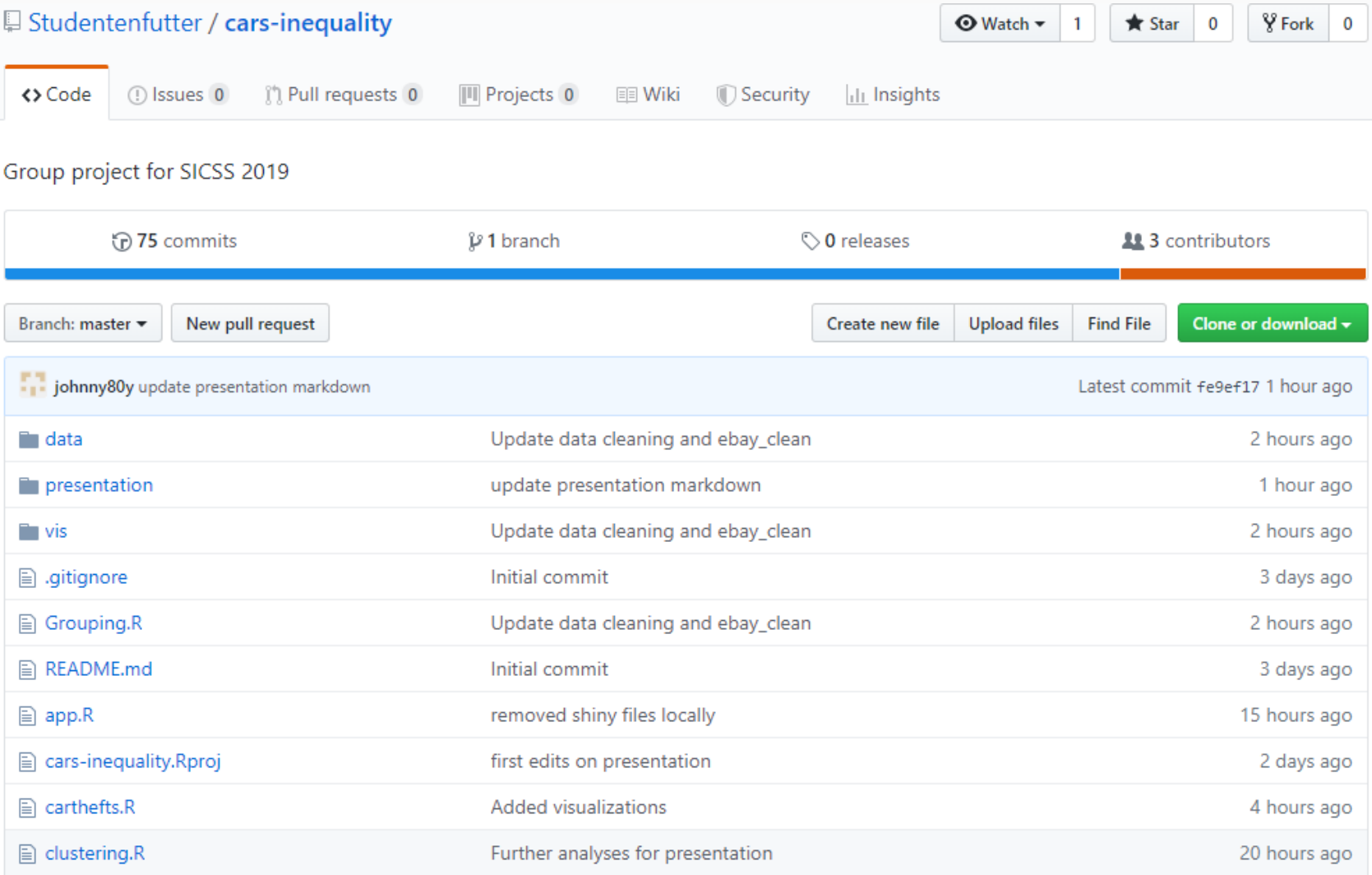
Scraped variables:

