SPATIAL DISTRIBUTION OF EMPLOYMENT AND RESIDENCE

EE464: Urban Economics
EE562: Selected Topics in Development Economics 2
Semester 1 / 2020
Faculty of Economics, Thammasat University

Regional Concentration of Manufacturing

Source: Kim, Sukkoo. "Economic Integration and Convergence: U.S. Regions, 1840–1987." Journal of Economic History. (1998), pp. 659–83.

Regional Concentration of Manufacturing

- The economic history of the United States shows periods of **regional concentration followed by dispersion** (Kim, 1998).
- During the colonial period, the national economy was dominated by agriculture, extraction, and fishing.
- **Regional specialization** was based on **natural comparative advantages** generated by differences in soil, climate, and geography.
- Most **non-agricultural products** were produced in the home or by **artisans** in **towns** and **cities**.

Source: Directly quoted from O'Sullivan (2012)

Regional Concentration of Manufacturing

- In the first half of the 19th century, **production shifted from artisan shops to** mechanized and nonmechanized **factories**.
- Among the products produced in factories were shoes, wagons, furniture, hats, paper, leather, and textiles.
- Factories were **concentrated** in the **Northeast region**, where, in 1840, about **36 percent** of the labor force produced **nonagricultural goods** (compared to 21 percent for the nation and 9 percent for the South).
- During the second half of the 19th century, a **manufacturing belt** developed in the **Northeast** and **Great Lakes regions**.

Source: Directly quoted from O'Sullivan (2012)

Regional Concentration of Manufacturing

- Innovations in production allowed firms to **exploit scale economies**, and many of the production processes required **large volumes** of relatively **immobile resources** (e.g., coal and iron ore).
- The **manufacturing belt** had a **natural advantage** in its **access to these resources**, so manufacturing was **concentrated there**.
- As late as 1947, the **manufacturing belt** contained **70 percent** of the nation's **manufacturing employment.**
- In 1954, the **manufacturing industry** employed about **28 percent** of **workers nationwide**.
- In three of nine regions, the manufacturing share was well above the national average; in the remaining six, the share was well below the average.

Source: Directly quoted from O'Sullivan (2012)

Regional Concentration of Manufacturing

- In the second half of the 20th century, economic activity became more **widely dispersed**.
- In 1987, seven of the nation's nine regions had manufacturing employment shares within 2.4 percentage points of the national share of 17.6 percent.
- By the year 2000, the **traditional manufacturing belt** contained only about **40 percent** of the nation's **manufacturing employment**, just above its share of total employment.
- An important factor in the **dispersion of manufacturing** was a general **reduction in transport costs** that **reduced the natural advantage** of the **old manufacturing belt**.
- In addition, producers switched to **alternative raw materials** as well as recycled inputs.

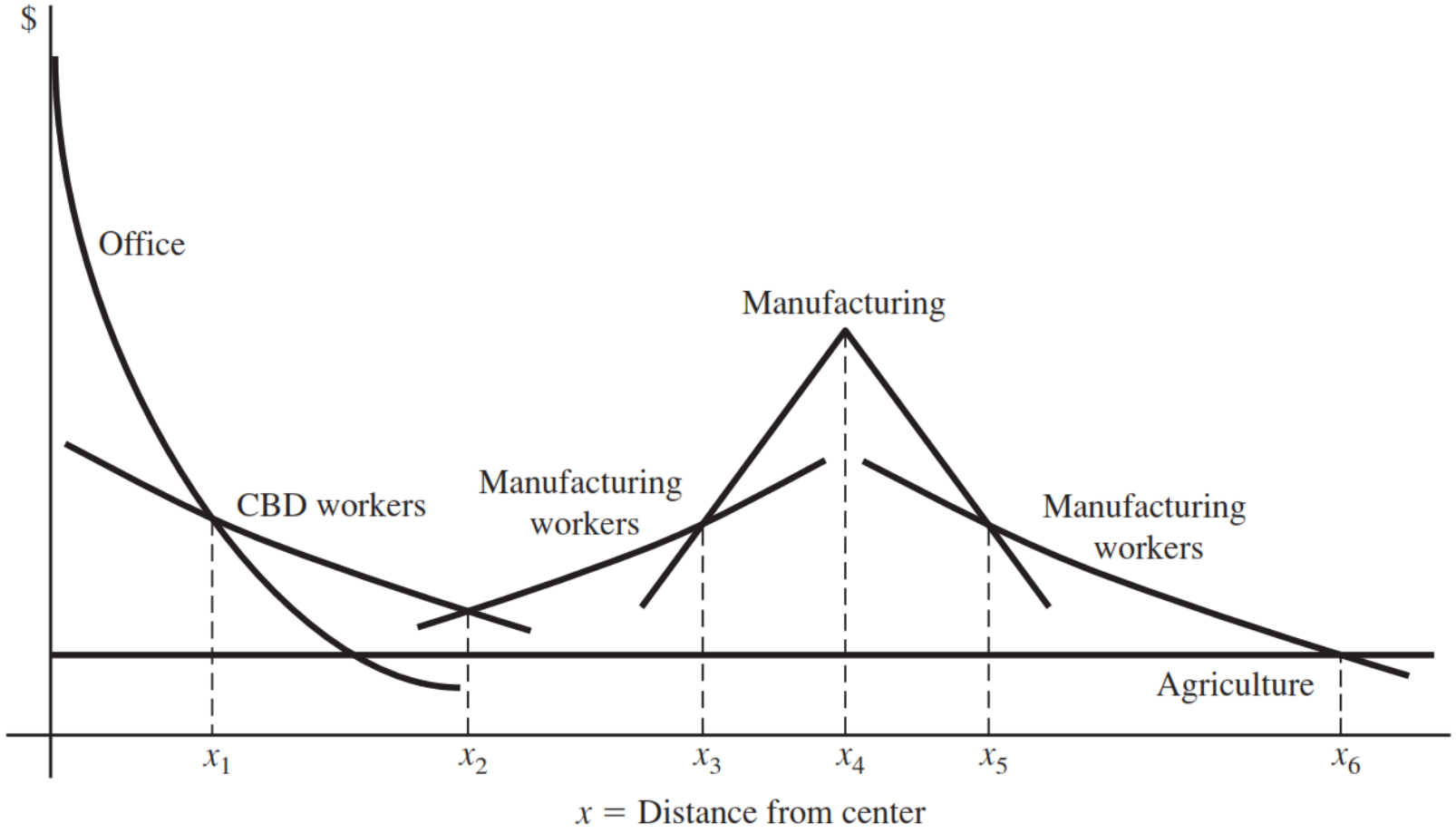
Source: Directly quoted from O'Sullivan (2012)

Regional Concentration of Manufacturing

- The experience of the United States is consistent with the **neoclassical model** of **regional development**.
- The **manufacturing belt developed** because of **natural advantage** (access to material inputs such as coal and iron ore), and **declined** because the **relative cost of transporting inputs decreased**.
- The **decrease in transport costs diminished the natural advantage** that played a key role in the development of the manufacturing belt, causing manufacturing to **disperse to other regions**.

Source: Directly quoted from O'Sullivan (2012)

Bid Rents and Land Use Patterns



Source: O'Sullivan (2012)

