Socio-Economic Aspects of Urban Development

Unit 7: Urban Land Use, Building Types, and Home Ownership

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Winter Semester 26/27

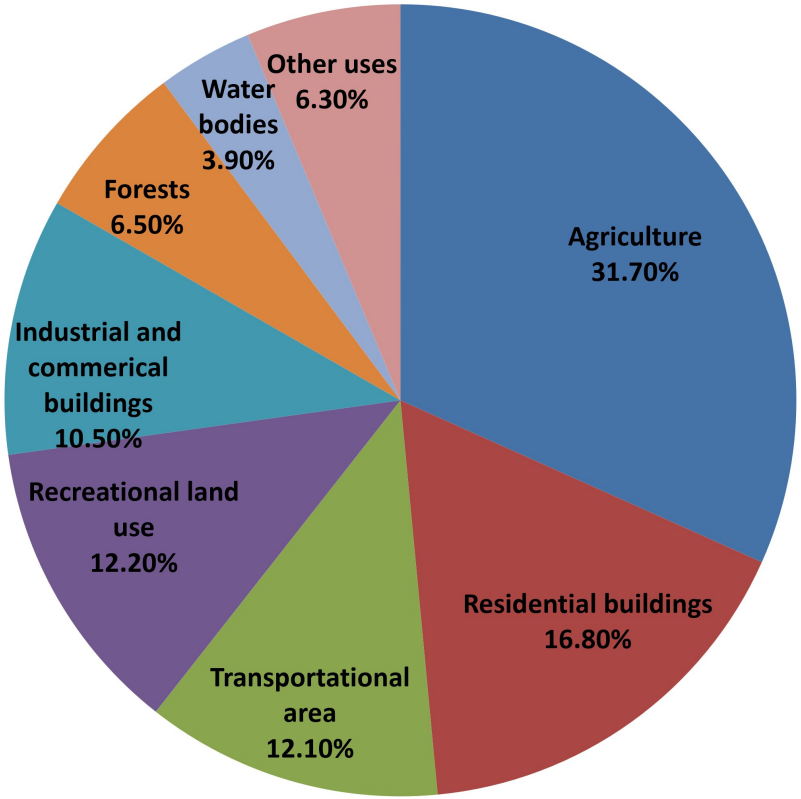
Overview of Unit 7

- What is urban land used for?
- Geography vs. building regulations
- Density and its components
- Residential building types
- Home ownership
  - Variation of home ownership rates across cities and countries
  - Advantages and disadvantages of home ownership

What Can Urban Land Be Used For?

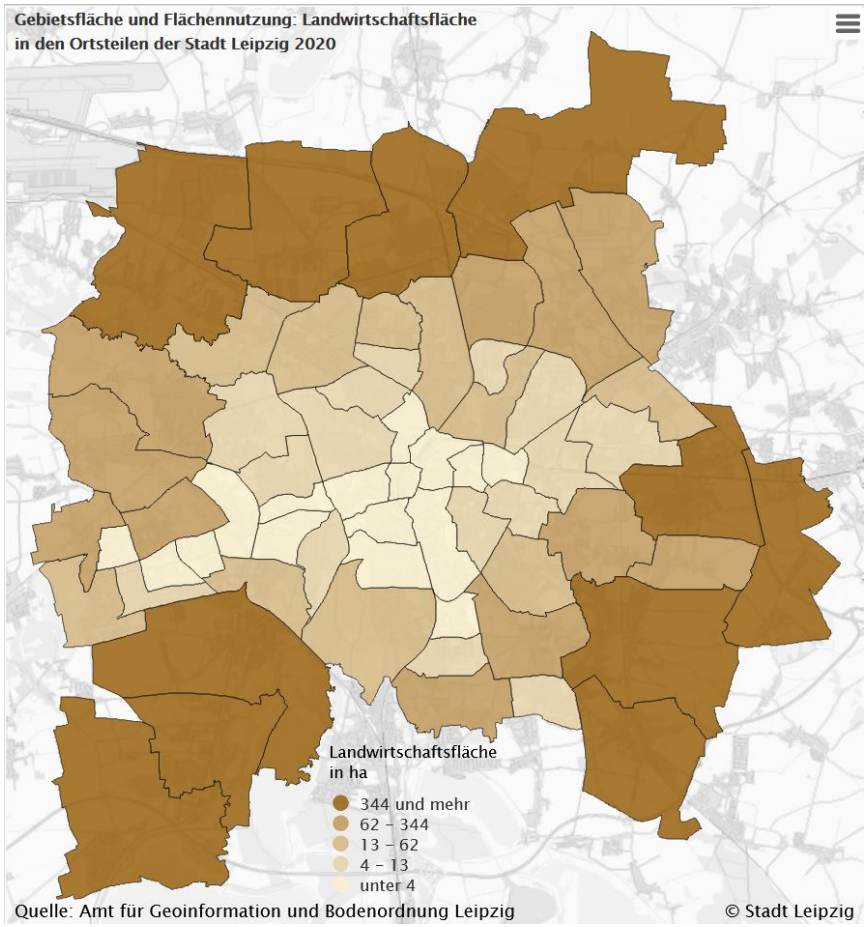
- Main categories of urban land use
  - Residential buildings
  - Industrial and commercial buildings
  - Institutional and public buildings
  - Transportational land use
  - Recreational land use (for sports, leisure, and entertainment)
  - Agriculture
  - Forests
  - Water bodies
- The precise categories might vary slightly across cities; some cities might combine some of these categories into one.
- Now which of these land use categories takes up most of the area of, say, Leipzig?

