CONTENT SUMMARY

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

1. Introduction and Axioms of Urban Economics

Definition of Urban Economics

- The field of urban economics is the **crossing point** of **geography** and **economics**.
- The economics investigates the **decisions of individuals** under the **constrained resources**.
- **Households** make their decisions **to maximize their utilities**, while **firms optimize their profits**.
- **Geographers** study how **resources and settlements** are **located** across **spatial dimension**.

Source: O'Sullivan (2018) and O'Sullivan (2012)

1. Introduction and Axioms of Urban Economics

Definition of Urban Economics (cont'd)

- **Where** does human action happen?
- Urban economics integrates the main features of **economics and geography altogether**, investigating the **spatial pattern** and **location-related decisions** of household's utility maximizing and firm's profit maximization.
- Urban economics also studies the **externalities (both positive and negative ones)** and **inefficiencies**, enabling the formulation of policy recommendations to improve inefficiencies and manage externalities.

Source: O'Sullivan (2018) and O'Sullivan (2012)

1. Introduction and Axioms of Urban Economics

The existence of cities

Three conditions must be satisfied.

- Agricultural surplus
- Urban production
- Transportation for exchange

Source: O'Sullivan (2018) and O'Sullivan (2012)

1. Introduction and Axioms of Urban Economics

The 5 Axioms of Urban Economics

1. Prices adjust to achieve locational equilibrium
2. Self-reinforcing effects generate extreme outcomes
3. Externalities cause inefficiencies
4. Production is subject to economies of scale
5. Competition generates zero economic profit

Source: O'Sullivan (2012)

2. Agglomeration economies

- The **economic forces** that cause firms to **locate close to one another** in clusters.
- The forces acting on firms in **a single industry** together are called **localization economies**, indicating that they are **"local"** to a **particular industry**.
  - For example, firms in the software industry cluster in Silicon Valley.
- When agglomeration economies **cross industry boundaries**, they are called **urbanization economies**.

Source: Directed quoted from O'Sullivan (2018) and O'Sullivan (2012)

2. Agglomeration economies

Agglomeration Economies

- **Localization Economies**
  - Cost savings when firms in the **same industry** are **clustering** in the same area.
- **Urbanization Economies**
  - Cost saving when firms **across different industries** are **clustering**.
  - One industry attracts others to relocate and form a cluster.
  - Urbanization economies incurs the **diverse cities**.

Note: Urbanization and localization economies are the characteristics of agglomeration economies

2. Agglomeration economies

Why do firms cluster?

- Sharing intermediate inputs
- Sharing a labor pool
- Labor matching
- Knowledge spillover

Localization vs Urbanization Economies

- Localization economies → Specialized cities
  - Specialized cities can attract the incumbent firms.
- Urbanization economies → Diverse cities
  - Infant companies can benefit from a diversity of economic activities.

With improvements in telecommunications technology:

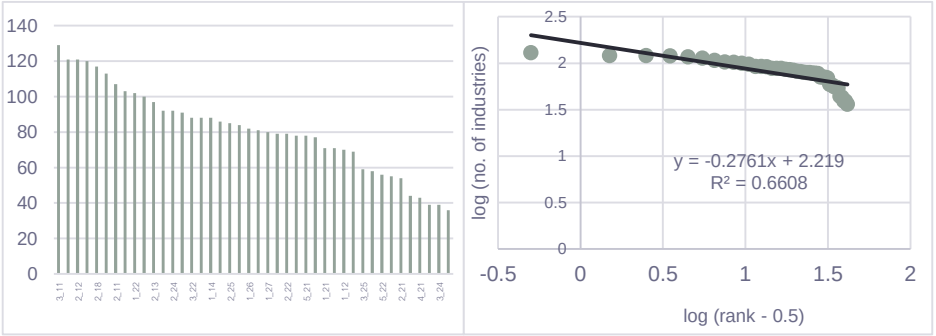
- Headquarters → located in diverse cities (urbanization economies).
- Production plants → located in specialized cities (localization economies).