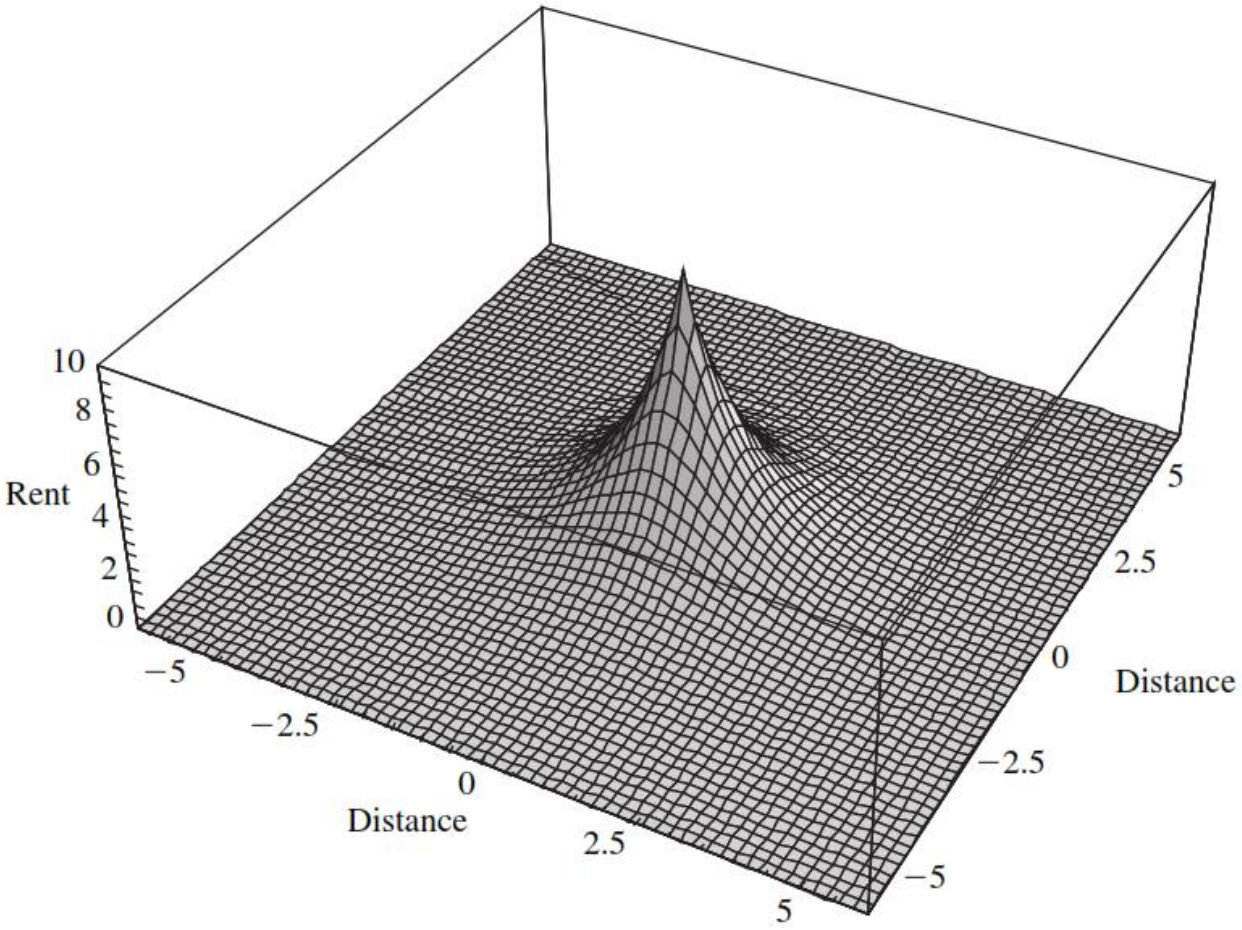
Regional Concentration of Manufacturing

- The **equilibrium land-use pattern** is determined by the **bid-rent curves** of firms and residents.
- The **CBD** is the area over which **office firms** outbid other users (from x_0 to x_1).
- The area between x_1 and x_2 is occupied by **residents** who **work in the CBD**.
- **Manufacturing workers** live in the areas between x_2 and x_3 and x_5 and x_6.
- **Manufacturers occupy** the area between x_3 and x_5.

Source: Directly quoted from O'Sullivan (2012)

Bid Rents and Land Use Patterns

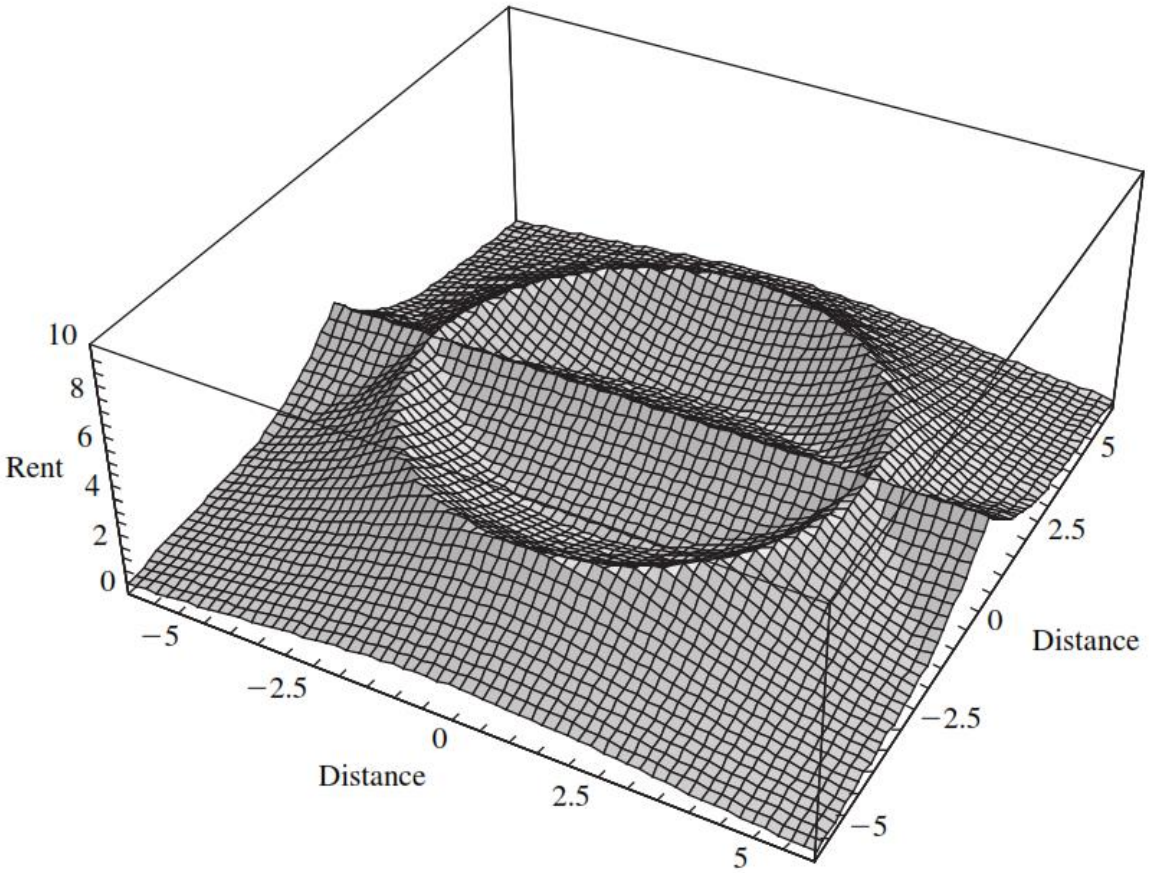
Bid Rent of the Office Sector



Source: O'Sullivan (2012)

Bid Rents and Land Use Patterns

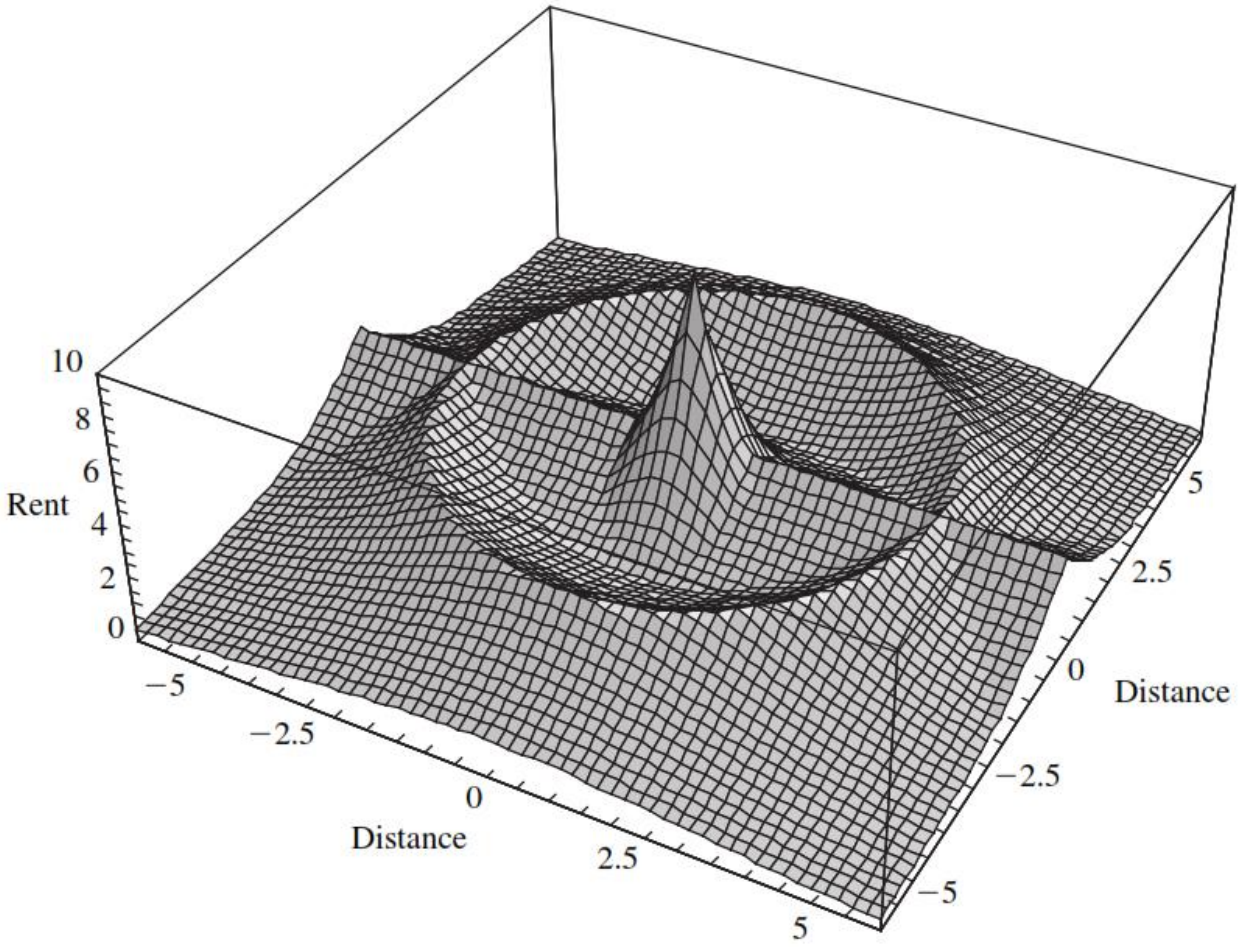
Bid Rent of the Manufacturing Sector



Source: O'Sullivan (2012)

Bid Rents and Land Use Patterns

Maximum Bid Rent of Employers



Source: O'Sullivan (2012)

The Rise of the Monocentric City

- How are **jobs distributed across** the typical **metropolitan area**?
- One approach to answering this question is to **divide a metropolitan area** into **two parts**, a **central area** and the **rest of the metropolitan area**, and show how jobs are divided between the two areas.
- A second approach is to take a closer look at the spatial distribution of jobs throughout the metropolitan area, using a **smaller geographical unit** such as a **census tract**—a small, relatively permanent statistical subdivision of a county, with between 2,500 and 8,000 residents.