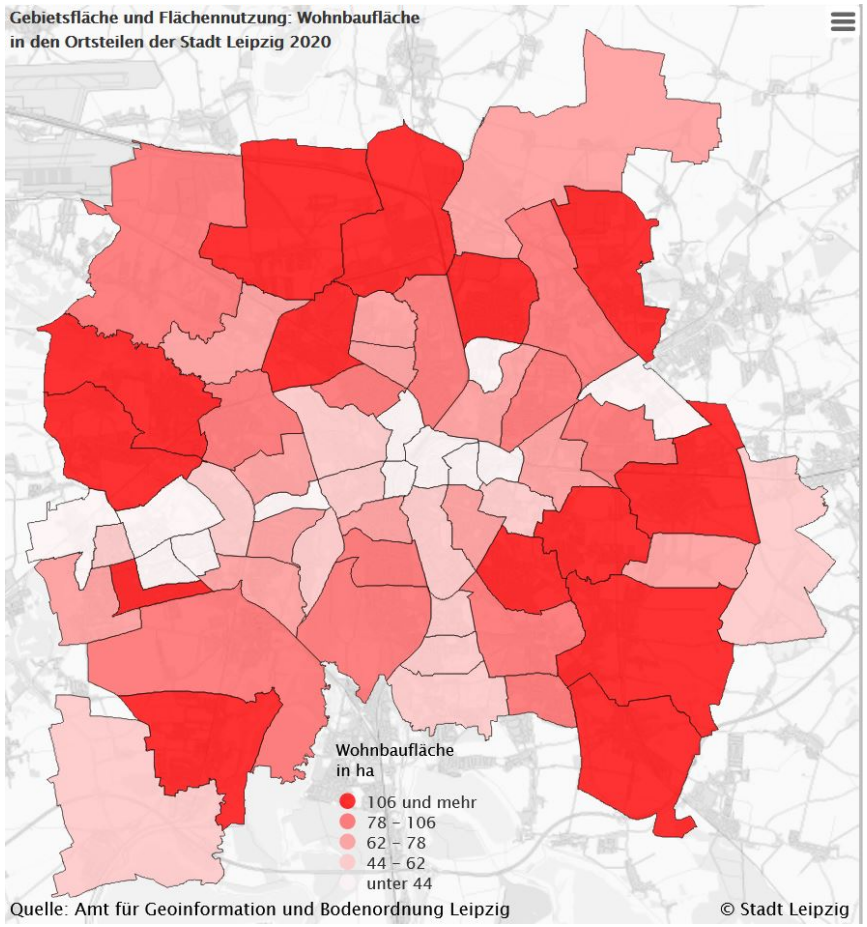
Urban Land Use in Leipzig in 2024



Are you surprised to learn that one third of the area within the administrational boundaries of Leipzig is used for agriculture? $\Longrightarrow$ Definition of the urban extent!

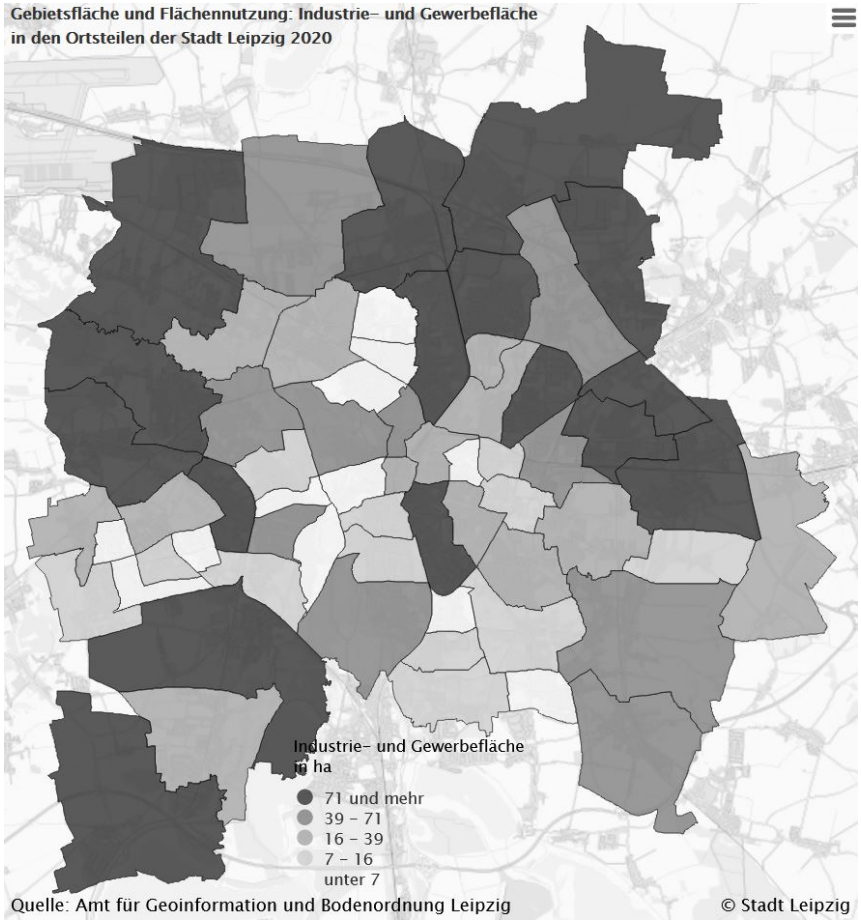
Agricultural Areas and Residential Areas in Leipzig 2020