- Model & class
- Price
- Description
- Location
- Age & mileage

Merged with macroeconomic indicators:

- GDP per capita
- Household income per capita
- Car thefts per capita

Workflow



Studentenfutter / **cars-inequality**

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Group project for SICSS 2019

75 commits | 1 branch | 0 releases | 3 contributors

Branch: master | New pull request | Create new file | Upload files | Find File | Clone or download

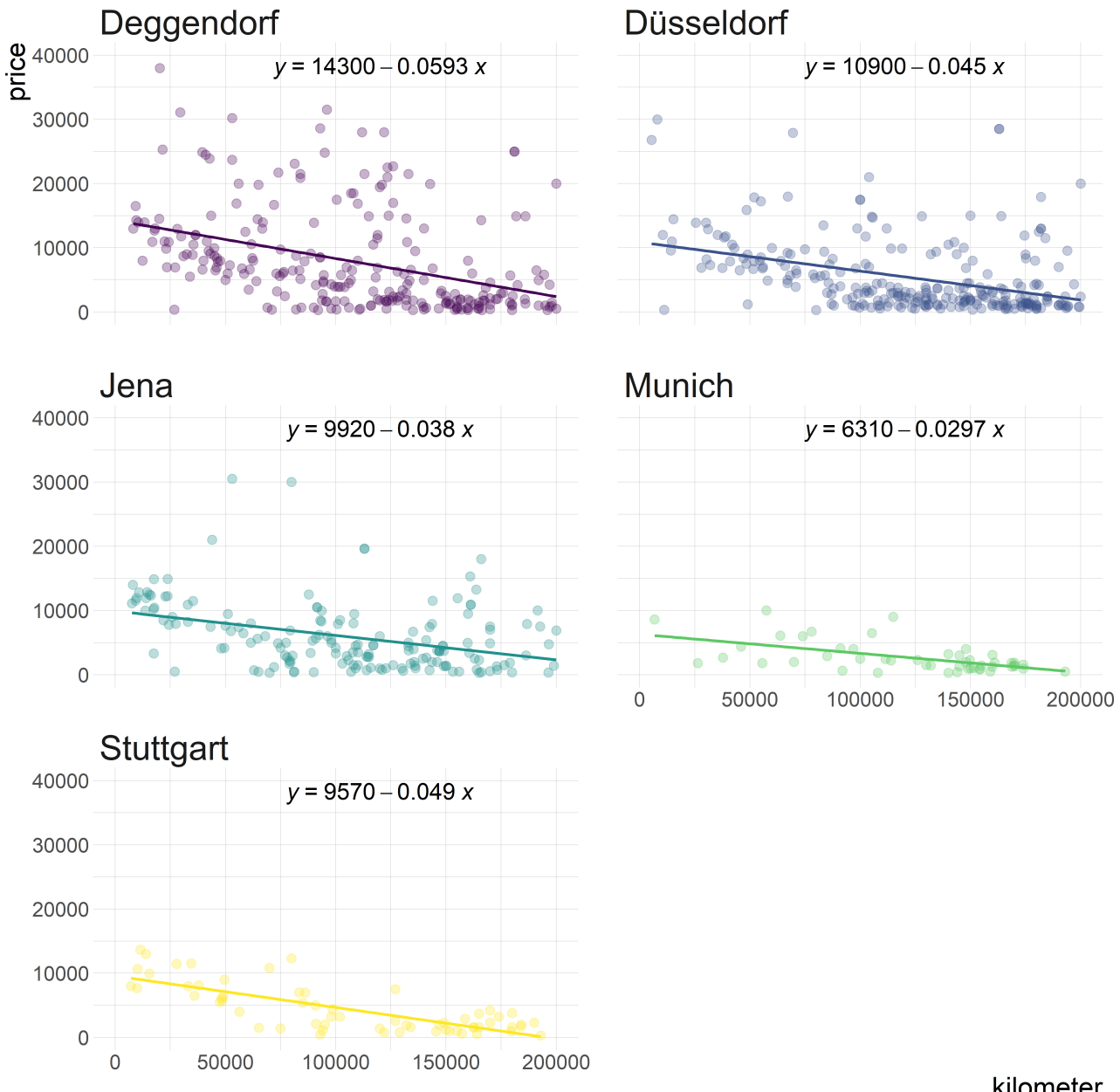
johnny80y update presentation markdown — Latest commit fe9ef17 1 hour ago