Source: O'Sullivan (2018) and O'Sullivan (2012)

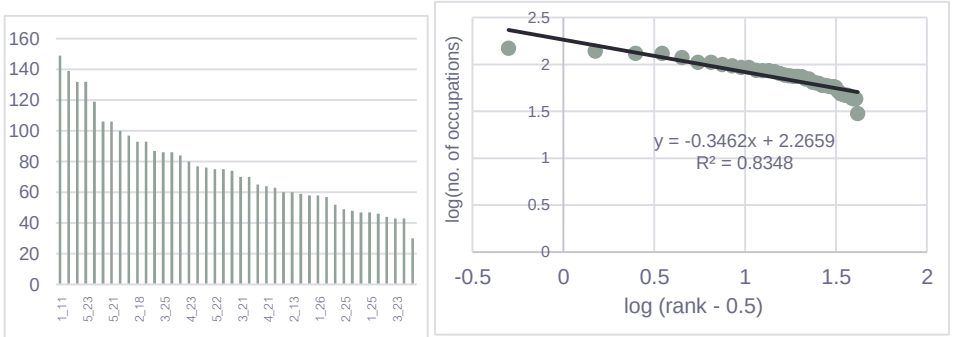
Thailand: Nationwide distribution of industries and occupations

1978

(a) Nationwide distribution of no. of industries

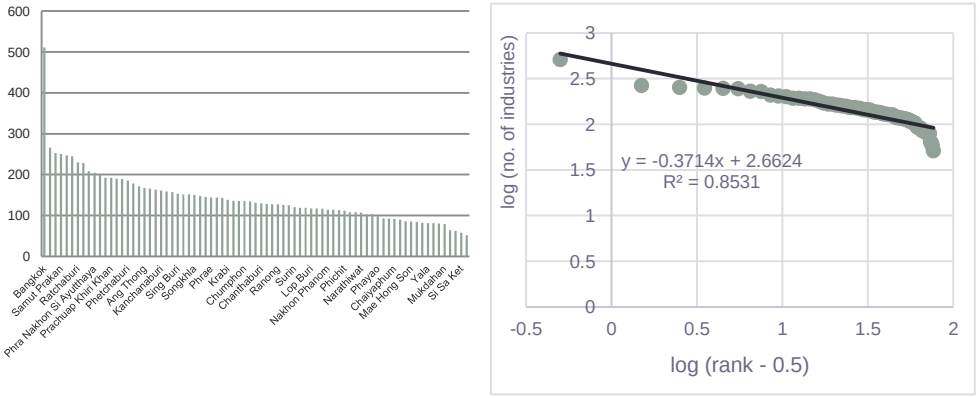


(b) Nationwide distribution of no. of occupations