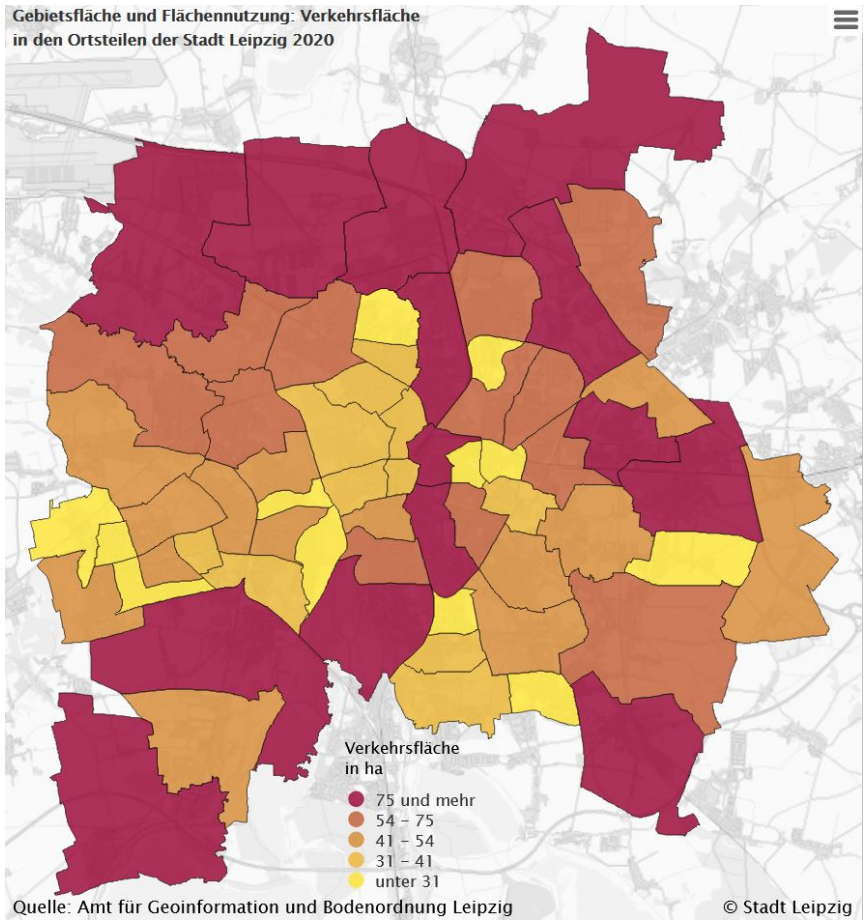




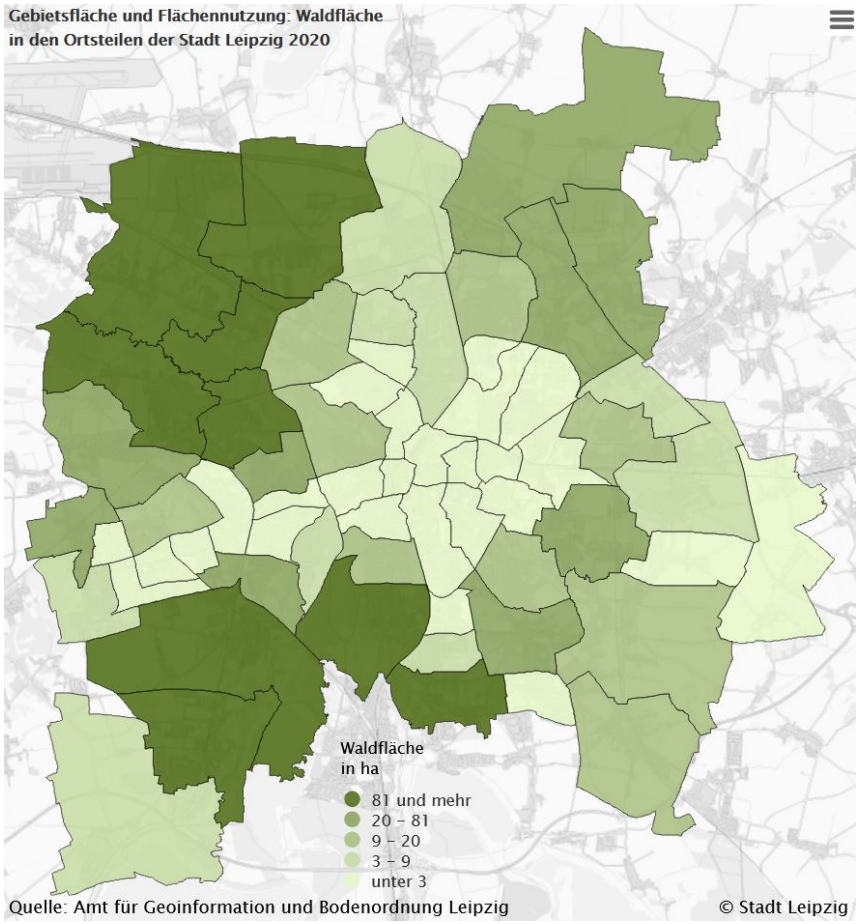
Also note the relative size of districts on the outskirts compared to the center, which contribute to the share of the area used for agriculture.

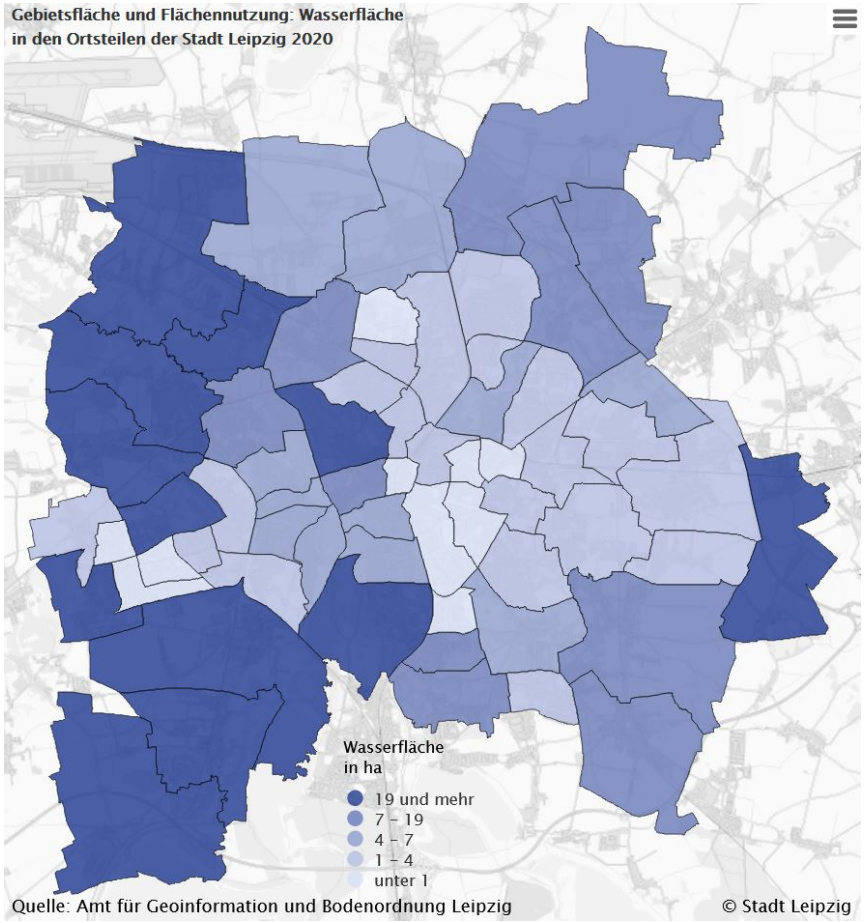
Industrial/Commercial Areas and Transportational Areas in Leipzig 2020





Forests and Water Bodies in Leipzig 2020





Note the importance of the lakes on the outskirts

Who/What Determines Land Use?