data	Update data cleaning and ebay_clean	2 hours ago
presentation	update presentation markdown	1 hour ago
vis	Update data cleaning and ebay_clean	2 hours ago
.gitignore	Initial commit	3 days ago
Grouping.R	Update data cleaning and ebay_clean	2 hours ago
README.md	Initial commit	3 days ago
app.R	removed shiny files locally	15 hours ago
cars-inequality.Rproj	first edits on presentation	2 days ago
carthefts.R	Added visualizations	4 hours ago
clustering.R	Further analyses for presentation	20 hours ago

Workflow

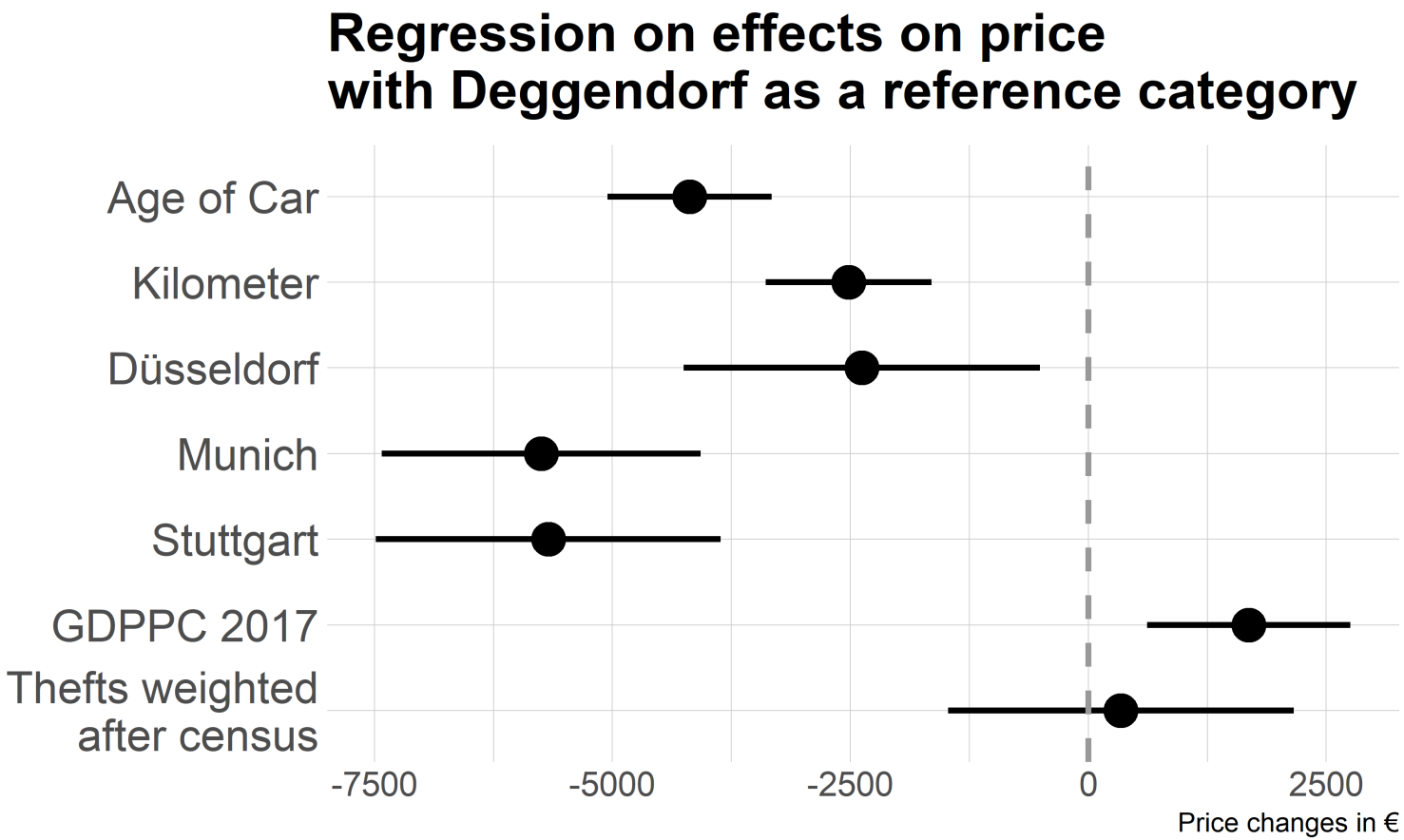
1. Data scraping
2. Data processing
3. Matching with other indicators (ZIP-code level)
4. Regression
5. Mapping / visualization