Source: Directly quoted from O'Sullivan (2012)

The Rise of the Monocentric City

TABLE 7–1 Employment Inside and Outside Central Cities, 1980–2000

	1980	1990	2000
In Central Cities	35.21	46.47	49.03
In Other Municipalities	31.58	43.75	53.75
(numbers in millions)			

Source: U.S. Census, Journey to Work.

- The boundary of a **central city** is a **political —not economic—boundary**.
- Table 7–1 shows the number of metropolitan jobs inside and outside central.

Source: Directly quoted from O'Sullivan (2012)

The Rise of the Monocentric City

- The typical metropolitan area has many other municipalities; these other municipalities comprise the **"suburban" area**—the rest of the metropolitan area.
- In 1980, central cities had about **11 percent more jobs**.
- Between 1980 and 2000, **central cities grew slower** than the other municipalities and, by 2000, central cities had **10 percent fewer jobs**.
- This trend is actually a continuation of a **long trend of employment decentralization**.
- In 1948, **central cities** had **roughly twice as many jobs** as the other **metropolitan municipalities**.

Source: Directly quoted from O'Sullivan (2012)

The Rise of the Monocentric City

- For the **largest 100 metropolitan areas**, roughly **22 percent** of jobs are **within three miles** of the center, and **65 percent** of jobs are **within 10 miles** of the center (Glaeser, Kahn, and Chu, 2001).
- The **median location** (where **half of jobs** are closer and half are farther away) is **seven miles**.
- Looking across the four regions of the country (Northeast, Midwest, South, West), the **10-mile shares** are remarkably close, with all four lying in the range of **64 percent** to **67 percent**.
- The **three-mile shares** are similar for all but the Northeast region, whose share of **29 percent** lies well outside the **19 to 21 percent range** of the other regions.

Source: Directly quoted from O'Sullivan (2012)

The Rise of the Monocentric City

TABLE 7–2 Employment within Three Miles and 10 Miles of the City Center: Selected Cities

	Indianapolis	Portland	Boston	Minneapolis	Atlanta	Los Angeles
Total Employment	635,818	762,677	1,152,387	1,294,873	1,604,716	4,680,802
Jobs within three miles of center	179,893	235,057	459,936	267,798	221,986	382,465
Percent within three miles of center	28	31	40	21	14	8
Percent within 10 miles of center	79	76	76	64	43	28

- As shown in Table 7–2 there is **substantial variation** in the **3-mile** and **10-mile employment** shares across U.S. metropolitan areas.
- The **3-mile share** ranges from **8 percent** for **Los Angeles** to **40 percent** for **Boston**.

Source: Directly quoted from O'Sullivan (2012)

The Rise of the Monocentric City

- The **10-mile share** ranges from **28 percent** for **Los Angeles** to **79 percent** for **Indianapolis**.
- In terms of the actual number of jobs within three miles of the center, the metropolitan areas with **largest concentrations** of central employment are not listed in the table: **New York** has over **1.4 million jobs** within **three miles** of the center, and **Chicago** has **530,000**.

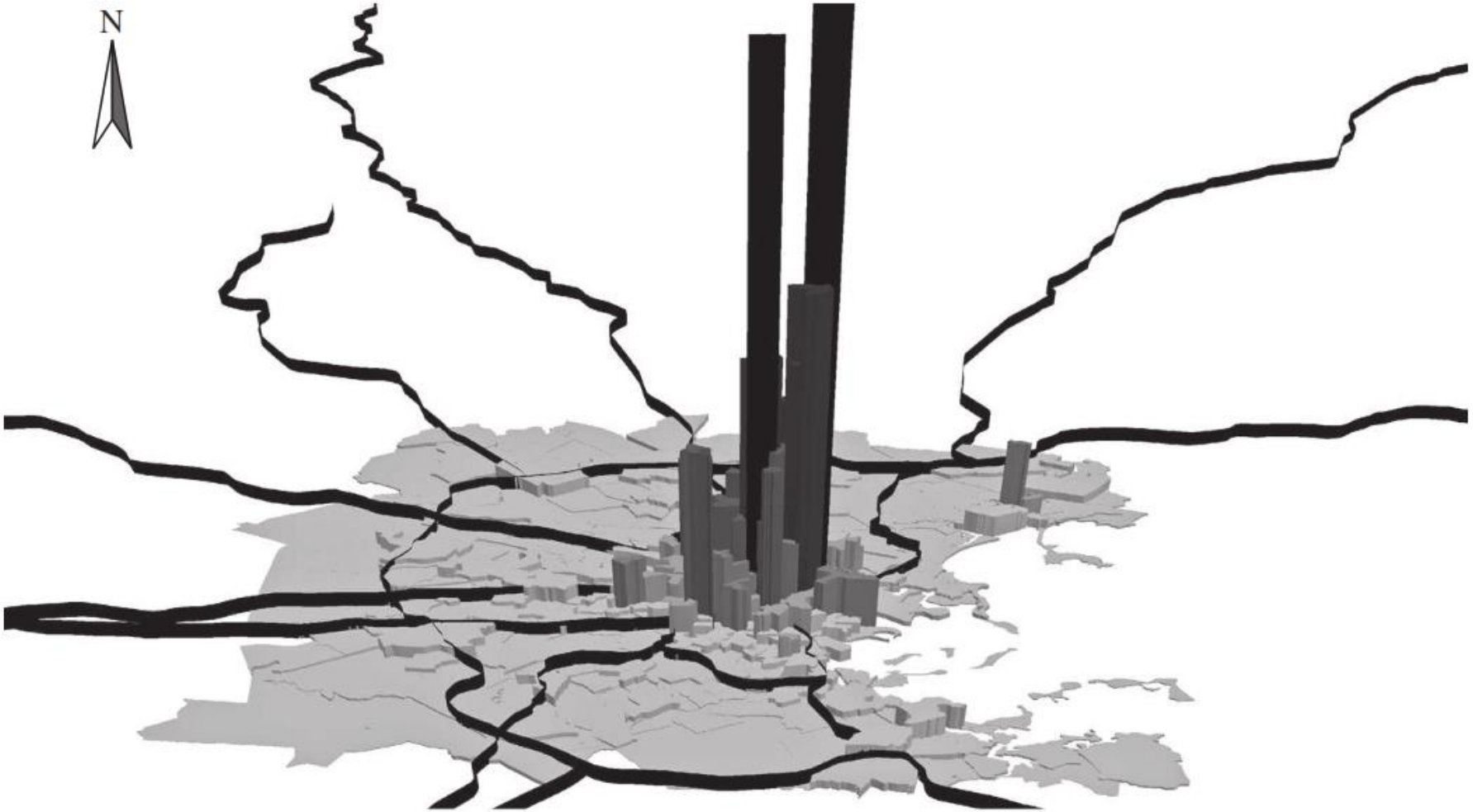
Source: Directly quoted from O'Sullivan (2012)

MAP 7–1 The Spatial Distribution of Employment: Portland

Each jigsaw-piece census tract is extruded to a height equal to its employment density, defined as the number of workers per hectare. The ribbons show freeways, extruded to a height of 25. Employment density reaches its maximum of 539 per hectare in the central business district.

Source: Directly quoted from O'Sullivan (2012)

MAP 7–2 The Spatial Distribution of Employment: Boston



Each census tract is extruded to a height equal to its employment density, defined as the number of workers per hectare. The ribbons show freeways, extruded to a height of 25. Employment density reaches its maximum of 1,953 per hectare in the central business district.

Source: Directly quoted from O'Sullivan (2012)

The Rise of the Monocentric City

Portland

- Employment density reaches its **highest level** in the **central area**, with a top density of **539 workers per hectare** (**137,890 workers per square mile**).
- **Outside the central area**, employment **density is highest near the freeways**, reaching **25** (the height of the freeway ribbons) at several places.

Boston

- Employment density reaches its maximum **at 1,953 workers per hectare** (500,001 workers per square mile) near the center.
- The **actual density** in the **center is roughly twice** as high as indicated by the map.