- Geography vs Politics
  - Urban land use planning is a complex interplay of potentially competing interests, with geography only forming the backdrop.
  - Geography is not a fixed constant factor but amenable to political decisions:
    - ★ In the 1980s, there had been plans of deforestation of the *Auwald* in Leipzig in order to extract the lignite lying beneath $\Longrightarrow$ Dropped after reunification
    - ★ Also, large areas on the outskirts of Leipzig formerly used for lignite were converted into lakes and recreational areas in recent decades.
  - The result of the urban planning process is a detailed urban land use plan for the years to come, which can be obtained from the city administration
  - Selected books on the urban planning process: Levy et al. (2025) as well as Deakin (2019)

Who/What Determines Land Use?

- Who is allowed to build what in which location of the city? Political decisions influence how the purely economic mechanisms of the Alonso-Muth-Mills model on rental prices, apartment size and building heights play out in practice
  - Parks vs. new housing estate? Balancing the interests of new citizens needing housing with the quality of life for everyone. Meaning of **NIMBYism**: 'Not in my backyard'.
  - **Building Heights**: Many cities have restrictions - buildings in the city center of Rome can't be taller than 136m (dome of St. Peter's Basilica)
  - **Ideological** decisions of the city administration and city planners
    - ★ Example of Leipzig Augustusplatz and demolition of the *Pauliner Church* in 1968, as well as architectural incorporation into the university campus in 2012
    - ★ Barr and Luo (2020) provide a Chinese example: Construction of skyscrapers in Chinese cities is mainly driven by political factors, ambitious politicians in smaller cities seeking attention

Who/What Determines Land Use?

- Hilber and Vermeulen (2016) work with English data on housing supply and house prices from 1974 to 2008
  - They investigate the degree of building restrictions from 353 local planning authorities. Also, they take into account the geographical conditions (elevation, ruggedness)
  - $\Longrightarrow$ Regulatory constraints affect house prices much more strongly than uneven ground topography
- Fischel (2004) provides a critical review of zoning laws in American cities (restrictive rules for new building development in this zone)
  - Zoning laws had the original purpose of protecting homeowners in residential areas from devaluation by industrial uses.
  - Homeowners gained ever more importance on city administration boards, using zoning laws to exclude further suburban development (resisting legal attempts to build low-income housing in suburbs)
  - Joining forces with the environmental movement for zoning laws, homeowners argue that restricting building supply has environmental benefits (in addition to increasing home values)

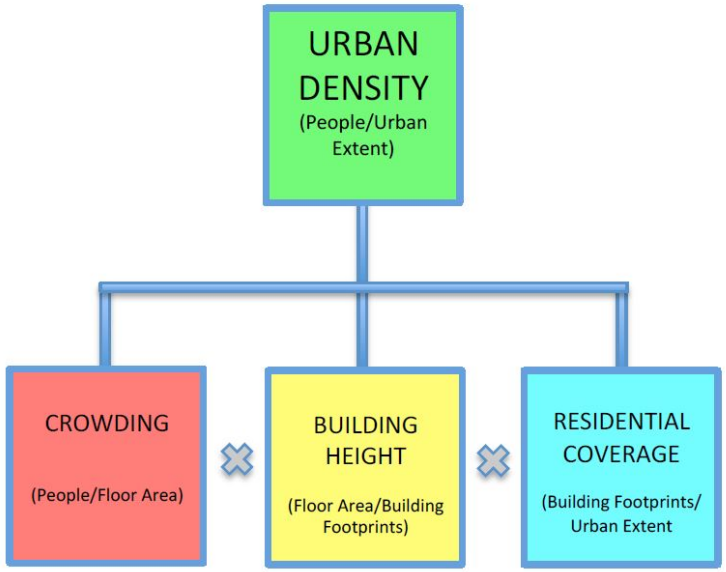
Population Density Varies Across Residential Areas





- **Population Density = Number of residents per square kilometer**
- Why is population density on the left lower than on the right? Into which components can population density be decomposed?

Components of Population Density: Angel et al (2019)



Angel, Lamson-Hall und Blanco (2019) split population density in residential areas into 3 components:

- **Crowding** = People per square meter of floor area
- **Building Height** = Floor area per building footprint
- **Residential Coverage** = Building footprint (rather than gardens, walkways etc) per square kilometer of residential area

Components of Population Density: Angel et al (2019)

- What about the economic mechanisms?
  - In the simple Alonso-Muth-Mills model, population density is the product of crowding ($= 1/q$) and building height, because (residential) buildings make up the whole city (no streets, gardens etc). Density decreases as a function of distance to the city center because both components decrease.
- Empirical analysis: Which of these three components drives population density? $\Longrightarrow$ Difficulty of data availability
- Angel et al (2019) combine census data with (day-time) satellite imagery of specific neighborhoods in 10 cities
  - Dhaka, Hong Kong, Bangkok, Kinshasa, Bogotá, Cairo, Baku, Madrid, Wuhan, Minneapolis
  - High variation in population density and its components across cities

Components of Population Density: Angel et al (2019)