Analysis

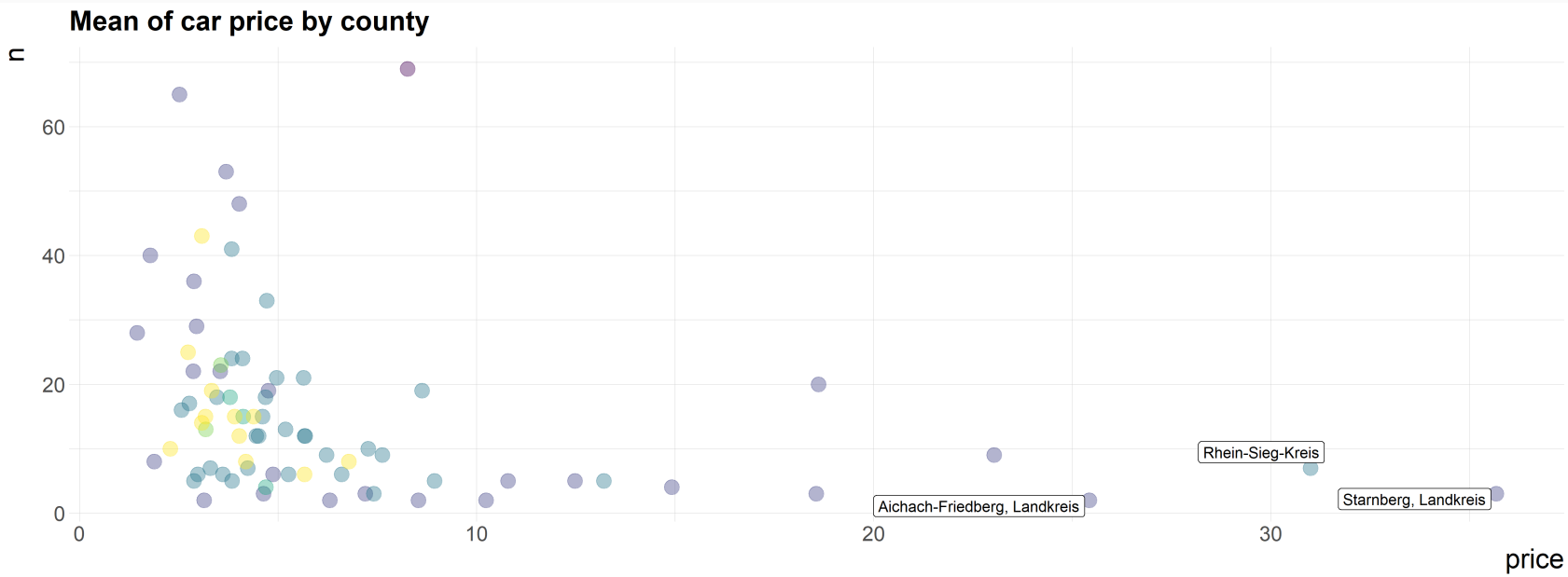

Deggendorf
y = 14300 – 0.0593 x
Düsseldorf
y = 10900 – 0.045 x
Jena
y = 9920 – 0.038 x
Munich
y = 6310 – 0.0297 x
Stuttgart
y = 9570 – 0.049 x
price
kilometer
0
10000
20000
30000
40000
50000
100000
150000
200000