Source: Directly quoted from O'Sullivan (2012)

The Rise of the Monocentric City

TABLE 7–3 Distribution of Jobs across Density Classes: Selected Cities

	Portland	Boston	Indianapolis	Minneapolis	Atlanta	Los Angeles
Total Employment	762,677	1,152,387	635,818	1,294,873	1,604,716	4,680,802
Percent of Jobs						
High Density (D > 50)	18	37	18	17	10	17
Medium Density (25 < D < 50)	8	10	3	12	8	22
Low Density (12.5 < D < 25)	16	22	14	24	12	28
Very Low Density (D < 12.5)	57	31	65	47	70	32

- As shown in the first column of Table 7–3, roughly **8 percent** of jobs in the metropolitan area have a job density between **25 and 50 workers per hectare**.
- The rest of the jobs are in areas with low or very low density: **16 percent are** in census tracts with between **12.5 and 25 workers per hectare**, and **57 percent** are in census tracts with fewer than **12.5 workers per hectare**.

Source: Directly quoted from O'Sullivan (2012)

The Rise of the Monocentric City

- For U.S. metropolitan areas as a whole, **36 percent** of people live in **central cities** and the **remaining 64 percent** live in **other municipalities**.
- For the **largest 100 metropolitan** areas, **20 percent** of people live within **three miles** of the center, and **65 percent** live within **10 miles** of the center (Glaeser, Kahn, and Chu, 2001).
- The **median residential** location is **eight miles** from the city center, one mile beyond the median location for employment.
- In other words, the **urban population** is a **bit more decentralized** than **urban employment**.

Source: Directly quoted from O'Sullivan (2012)

MAP 7–4 Population Density: Portland

The ribbons show freeways, extruded to a height of 25. Each census tract is extruded to a height equal to population density (people per hectare). Population density reaches its maximum of 91 per hectare in the central area.

Source: Directly quoted from O'Sullivan (2012)

MAP 7–5 Population Density: Boston

The ribbons show freeways, extruded to a height of 25. Each census tract is extruded to a height equal to population density (people per hectare). Population density reaches its maximum of 420 people per hectare in the central area.

Source: Directly quoted from O'Sullivan (2012)

The Rise of the Monocentric City

- The **price of land** generally **decreases** as we **move away** from the **city center**, reflecting the superior accessibility of central locations.
- As a result, people living close to the center economize on land, leading to higher population density.
- In **Paris**, the population density in the central area is roughly **six times** the density at a distance of **20 kilometers**.
- In **New York**, population density near the center is roughly **four times** the density at a distance of **20 kilometers**.
- The **density gradient** is defined as **percentage change** in **density per additional mile** from the **city center**.
- For example, the density gradient is **0.13 in Boston**: Population **density decreases** by **13 percent** for **each additional mile** from the city center.
- For most large metropolitan areas in the United States, the density gradient is in the range **0.05 to 0.15**.

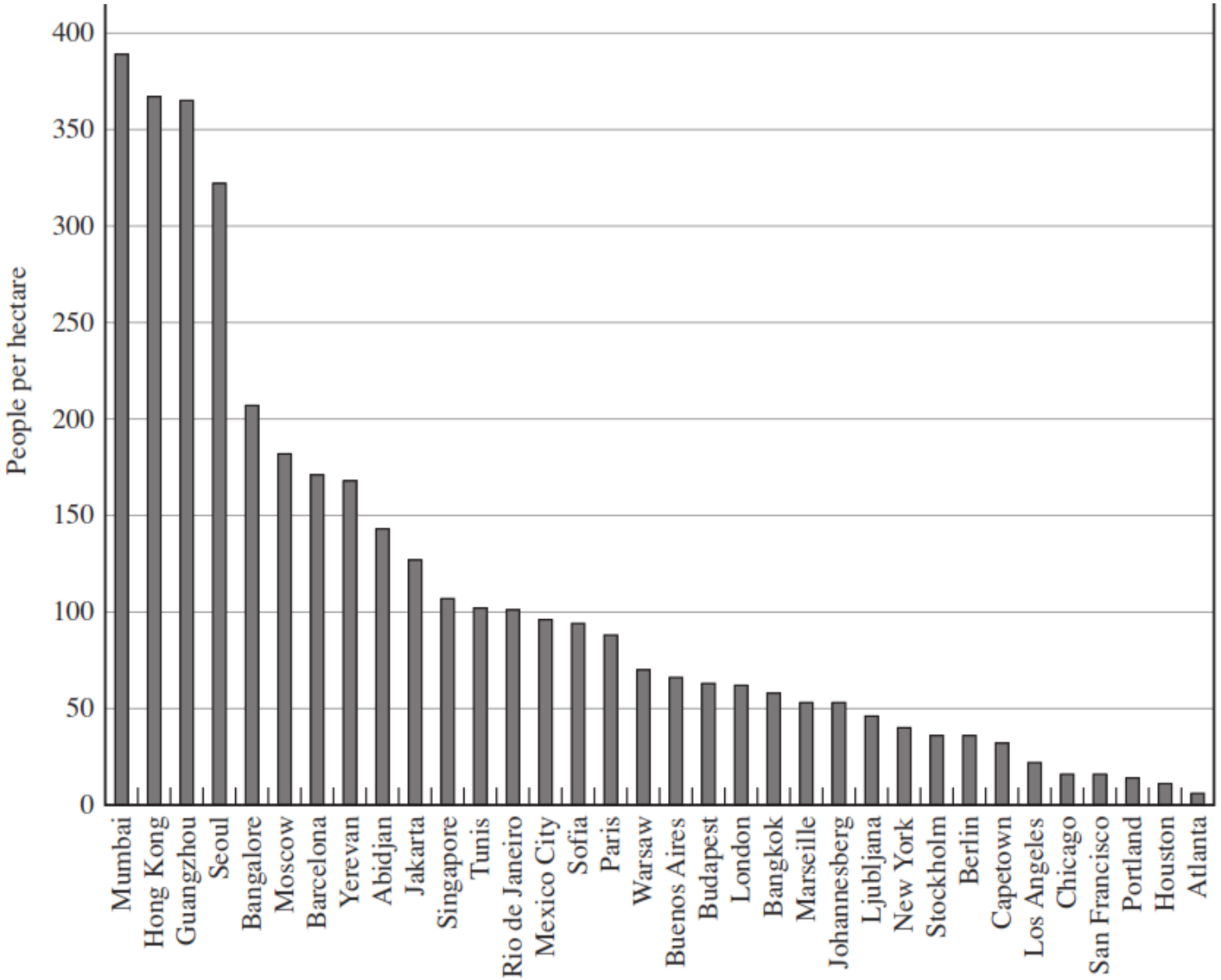
Source: Directly quoted from O'Sullivan (2012)

The Rise of the Monocentric City

- Figure 7–1 shows the **urban density** in selected cities around the world.
- In this figure, **urban density** is the **total population** of a metropolitan area **divided by the amount of land** in urban use, including residential areas, industrial districts, commercial areas, roads, schools, and city parks.
- This is called **built-up density**, as **opposed to residential density**.
- **Asian cities** are at the **top of the density list**, and **U.S. cities** are at **the bottom**.
- **New York** is the densest U.S. metropolitan area, yet its density is about **half the density of Paris**, **one-fourth** the density of **Barcelona**, and **one-tenth** the density of **Mumbai** (formerly known as Bombay).
- **Los Angeles**, the second densest U.S. metropolitan area, is **roughly half** as dense as **New York**.
- All the **European cities** shown rank above Los Angeles in density, and most **rank above New York**

Source: Directly quoted from O'Sullivan (2012)

FIGURE 7–1 Population Density in World Cities



Source: Directly quoted from O'Sullivan (2012)

The Rise of the Monocentric City

- Cities looked very different just 100 years ago.
- At the start of the 20th century, **jobs were concentrated** near the **city center**.
- **Manufacturing firms** located **close to railroad terminals** and **ports to economize** on the cost of **transporting inputs** and **outputs within the city**.
- **Office firms clustered** in **the CBD** to facilitate **the rapid exchange of information**.
- **Workers** either lived **near the central city** and **commuted** by foot or rode streetcars from suburbs to the city center.
- Before exploring the reasons for the demise of the monocentric city, we will explore why it arose in the first place.

Source: Directly quoted from O'Sullivan (2012)

The Rise of the Monocentric City

Production is subject to economies of scale

- Recall the **fourth axiom** of **urban economics**.
- The **Industrial Revolution** of the **19th century** generated innovations in production and energy that **increased the scale of production**.
- Firms used indivisible inputs and specialized labor to produce on a large scale, and they **located in cities** to **exploit agglomeration economies**.
- The Industrial Revolution also generated innovations in **intercity transportation** that allowed the wider exploitation of comparative advantage, leading to **increased trade** and **larger trading cities**.

Source: Directly quoted from O'Sullivan (2012)

The Rise of the Monocentric City

Innovations in Intracity Transportation

- The Industrial Revolution also generated a series of innovations in **intracity transportation** that **decreased commuting costs**.
- Before the 1820s, **most urban travel was by foot**, although a few wealthy people traveled by private horse-drawn carriage.
- Beginning in the late 1820s, **innovations in transportation** included the following: Omnibus (1827), Cable cars (1873), Electric trolley (1886) and Subways (1895).