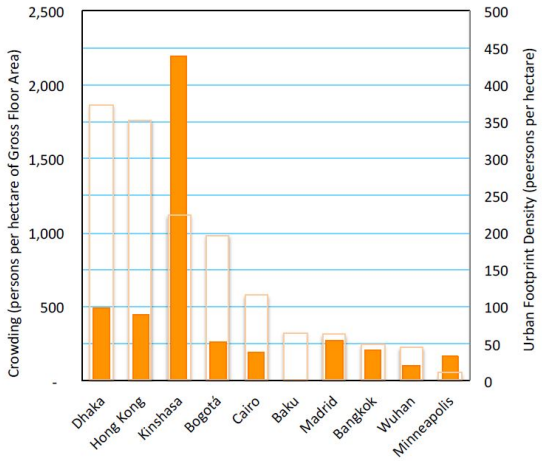


Figure 3: ***Crowding*** **values for ten cities.**

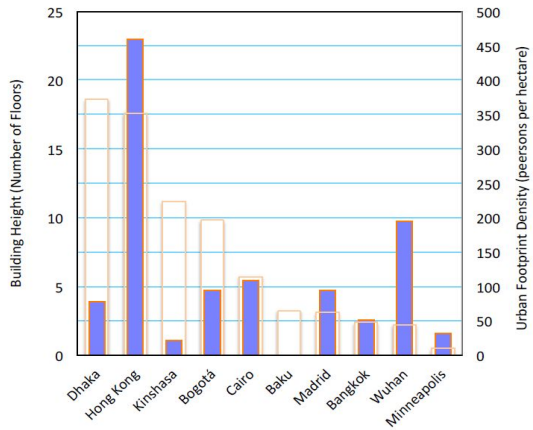


Figure 4: ***Building Height*** **values for ten cities.**

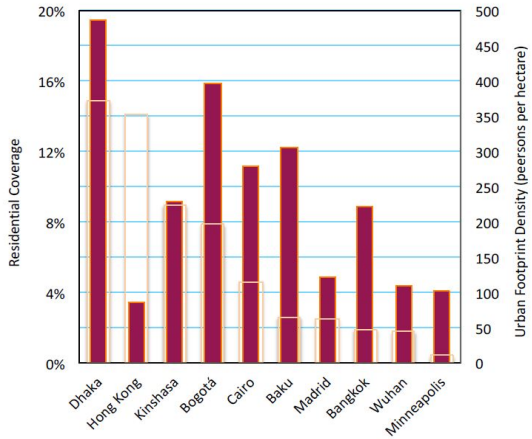
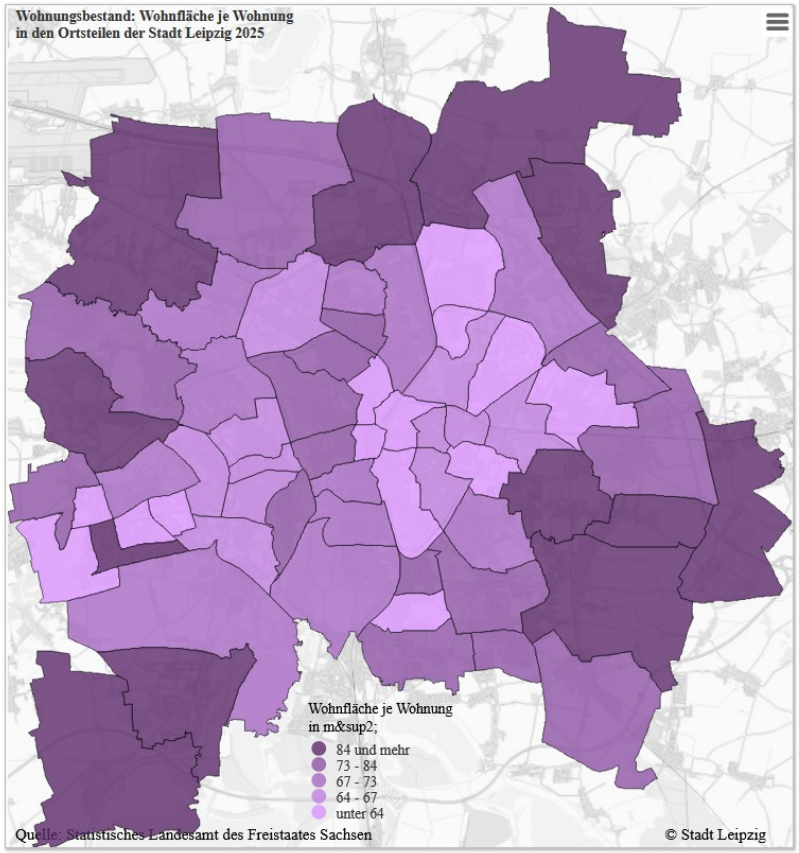


Figure 5: ***Residential Coverage*** **values for ten cities.**

- In Kinshasa, population density is driven primarily by crowding (high residential occupancy, big household sizes).
- Buildings are particularly high in Hong Kong and Wuhan.
- Of the 10 cities, Dkaha and Bogotá have the highest residential coverage.

Leipzig: Apartment Size

For Leipzig, we have a map of the square meters of living space per apartment. This is closely related to q, the square meters of living space per person (the inverse of crowding)



Note how living space increases with distance to the city center (with the notable exception of the Waldstraßenviertel, a district of *Gründerzeit* architecture with rather large apartments close to the city center).

Leipzig: Living Space per Demographic Group in 2025

q, the square meters of living space per person (the inverse of crowding) varies by household size and inhabitants' age

Average living space per head	46.6 sqm
... in households of 1 person	57.7 sqm
... in households of 2 people	38.4 sqm
... in households of 3 people	29.6 sqm
... in households of 4 people	25.0 sqm
... by age of inhabitants: 18-34 years	41.0 sqm
... by age of inhabitants: 35-54 years	42.2 sqm
... by age of inhabitants: >55 years	54.3 sqm