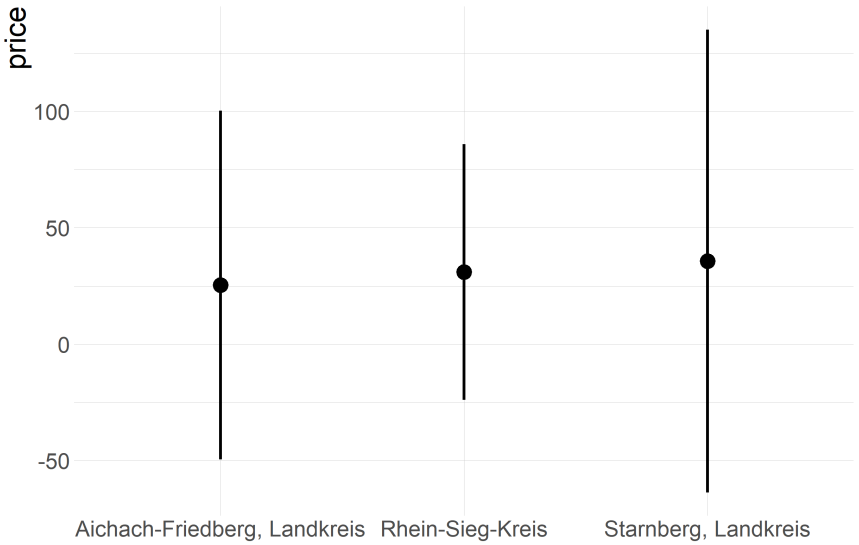
Analysis

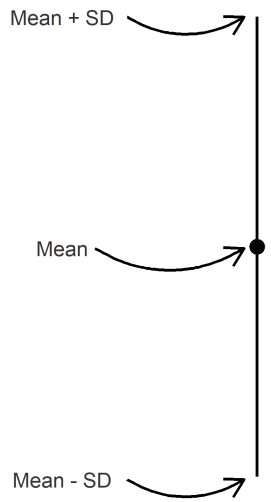
OLS: (price ~ cities + mileage + age + gdp_pc)