Source: Directly quoted from O'Sullivan (2012)

The Rise of the Monocentric City

- These innovations **decreased commuting costs** and **increased** the feasible **radius of cities**.
- One rule of thumb is that the **radius of a city** is **the distance** that can be traveled in **an hour**.
- In the "**walking city**" of the early 19th century, **the maximum radius** was about **two miles**.
- The series of innovations in **intracity transport increased travel speeds** and **increased the feasible radius** of cities.
- The design of the public transit systems of the **19th century** facilitated the **large concentrations of employment** near **city centers**.
- These were **hub-and-spoke systems**, with spokes radiating out from a central hub.
- They were designed to **transport workers and shoppers** from **suburban areas** along the spokes to the city center.

Source: Directly quoted from O'Sullivan (2012)

The Rise of the Monocentric City

- Another limit to city size comes from **the costs of building high-density housing** to accommodate workers.
- In the early 1800s, **wood buildings** were made of posts and beams, with 16-inch timbers, and the **practical height limit was three floors**.
- Office buildings were transformed by the switch from masonry to **steel frames**.
- In 1848, a **five-story building** in New York used **cast-iron columns** instead of masonry walls.
- The switch to steel followed, providing **framing material** that was **stronger and more elastic** and workable than cast iron.
- The world's first skyscraper, an **11-story building** housing the Home Insurance Company, was built in 1885 with a **steel skeleton frame**.

Source: Directly quoted from O'Sullivan (2012)

The Rise of the Monocentric City

- One limit on **building heights** is the **cost of vertical transportation**.
- In 1854, **Elisha Otis** demonstrated the safe use of a **steam-powered elevator**.
- By 1857, the **Otis elevator** was being used in a **five-story building**.
- When the dedicated steam engine was **replaced by electricity**, the **cost of running elevators decreased** and their range increased.
- In the world's first skyscraper, a bank of elevators carried people up and down at a speed of 500 feet per minute.
- The **elevator changed the pricing of space** on different floors of an office building.

Source: Directly quoted from O'Sullivan (2012)

The Rise of the Monocentric City

Prices adjust to achieve locational equilibrium

- In a tall office building, **locational equilibrium** requires firms to be **indifferent between different floors**.
- Before the elevator, **upper floors were rented at a discount** to offset the cost of climbing four or five flights of stairs.
- The **elevator reduced the cost of vertical travel**, and the upper floors became more desirable.
- **Upper floors**, with their better views, **rented at a premium** rather than a discount (Bartlett, 1998).

Source: Directly quoted from O'Sullivan (2012)

The Rise of the Monocentric City

- The share of **metropolitan manufacturing employment** in **central cities decreased** from about two-thirds in 1948 to less than half in 2000.
- Mills (1972) provides evidence that the **decentralization of manufacturing** started long before 1948.
- What caused the suburbanization of manufacturing employment?
- Moses and Williamson (1972) explain the role of the **intracity truck in the suburbanization of manufacturing**.
- The **truck** was developed in 1910, providing **an alternative** to the horse-drawn wagon used for **the trip from factory** to **port or rail terminal**.
- The **truck was twice** as fast as a horse-drawn wagon and **half as costly**, with a unit freight cost of only $0.15 per ton per mile.

Source: Directly quoted from O'Sullivan (2012)

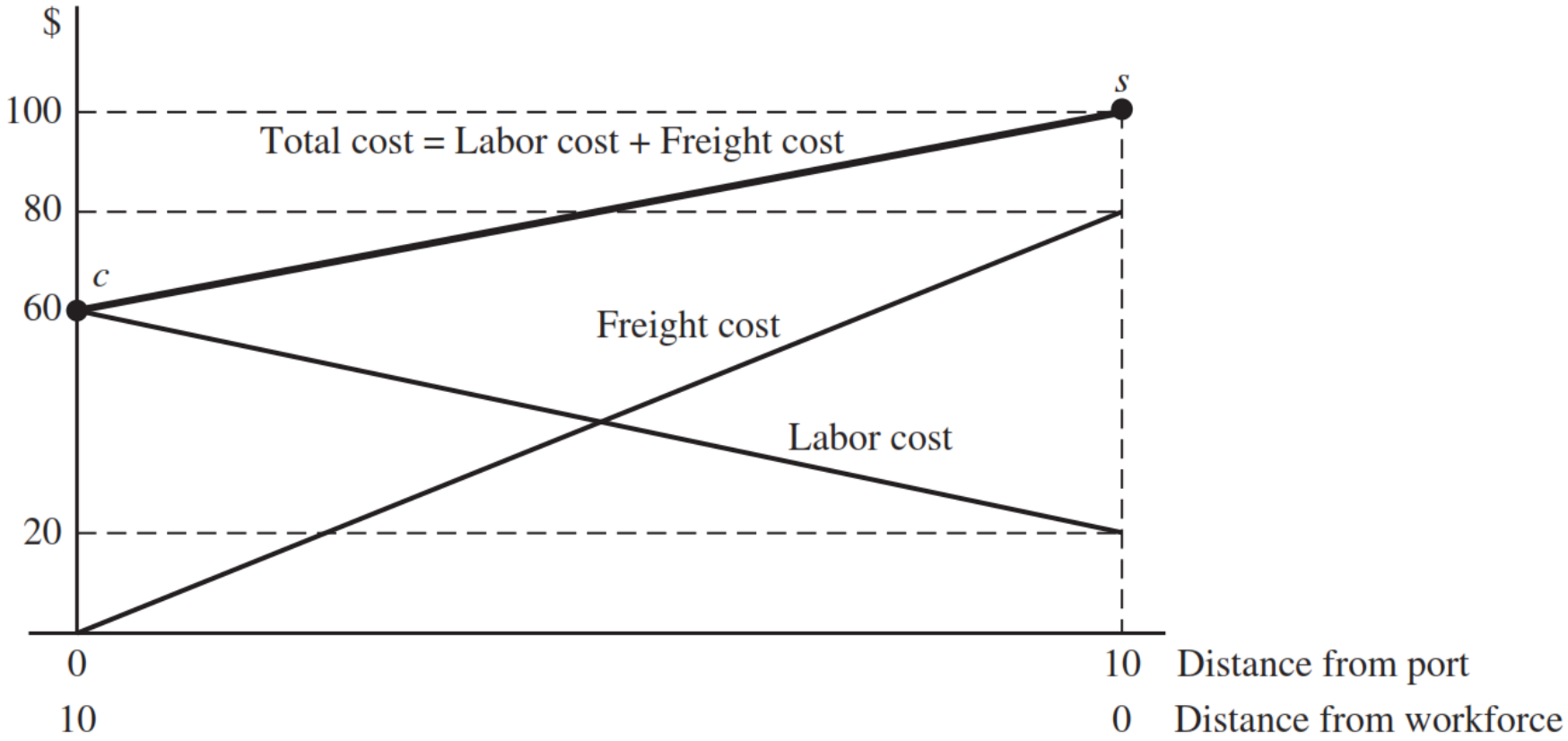
The Rise of the Monocentric City

- Between 1910 and 1920, the number of **trucks in Chicago** increased from **800 to 23,000**.
- Consider the **trade-offs** faced by a manufacturing firm that **moves away from a central port** to a **suburban location**:
  - Higher freight cost: The cost of transporting output to the port increases.
  - Lower wages: As the factory moves closer to its workforce, commuting time decreases, decreasing wages.
- In the era of the **horse-drawn wagon** and the streetcar, **the cost of moving freight** was **high** relative to the **cost of moving workers**, so as a **firm moved away** from the **city center**, **freight costs increased** more rapidly than **wages dropped**.
- It was cheaper to **move the workers** from the **suburbs to the central factory** than to **move output** from **a suburban factory** to **the export node**.

Source: Directly quoted from O'Sullivan (2012)

The Rise of the Monocentric City

The Truck and the Suburbanization of Manufacturing



Total transport cost (labor cost + freight cost) is minimized at the city center (the port) because the cost of moving output (on horse-drawn wagons) is high relative to the cost of moving workers (on streetcars).