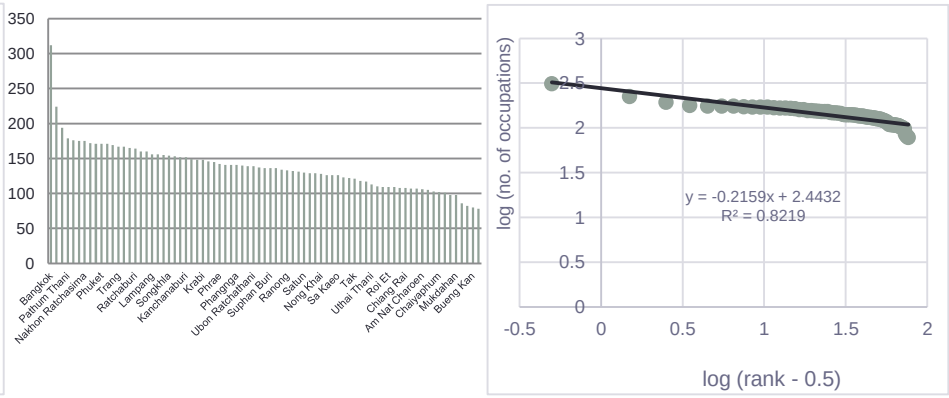


2016

(a) Nationwide distribution of no. of industries

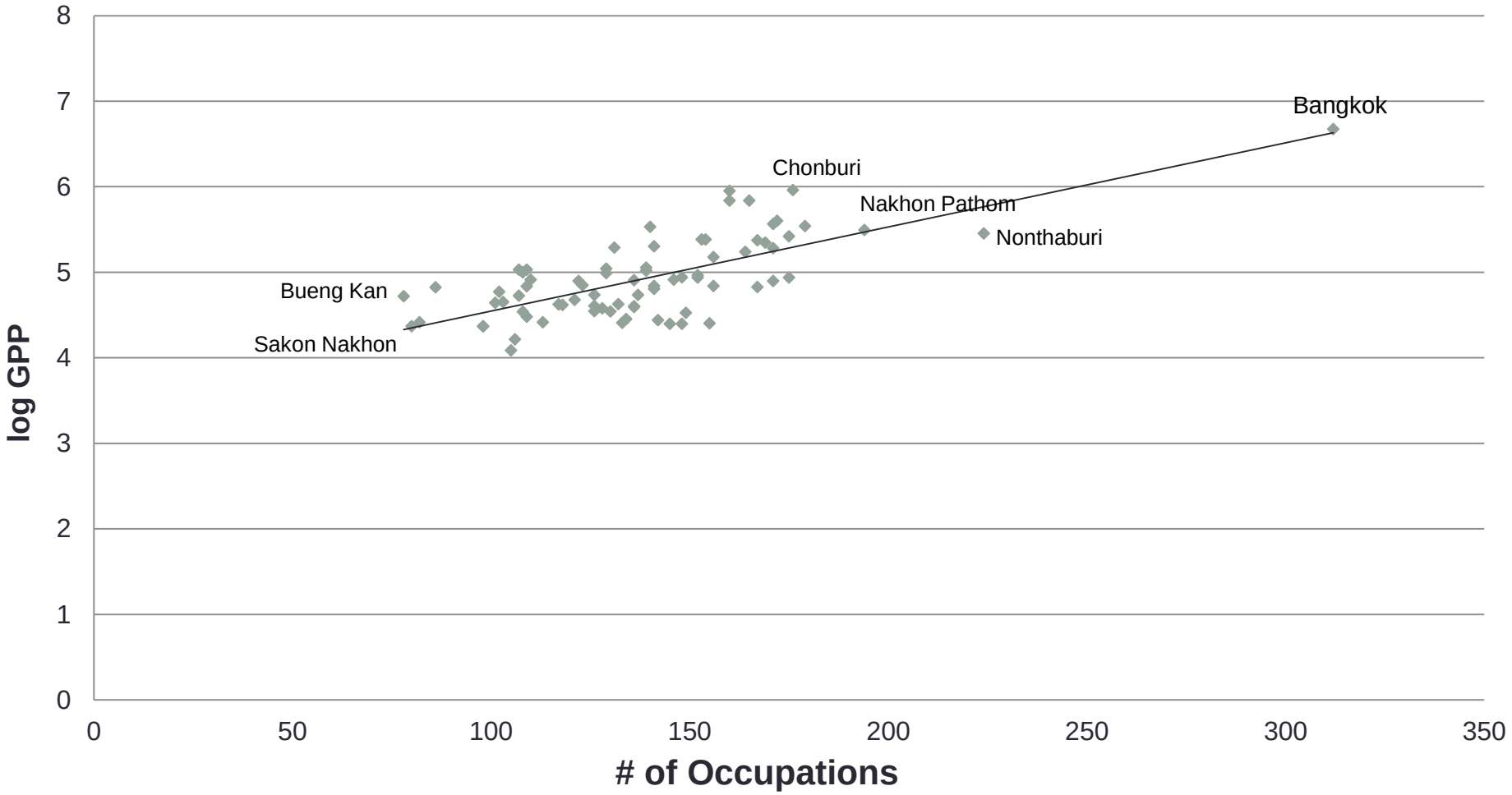


(b) Nationwide distribution of no. of occupations



Source: Puttanapong (2018)

Thailand: Variety of occupations and GPP (2016)



Source: Puttanapong (2018)