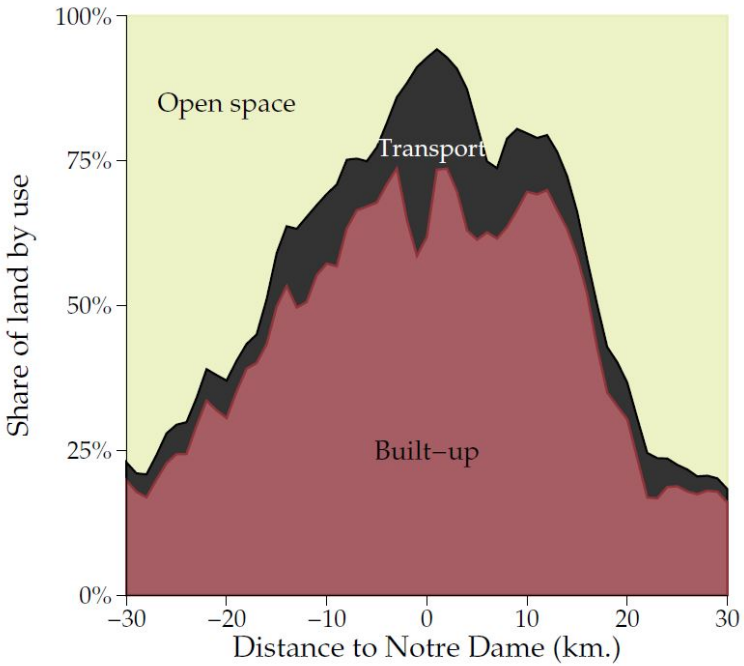
How to explain these patterns?

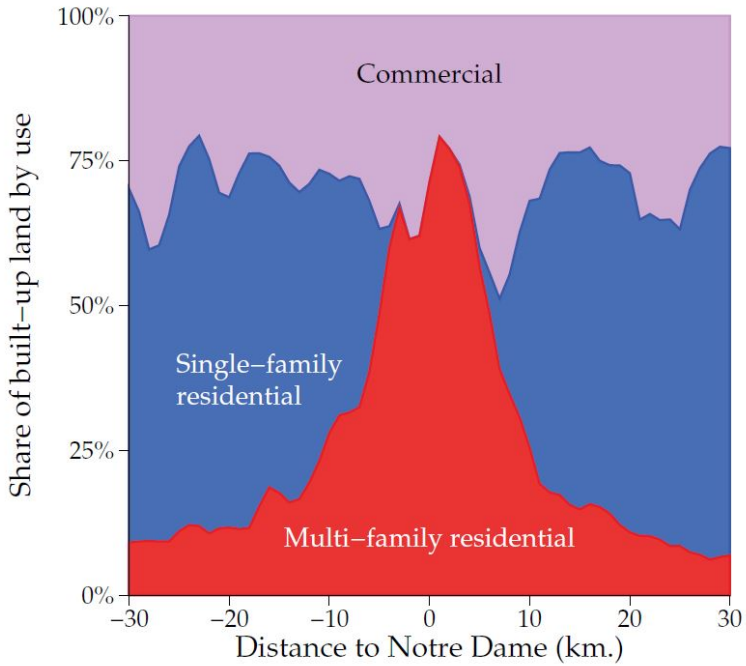
Types of Residential Buildings

1. Single-family detached house
   - No wall is shared with the neighbors, nor is land, plumbing, electrical system
2. Semi-detached house
   - Sharing walls and the roof with the neighbor, while tending to their own land/garden
3. Row house / townhouse
   - Typically found in an urban environment, row houses share not only walls with the neighbors, but also the architectual style
4. Multi-family house
   - Can be low-rise, mid-rise or high-rise, housing at least two apartments in one house
5. Other
   - Buildings with semi-commercial use (farms, studios, shops with dwellings), mobile homes

Paris: Types of Residential Building

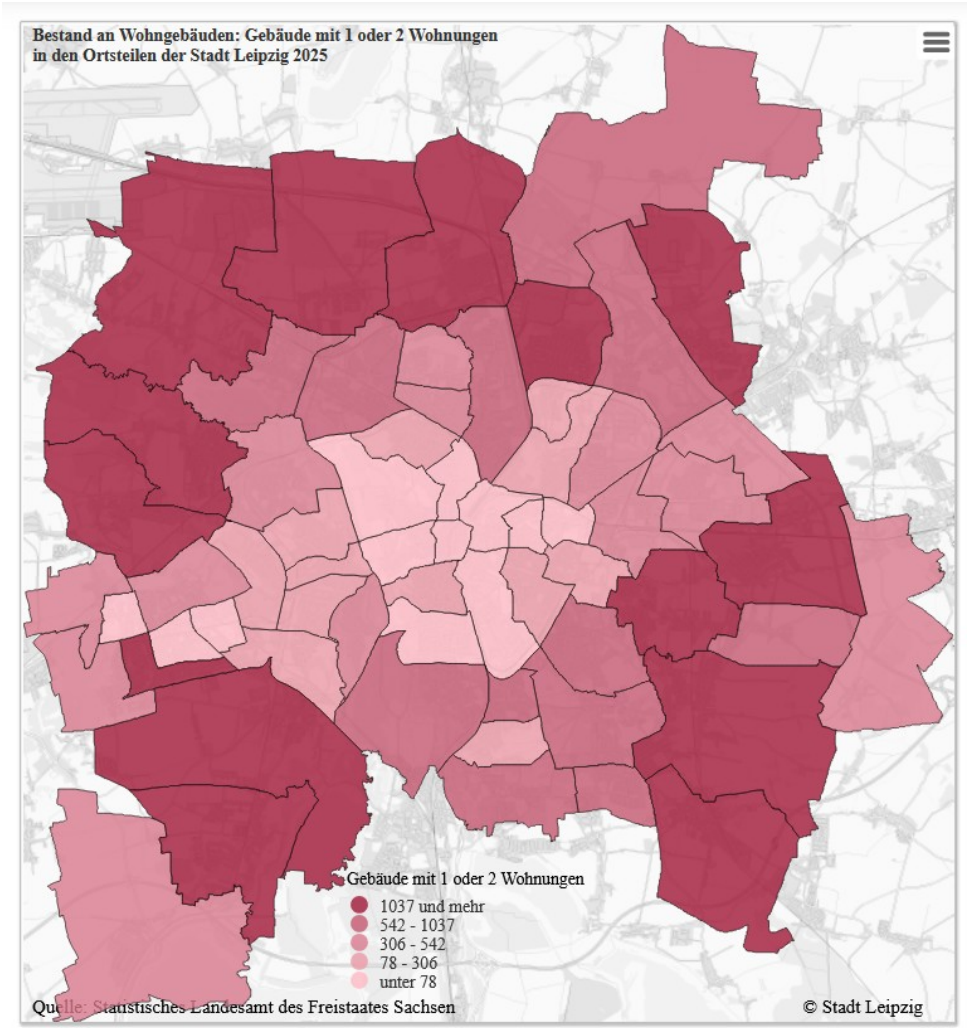
- Duranton and Puga (2015) look at Paris. They contrast built-up land uses (residential and industrial/commercial buildings) with open space (recreational areas, forests, water bodies) and analyze how these are distributed as a function of distance from Notre Dame Cathedral. Also note the distribution of types of different residential buildings