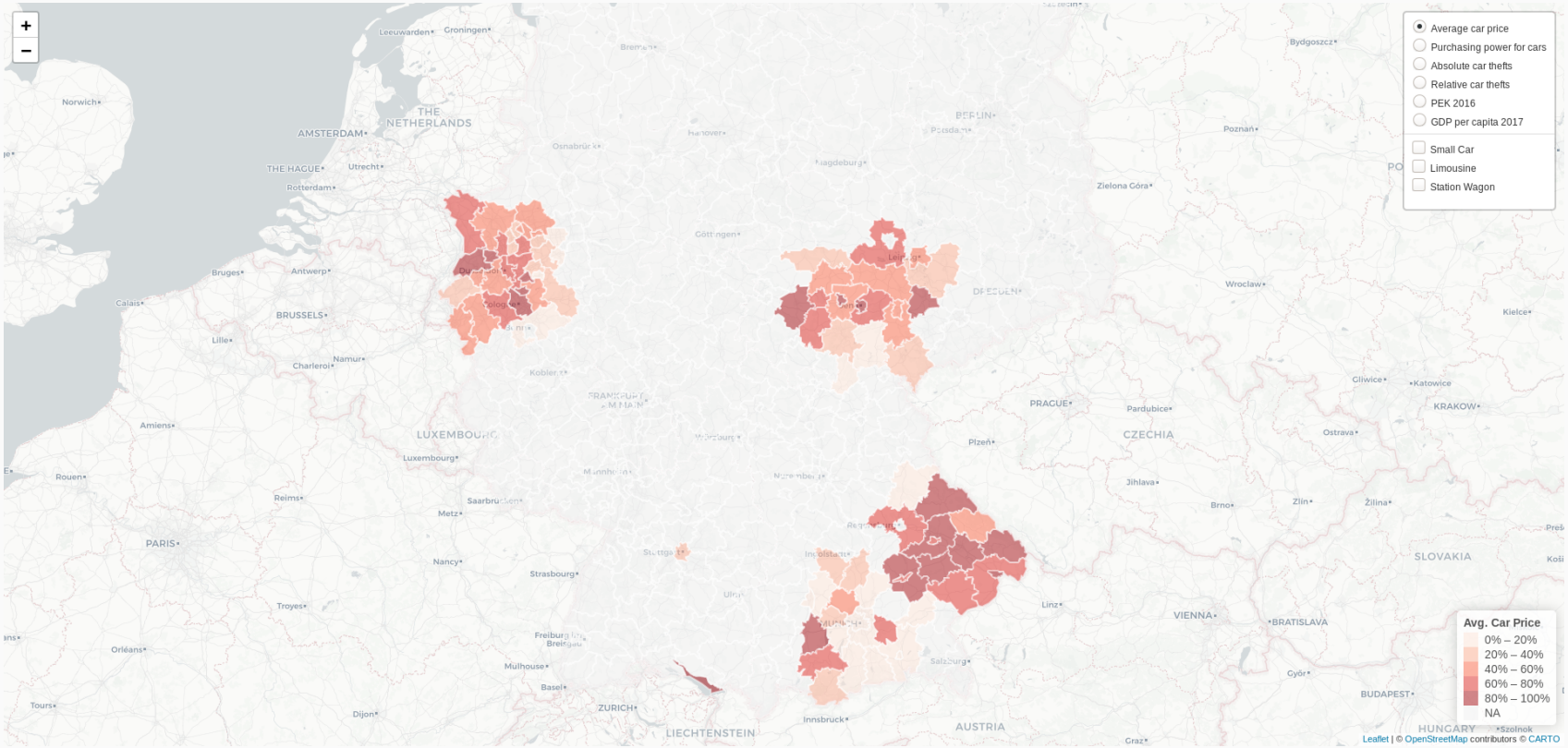
Analysis


Mean of car price by county
n
60
40
20
0
0
10
20
30
price
Rhein-Sieg-Kreis
Aichach-Friedberg, Landkreis
Starnberg, Landkreis


price
100
50
0
-50
Aichach-Friedberg, Landkreis
Rhein-Sieg-Kreis
Starnberg, Landkreis


Mean + SD
Mean
Mean - SD

Map Visualization



https://cloud.sowi.uni-due.de/index.php/s/37LjkxP7DCe4j36

Next Steps

- Extend data collection (more cities, car models, other products)
- Access APIs of other platforms
- Include additional control variables (condition, configurations, etc.)

Application

- Tool for policy advisors
- Potential robustness test for consumer index measures (purchasing power)
- Tool for prospective car sellers/buyers

Sources:

- Kholodilin, K. A., & Siliverstovs, B. (2012) Measuring regional inequality by internet car price advertisements: Evidence for Germany. Economics Letters, 116(3), 414-417. www-sre.wu.ac.at/ersa/ersaconfs/ersa12/e120821aFinal00913.pdf.
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Sources:

- GADM (2018) Country Spatial Data (version 3.6). `https://gadm.org/download_country_v3.html`.
- SERP Perception (2009) Umkreissuche PLZ/Ort. www.serp-perception.com/umkreissuche.php.
- Bundeskriminalamt (2018) PKS 2018 - BKA (Länder-, Kreis- und Städte) Übersicht Falltabellen, Grundtabelle - Kreise - ausgewählte Straftaten/-gruppen. www.bka.de/DE/AktuelleInformationen/StatistikenLagebilder/Polize

Reproduceability

https://github.com/Studentenfutter/cars-inequality

Questions?