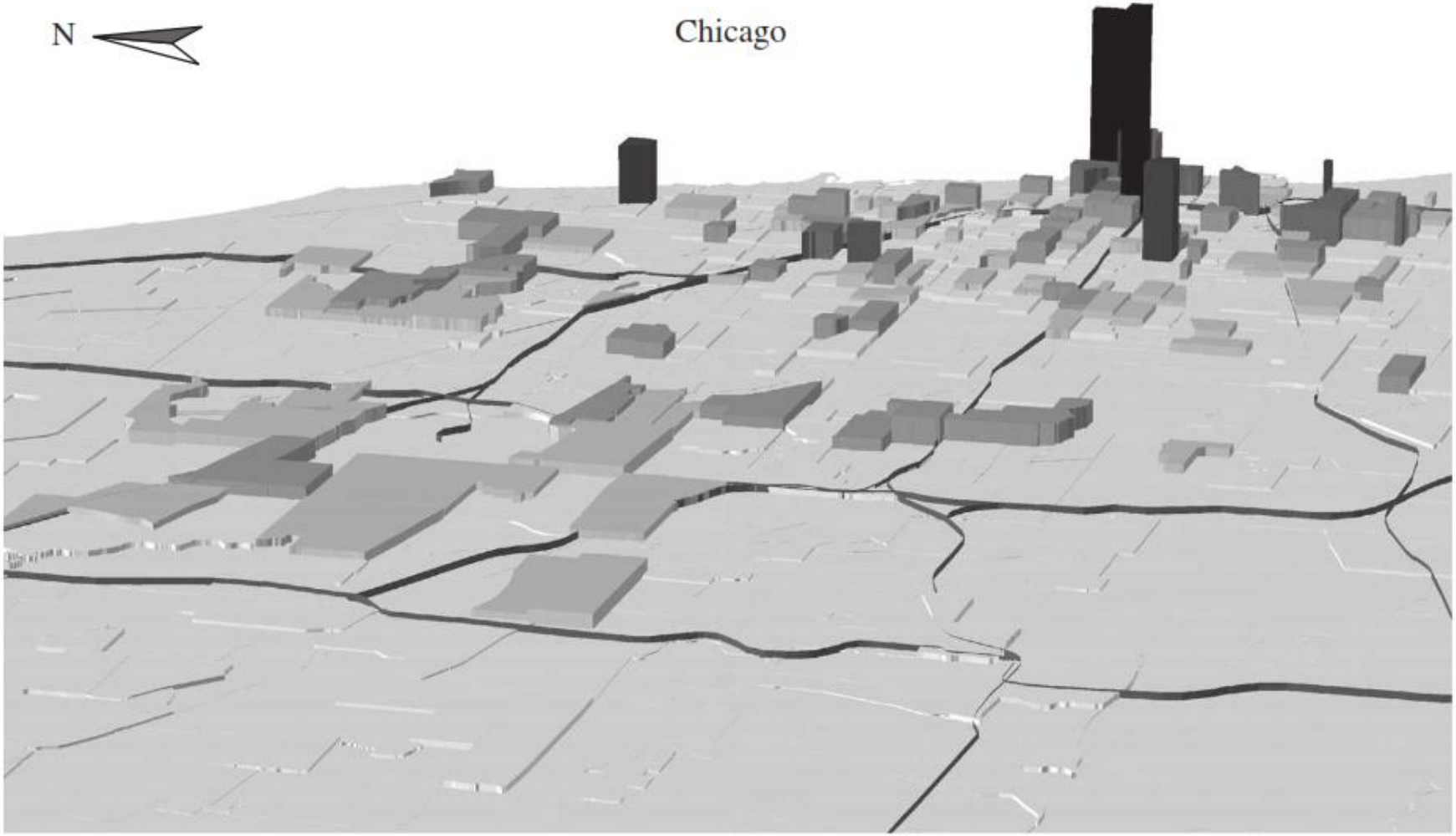
Source: Directly quoted from O'Sullivan (2012)

Decentralization of Office Employment

- Before the early 1970s, most office firms located in the CBD because the central location **facilitated face time** with **other office firms**.
- There was **some suburban office activity**, but most of it involved back-office operations—**paper processing** rather than **information exchange**.
- For most office activities, **the advantages of a CBD location** (timely contact with other firms) **outweighed the disadvantages** (high wages and rents).
- In the last 30 years, **advances in communications technology** have allowed more office activities to be **performed outside CBDs**.
- The **electronic transmission** of information allows workers to **exchange** a wider variety of **information without face time**.
- Firms can decouple their operations, with **information processing** in the **suburbs** and activities requiring face time in the CBD.
- For example, a firm's **accountants can locate in the suburbs** and transmit reports electronically to executives in the CBD, who then use the reports in their interactions with other firms.

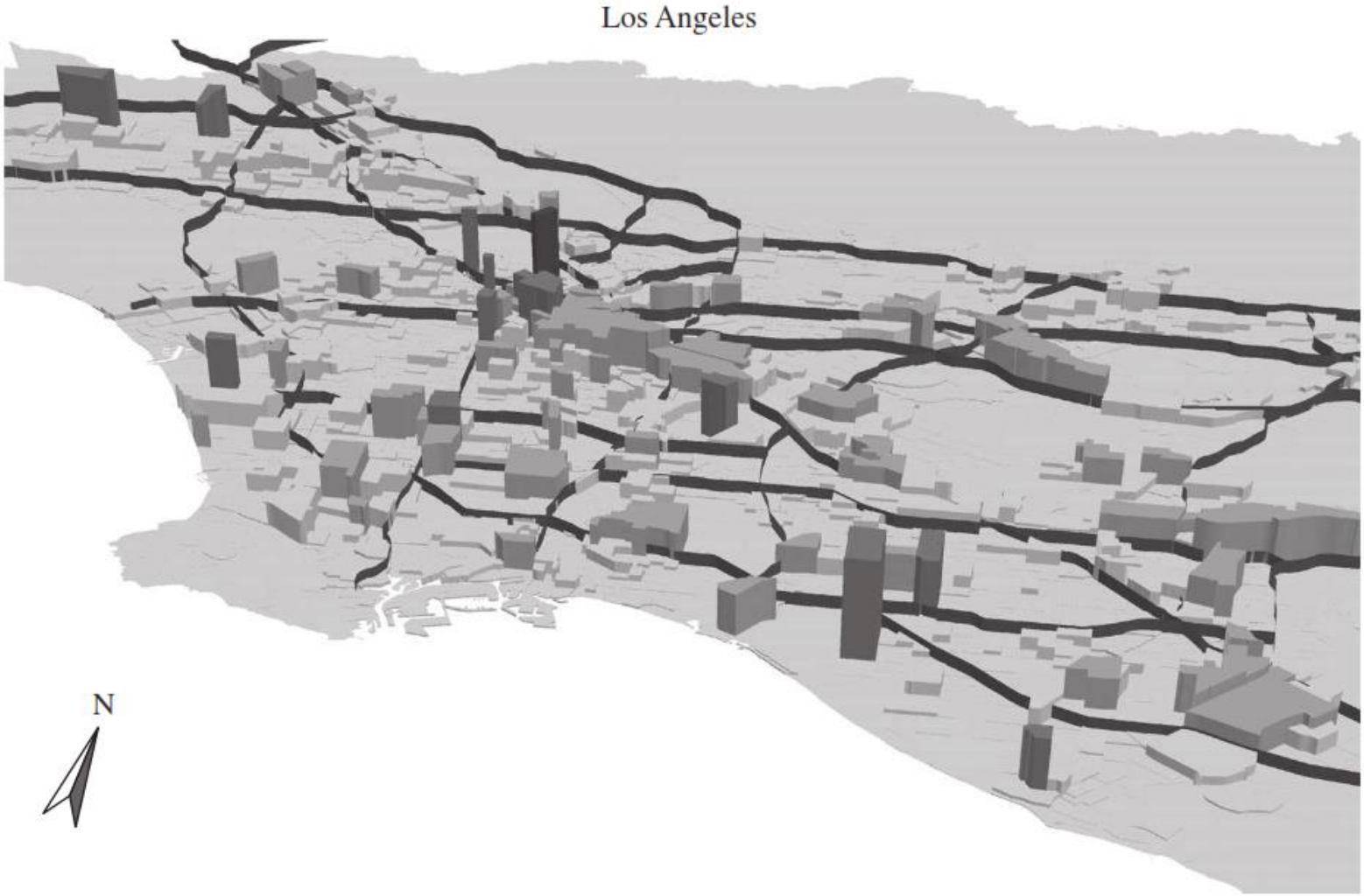
Source: Directly quoted from O'Sullivan (2012)

Distribution of Manufacturing Employment



Source: O'Sullivan (2012)

Distribution of Manufacturing Employment



Source: O'Sullivan (2012)

Urban Sprawl

- One measure of **urban sprawl** is the **density of economic activity**.
- The **lower the density**, the **larger the land area** required to accommodate a given population, and the greater the spread or sprawl of the metropolitan area.
- We saw earlier in the chapter that **U.S. cities** are much **less dense than cities** in the rest of the world, including **cities in Europe** with similar education and **income levels**.
- Metropolitan areas in **Germany** are **four times as dense as U.S.** metropolitan areas, and **Frankfurt** is **three times** as dense as New York City.
- **Barcelona** is **28 times** as dense as **Atlanta**, and the **land used per person** is **58 square meters**, compared to **1,712 in Atlanta**.

Source: Directly quoted from O'Sullivan (2012)

Urban Sprawl

Population Density in Atlanta and Barcelona

	Atlanta	Barcelona
Population in 1990 (million)	2.5	2.8
Average density (people per hectare)	6	171
Land per person (square meters)	1,712	58
Maximum distance between two locations (kilometers)	138	37
Percent of trips walking	Less than 1	20
Percent of trips on public transit	4.5	30

Source: Computations based on Alain Bertaud. "The Spatial Organization of Cities: Deliberate Outcome or Unforeseen Consequence?" Working Paper, Institute of Urban and Regional Development, University of California, Berkeley, 2004.

- A trip between the **two most distant points** in **Atlanta is 86 miles**, compared to only **23 miles in Barcelona**.
- Reflecting its **greater density**, Barcelona has more trips **by public transit** and **walking**.