Leipzig: Types of Residential Buildings

The distribution of single-family houses and semi-detached houses

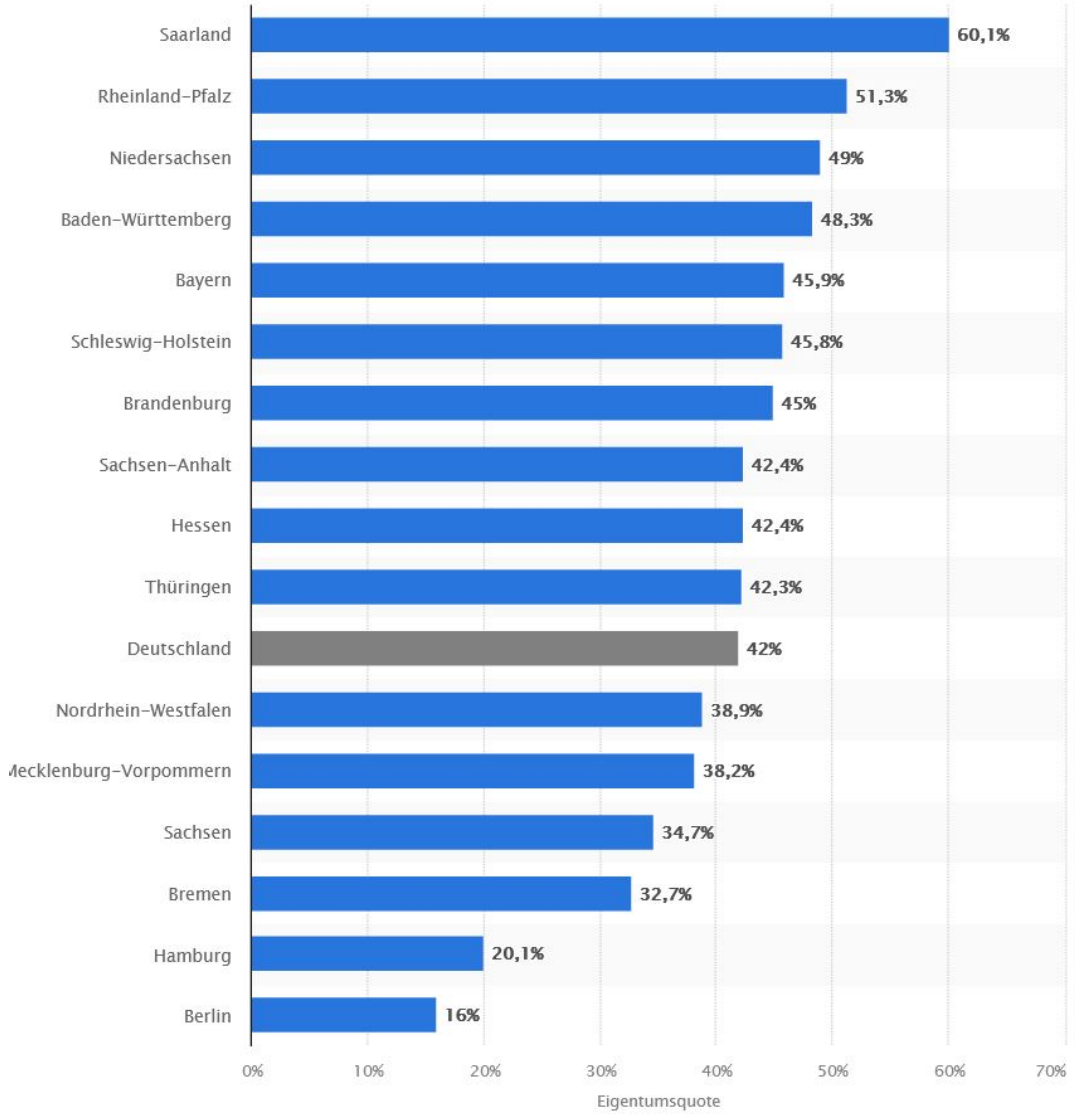


Home Ownership in Leipzig - in a National and International Comparison

Percentage of Residents of Leipzig living in...	Year 2025
Rented Apartment or Rented House	86%
Owner-occupied Apartment	5%
Owner-occupied House	7%
Other	2%