3. Urban labor market

Equilibrium in labor market

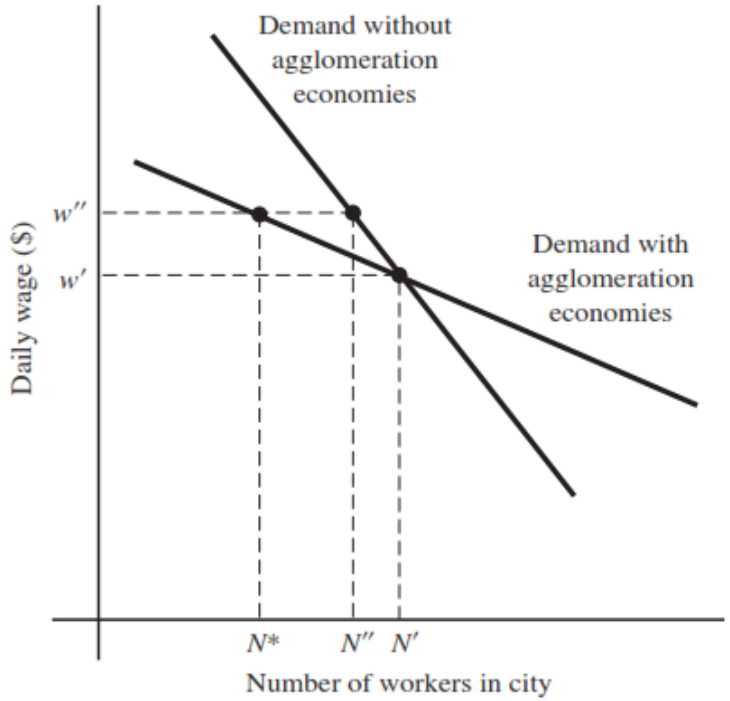
- Agglomeration economies **increase labor productivity**.
- Therefore, as **total employment in a city increases**, the **marginal product of labor increases**, pushing up the **marginal benefit of labor** (the marginal revenue product).
- If we start with a demand curve that ignores agglomeration economies and then **incorporate the productivity** effects of agglomeration economies.
- **The demand curve becomes flatter**: agglomeration economies and the resulting productivity boost moderate the normal decline in productivity that occurs as the workforce expands.
- In other words, **agglomeration economies generate a flatter labor-demand curve**, with a more elastic demand for labor.

Source: O'Sullivan (2018) and O'Sullivan (2012)

3. Urban labor market

Equilibrium in labor market

- To illustrate the importance of agglomeration economies for the urban labor market, consider the **effects of an increase in the market wage**.



- Agglomeration economies generate a **relatively flat labor-demand curve**.
- An **increase in the wage** from **w' to w" decreases** the quantity demanded from **N' to N"** in the absence of agglomeration economies.
- If the city is subject to **agglomeration economies**, the quantity of labor **demanded decreases to N***.

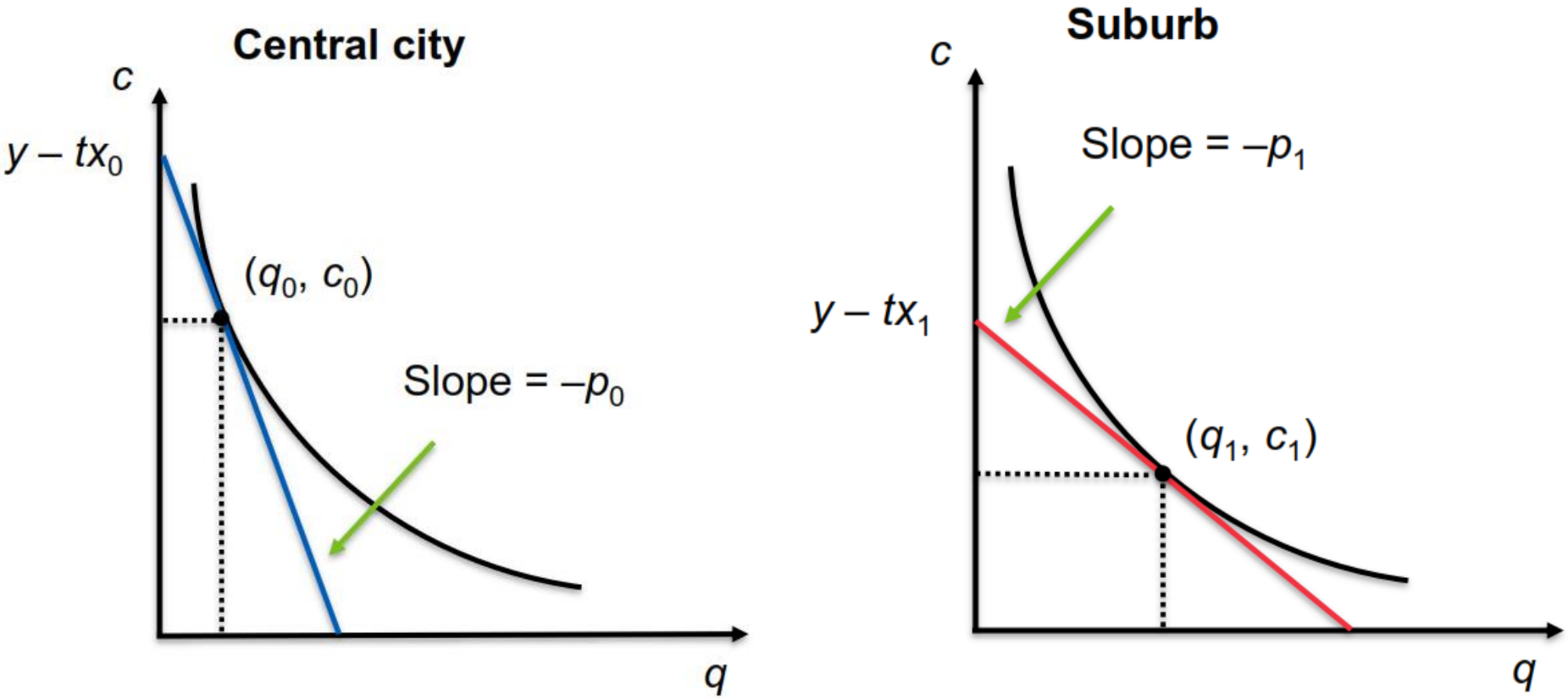
Agglomeration economies **amplify any increase in the city's workforce** because the gain of agglomeration economies **makes workers more productive**.