Source: Directly quoted from O'Sullivan (2012)

Urban Sprawl

Changes in Urban Land and Population, 1982-1997

Region	Percentage Increase in Urban Land	Percentage Increase in Urban Population	Elasticity of Urban Land with Respect to Urban Population
United States	47	17	2.76
West	49	32	1.53
South	60	22	2.73
Northeast	39	7	5.57
Midwest	32	7	4.57

Source: Computations based on William Fulton, Rolf Pendall, Mai Nguyen, and Alicia Harrison. "Who Sprawls Most? How Growth Patterns Differ across the U.S." The Brookings Institution Survey Series, July 2001, pp. 1–23.

Urban Sprawl

- What causes urban sprawl—low density cities?
- Living at a **low density** means **consuming a large quantity of land**.
- Land is a **normal good**, so the **higher the income**, the **larger the consumption of land** and the **lower the population density**.
- A second factor is a **low cost of travel**, which allows workers and shoppers to live relatively long distances from jobs, shops, and destinations for social interaction.
- **Distant land** is **cheaper**, so lot sizes are larger and population density is lower.
- Putting these **two factors together**, **high income** makes people **demand large lots**, and a **low travel cost** allows them to move to the suburbs where land is relatively cheap.
- So we get **low-density development** at distant locations, also known as **urban sprawl**.

Source: Directly quoted from O'Sullivan (2012)

Urban Sprawl

- A number of government **policies** in the **United States encourage low densities** in large metropolitan areas.
  - **Congestion externalities:** The underpricing of urban transportation encourages people to commute relatively long distances from locations far from the city center where the low price of land encourages large lots.
  - **Mortgage subsidy:** Interest on housing mortgages is a deductible expense for federal and state income taxes, providing a subsidy for housing that increases housing consumption.
  - **Underpricing of fringe infrastructure:** In some metropolitan areas, the infrastructure cost of new development at the urban fringe is not fully borne by developers and their customers.
  - **Zoning:** Many suburban municipalities use zoning to establish minimum lot sizes. One motivation is to exclude low-income households, whose tax contribution may fall short of the costs they impose on municipal government.

Source: Directly quoted from O'Sullivan (2012)

Urban Sprawl

- Glaeser and Kahn (2004) argue that **sprawl is caused** mainly by the **automobile and the truck**.
- These two travel modes eliminated the orientation of firms and workers toward the indivisible transportation infrastructure near the city center.
- The authors show that **sprawl is ubiquitous across metropolitan areas** with all levels of income, poverty, and government fragmentation, suggesting that **something else** —the internal combustion engine— is the **driving force** behind sprawl.
- The authors suggest that the subsidies for highways and housing are too small to have much of an effect.

Source: Directly quoted from O'Sullivan (2012)

Urban Sprawl

European Policies

- Why is urban population **density higher in European cities**?
- Nivola (1998) discusses **various public policies** that promote higher urban density in European cities.
- One factor is a higher **cost of personal transportation**.
- Because of high taxes, the **price of gasoline** in **Italy** is roughly **four times** the price in the United States.
- Another factor is the policy of **heavier taxes** on **consumption** rather than income.
- **Sales taxes on cars** sold in Europe are much higher than in the United States—**nine times higher** in the **Netherlands** and **37 times higher** in **Denmark**.
- A number of policies in Europe **promote the small neighborhood shops** that facilitate high-density urban living.

Source: Directly quoted from O'Sullivan (2012)

Urban Sprawl

European Policies (continued)

- **Electricity is more costly** in Europe, so it would be very expensive to operate the **huge refrigerators and freezers** that allow Americans to make infrequent trips to suburban megastores.
- Most Europeans rely to a greater extent on more **frequent trips to neighborhood stores**.
- Many European countries **restrict the pricing and location** of **large retailers**, protecting small shops from competition.
- The result is **more neighborhood shops**—and **higher prices for consumers**.

Source: Directly quoted from O'Sullivan (2012)

Urban Sprawl

European Policies (continued)

- Several other policies in Europe **promote higher density living**.
- Large **agricultural subsidies** allow small farmers on **urban fringes** to **outbid city dwellers for land**.
- In 1995, the **subsidy per hectare** was **$791** in the European Union, compared to **$79** in the United States.
- In Europe, investment in transportation infrastructure favors **mass transit rather than highways**.
- **Britain** and **France** allocate between **40 percent** and **60 percent** of their transport investment to **mass-transit networks**, compared to **17 percent** in the **United States**.

Source: Directly quoted from O'Sullivan (2012)

Urbanization in Thailand is dominated by the Bangkok urban area

- According to the **World Bank** report East Asia's Changing Urban Landscape: Measuring a Decade of Spatial Growth, urban growth in Thailand is **dominated by** the **Bangkok urban area**, which was the **fifth largest in East Asia** in terms of **area** and the **ninth largest** in terms of its **population** approaching 10 million in 2010.
- **No other urban** area in Thailand had **more than 500,000 people**.

Country findings

- Thailand's urban area grew from about 2,400 square kilometers to 2,700 between 2000 and 2010, an average annual growth rate of 1.4%.
- This growth rate was **slower than** the average for the **region** (2.4%).
- Its **urban population** (the population living in **urban areas of more than 100,000 people**) increased during this period from 9.3 million to slightly less than **11.8 million**.

Source: https://www.worldbank.org/en/news/feature/2015/01/26/urbanization-in-thailand-is-dominated-by-the-bangkok-urban-area#:~:text=Urbanization%20in%20the%20country%20is,the%20megacities%20of%20the%20region.&text=In%202010%2C%20the%20Bangkok%20urban,total%20urban%20area%20in%20Thailand.

Urbanization in Thailand is dominated by the Bangkok urban area

Country findings (continued)

- The average annual rate of **urban population growth, 2.3%,** was slightly slower than that for the **region as a whole (3.0%).**
- The overall urban population density was about 4,000 people per square kilometer in 2000, increasing slightly to **4,300 in 2010**.
- It is **less densely populated** than in other countries in the region, which **averaged 5,800 people per square kilometer** in 2010.
- **Urbanization** in the country is **dominated by the Bangkok** urban area, which at 9.6 million people in 2010 almost joined the ranks of the megacities of the region.
- The Bangkok urban area grew from **1,900 square kilometers** to **2,100** between **2000 and 2010**, making it the fifth-largest urban area in East Asia in 2010, larger than megacities such as Jakarta, Manila, and Seoul.

Source: https://www.worldbank.org/en/news/feature/2015/01/26/urbanization-in-thailand-is-dominated-by-the-bangkok-urban-area#:~:text=Urbanization%20in%20the%20country%20is,the%20megacities%20of%20the%20region.&text=In%202010%2C%20the%20Bangkok%20urban,total%20urban%20area%20in%20Thailand.

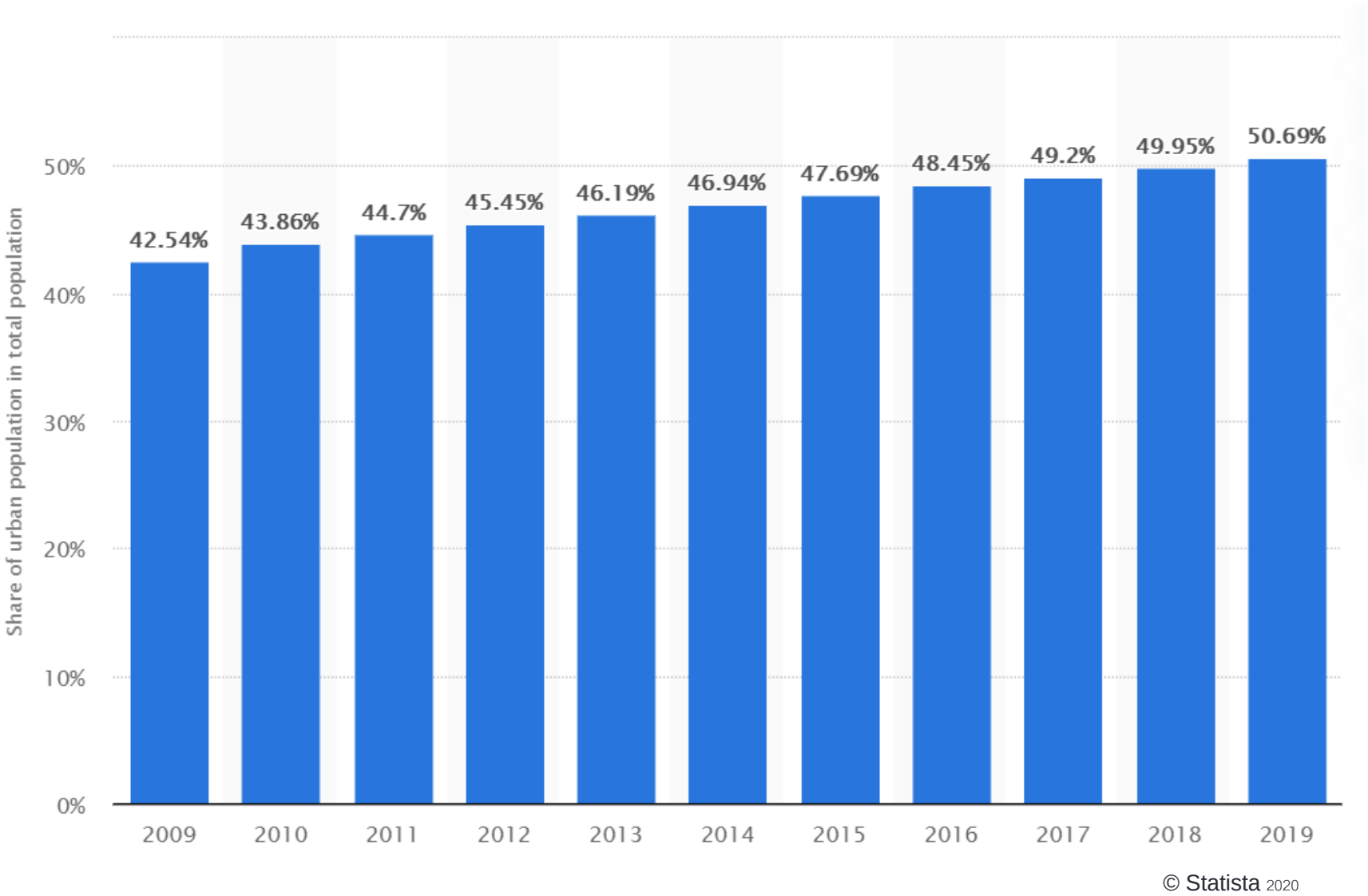
Urbanization in Thailand is dominated by the Bangkok urban area