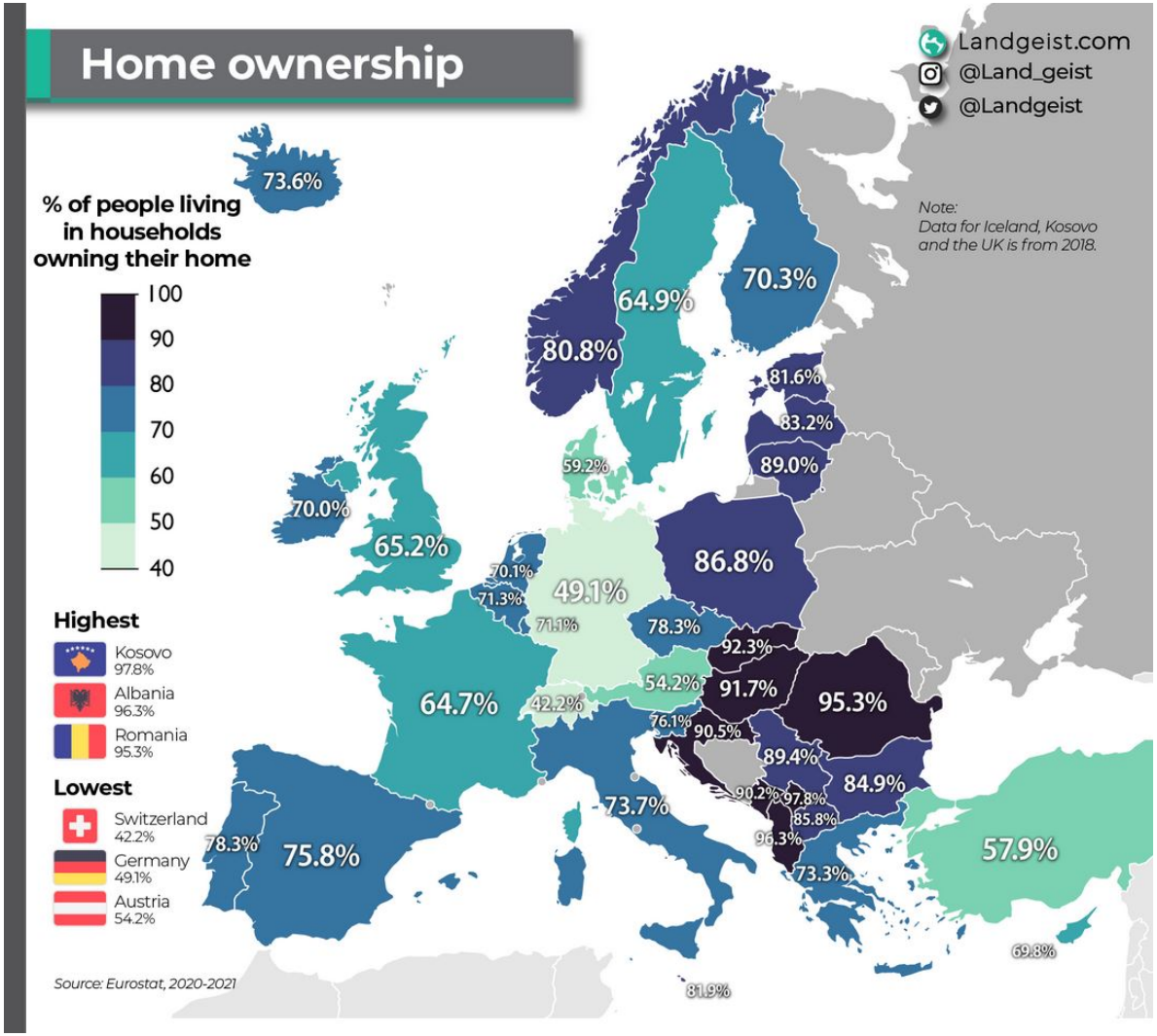
Only 12% of residents of Leipzig own the apartment or house they live in. Why is it so low?
And what are actually the advantages and disadvantages of home ownership?

Home Ownership Rates in Germany (2022, Statista)



Home Ownership Rates in Europe (2020/21, Eurostat)

Germany has one of the lowest home ownership rates in Europe. Why?



Factors Influencing Home Ownership Rates

- Degree of urbanization
  - Higher ownership rates in rural areas and in small cities
- Household size
  - Lower ownership rates among single households
- Financing conditions
  - Interest rates, equity requirements, loan-to-value ratio
- Legal conditions
  - Are laws tenant-friendly? Is mortgage interest payment tax-deductible?
- Institutional framework and historical/cultural factors
  - Societal aspirations of owning your own place vs public investment in affordable tenant apartments? Note the transmission across generations via inheritance, as well as social norms.
- Alternative forms of investments and retirement provision
  - Confidence in the pension system? Stock market for investments?

The Case of Germany: Kaas et al (2021)

- Kaas, Korchakov, Preugschat, and Siassi (2021) analyze the mechanisms of the German housing market in a theoretical model to explain the comparatively low homeownership rate. Focus on three aspects:
  - History: Post World War II reconstruction, creation of **social housing estates** with tenants' dwellings
    - ★ This holds particularly for East Germany. But also in the West, up to 30% of publicly built residential buildings in the 1950s were social housing estates of comparatively high quality
  - High **real estate purchase tax**
  - **No tax deduction** of interest payments on mortgage payment
- Results of the theoretical model with calibrated figures of Germany and the U.S.: Without these three components, the gap in homeownership rates between Germany and the U.S. would shrink by 2/3 $\Longrightarrow$ The paper shows the mechanisms and starting points for change, but would a higher homeownership rate really be desirable?

Advantages of Home Ownership

- Investment and wealth creation, old-age provision
  - Alternative or complement to public pension or financial assets
- Full control over the dwelling you live in, independence from a landlord
  - Refurbishments, pets etc
  - Free from the risk of rent increase or eviction
- Stability
  - Both in one's own life and in the neighborhood: Home ownership empirically goes in line with stronger political commitment and neighborhood volunteer work

Disadvantages of Home Ownership

- High transaction costs, taxes and long commitment periods
  - When is the right time to buy?
- Mortgage debt is a responsibility and needs to be serviced for a long time
- Lower mobility to move, less spatial flexibility
  - What if the job or family situation changes?
- Insider-Outsider problems
  - Homeowners have an interest to limit new buildings in their neighborhood, NIMBYism

Wrap-Up of Unit 7

- The categories of **urban land use** are buildings (of residential, industrial and institutional type), transportation, recreation, agriculture and forest/water. Urban land use planning is a complex interplay of potentially competing interests, with geography only forming the backdrop.
- Urban **population density** varies across different parts of a city. It can be decomposed into crowding, building height, and residential coverage.
- The main types of **residential buildings** are single-family detached houses, semi-detached houses, row houses and multi-family houses, with the latter dominating closer to the city center.
- Differences in **homeownership rates** between different cities and countries are due to, among other things, the degree of urbanization, family size, legal frameworks for tenants and homeowners, financing conditions, and historical/cultural factors.

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