Source: O'Sullivan (2018) and O'Sullivan (2012)

4. Monocentric City and real estate price

Spatial Equilibrium

The spatial equilibrium exists with two sets of budget constraints. These utility-maximization behaviors create the spatial distribution of housing.

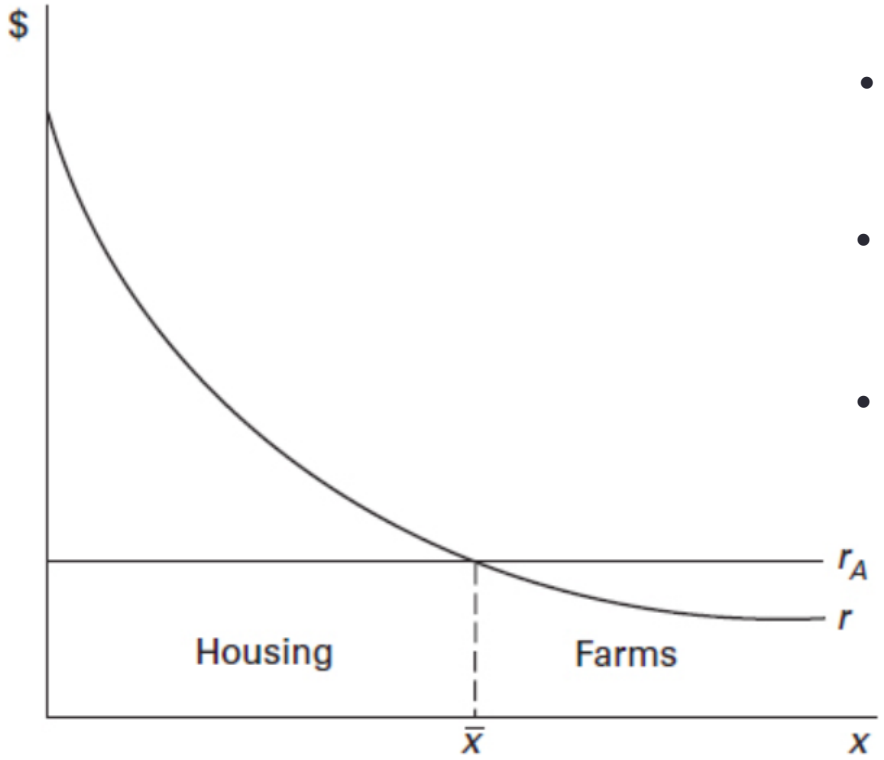


- A substitution between transportation cost and housing space.
- A substitution between consumption expenditure and distance from the city center.

4. Monocentric City and real estate price

Supply-demand equilibrium of the city

- The city's boundary is the outcome of **competition** between **urban activity** and **agriculture**.