Country findings (continued)

- Its average annual rate of growth, **1.1%**, was among the **slowest for urban areas in the region** with more than 5 million inhabitants, faster only than Hong Kong SAR, China, and the larger Japanese urban areas.
- In 2010, the **Bangkok urban** area accounted for **nearly 80% of the total urban** area in Thailand.
- The urban population of the Bangkok urban area grew from 7.8 million people to 9.6 million between 2000 and 2010, a relatively modest annual **growth rate of 2.0%.** It has the ninth largest population in East Asia.
- **Surat Thani** was the **fastest-growing urban** area spatially, growing from 20 square kilometers in 2000 to 36 in 2010, at **5.8% a year**, as well as in population, more than **doubling from 62,000 people to 131,000** during this period.
- The **densest urban areas** were **Hat Yai** (5,900 people per square kilometer in 2010) and **Chiang Mai** (5,000 people per square kilometer).

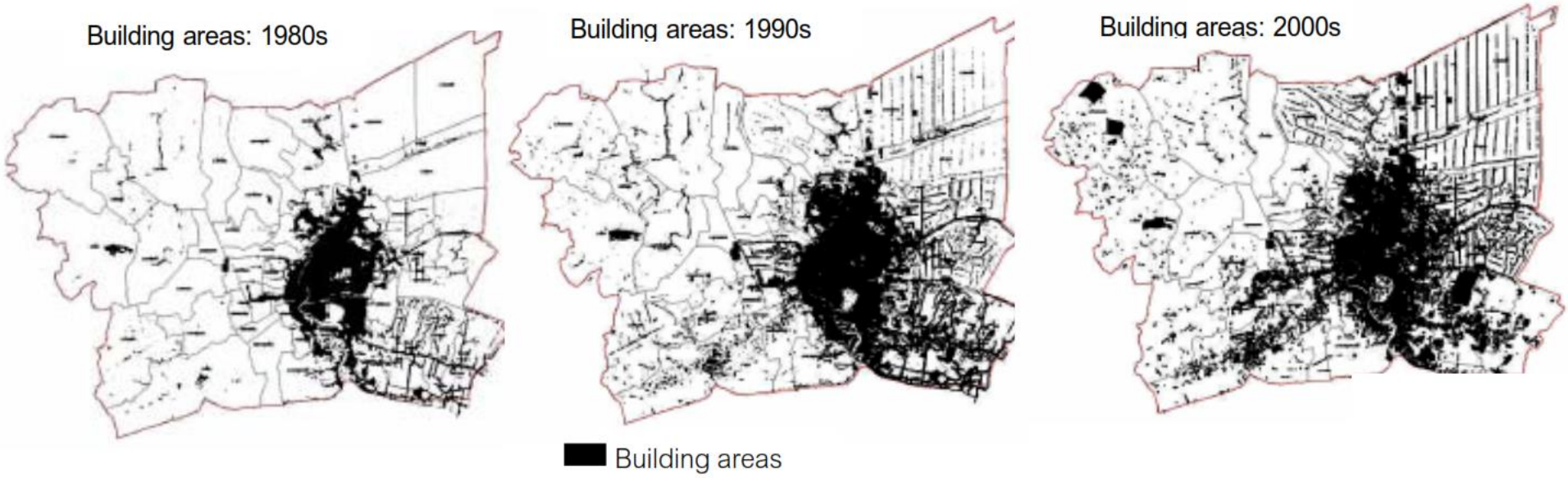
Source: https://www.worldbank.org/en/news/feature/2015/01/26/urbanization-in-thailand-is-dominated-by-the-bangkok-urban-area#:~:text=Urbanization%20in%20the%20country%20is,the%20megacities%20of%20the%20region.&text=In%202010%2C%20the%20Bangkok%20urban,total%20urban%20area%20in%20Thailand.

Thailand: Urbanization from 2009 to 2019



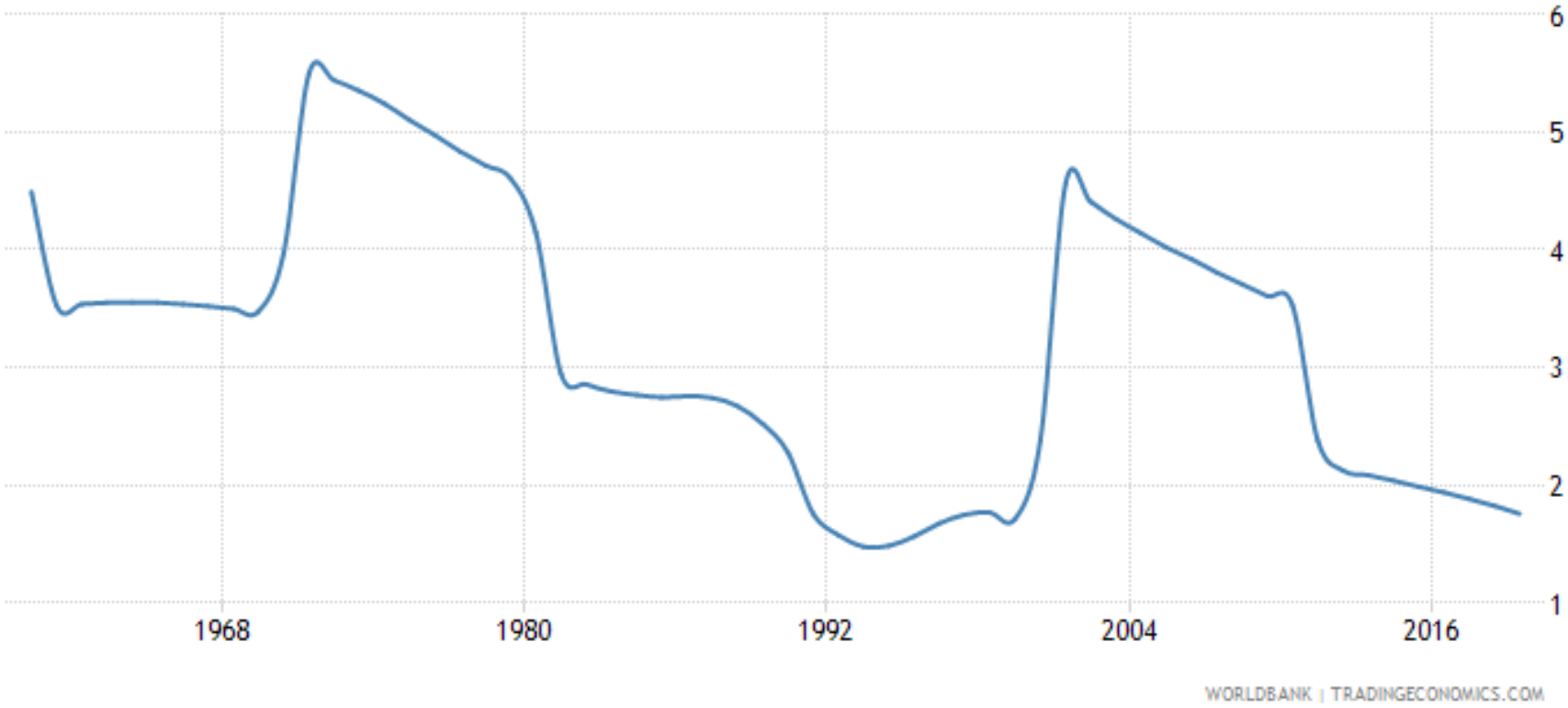
Source: https://www.statista.com/statistics/455942/urbanization-in-thailand/

The growth of building areas in Bangkok and its vicinities



Source: Iamtrakul & Hokao (2011)

Thailand - Urban Population Growth (annual %)



Source: https://tradingeconomics.com/thailand/urban-population-growth-annual-percent-wb-data.html