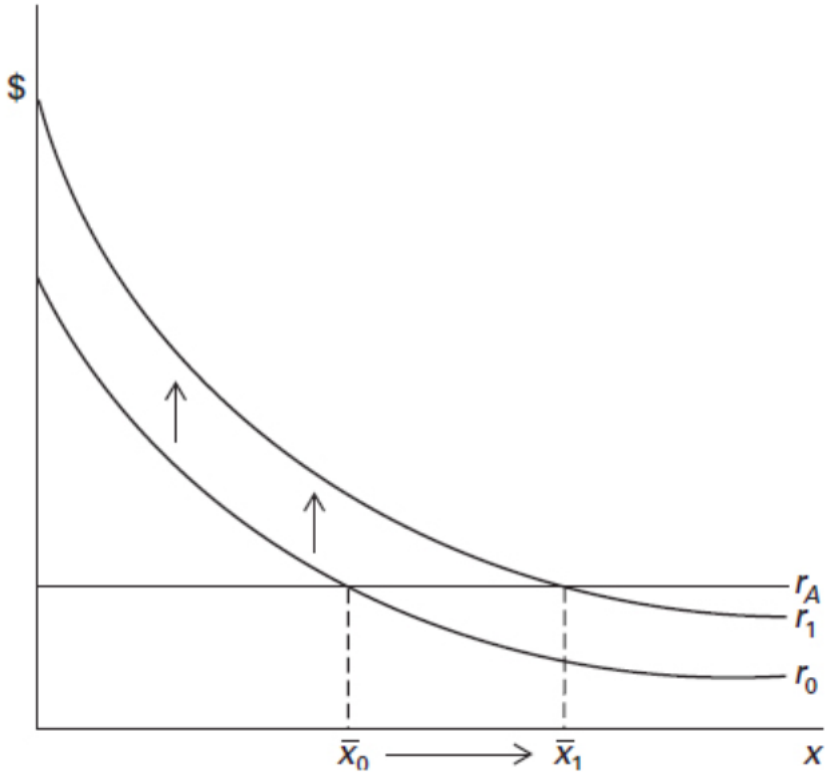


- r_A is rent for farming activity which is constant for all areas.
- $\bar{X}$ is the location where the rent of both urban and agricultural activities are equal.
- $\bar{X}$ is the boundary of the city.

4. Monocentric City and real estate price

Expansion of city

- The **city's boundary** will **expand** if the number of **population increase**, leading to a higher demand for housing.



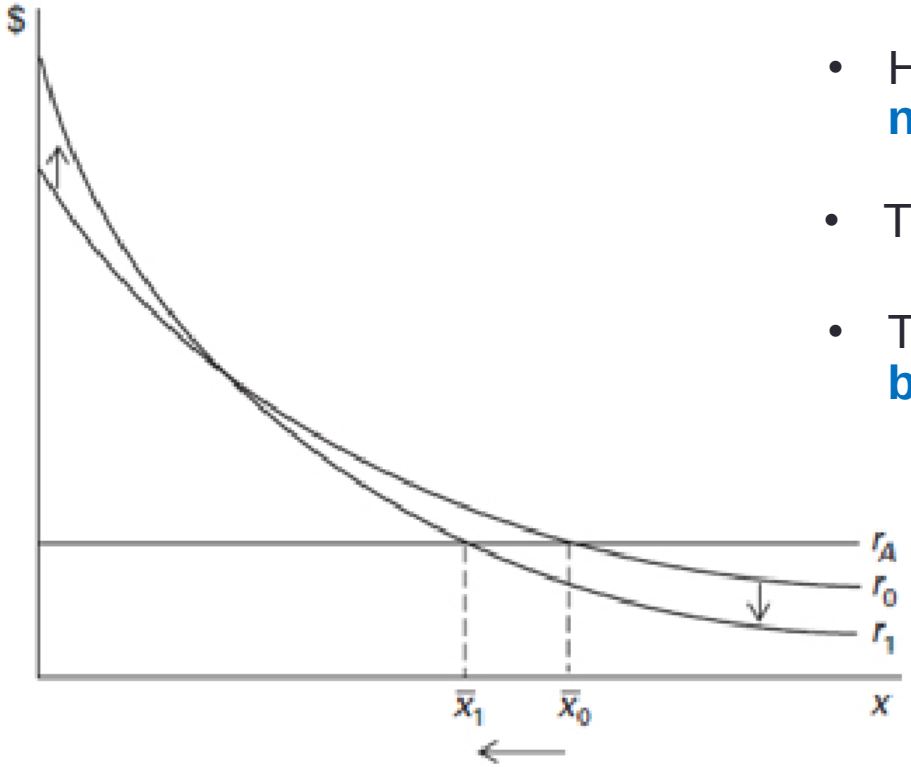
- The rent is increased from r_o to r_1 causing the boundary of city to expand from $\bar{X}_0$ to $\bar{X}_1$.

4. Monocentric City and real estate price

Spatial Equilibrium

Increase in commuting cost

- People living in the suburb will **increase their utilities** by **moving closure** to the city center.



- Housing prices will increase to reach the **new spatial equilibrium**.
- The price curve will **rotate clockwise**.
- These changes will **relocate** the **boundary** of city.

Real Estate Price

Determination of real estate price

p = rent per square meter

q = area (square meter)

i = discount rate

V = the value of a house or land

= the present value of the cash flow generated by future rents

Net Present Value (NPV) of the future rents is $$V = \sum_{t=1}^{T} \frac{p_t q_t}{(1+i)^t} \approx \frac{pq}{i}$$

Real Estate Price

In the case of perpetual rent, the value of real estate is

$$V_L = \frac{R_{L1}}{(1+i)} + \frac{R_{L2}}{(1+i)^2} + \frac{R_{L3}}{(1+i)^3} + \frac{R_{L4}}{(1+i)^4} + \cdots$$

$$= \sum_{t=1}^{\infty} \frac{R_{Lt}}{(1+i)^t} \approx \frac{R_L}{i}$$

Note: Assuming $q = 1$.

5. Housing policy

- Housing has **three features** that make it **different from other products**.

  (1) the **housing stock** is **heterogeneous**, with dwellings that differ in size, age, style, interior features, utilities, and location.

  (2) housing is **durable** and can **deteriorate over time** at a fast rate or a slow one, depending on the maintenance and repair decisions of its owner.

  (3) **moving is costly**, so when income or housing preferences change, consumers don't instantly adjust their housing consumption. Instead, residents **wait until** the **gap between the ideal house and their actual house** is **large enough** to justify the large cost of moving.

Source: O'Sullivan (2018) and O'Sullivan (2012)

Hedonic Pricing Model

- To predict the price of a particular dwelling, we add to the base price to reflect **differences between** the **average dwelling** and a particular dwelling.

Example

- The **fourth bedroom** adds **$30,000** to the price.
- A **new roof** adds another **$3,000**.
- The **four-unit difference** in **air pollution** adds **$4,000**.
- If the average **test scores** in the **local school** are **three points higher** than the city average, that adds another **$6,000**.
- Adding up these adjustments, the predicted price of the dwelling is **$243,000**.

Source: O'Sullivan (2018) and O'Sullivan (2012)

5. Housing policy – case study of Singapore

- The **homeownership rate** for the resident population has been **above 90%** since the early 1990s.
- Among resident employed households, the 2014 median household income from work was S$8,292 per month, or **S$99,504 per year**.
- The median house type is a **four-room** (approximately **90 m^2**) flat sold by the **Housing & Development Board (HDB)**, the government housing agency, on a **99-year leasehold** basis.
- The median **house price** (market values) to annual **household income ratio** for 2015 was estimated at **5.0**.

Source: Phang & Helble (2015)

5. Housing policy – case study of Singapore

- The **unique housing system** has **75%** of the housing stock in 2015 classified as "**public housing**" built predominantly by the HDB; **82%** of the resident **population live in HDB estates**, of which **79% lived in HDB-sold flats**.
- **Demand for homeownership** is driven by the housing pension fund system introduced in 1968 when **Central Provident Fund (CPF) savings** were allowed to be **used for down payment and mortgage payments** for HDB flats.

Source: Phang & Helble (2015)

5. Housing policy – case study of Singapore

Lessons Learned for Other Asian Countries

- **Housing's contribution to economic development:** The housing and housing finance sectors can contribute **positively** and significantly to the **economic and financial development of a country**. Singapore's macroeconomic environment has been one of **high savings and income growth**, **low unemployment**, **inflation** and **interest rates**, and **government budgetary surpluses**, as well as **exchange rate appreciation**. Housing policy has also been used to promote racial integration, which, in turn, has contributed to **social stability** and **economic growth**.

Source: Phang & Helble (2015)

6. Spatial distribution of Employment and residence

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)

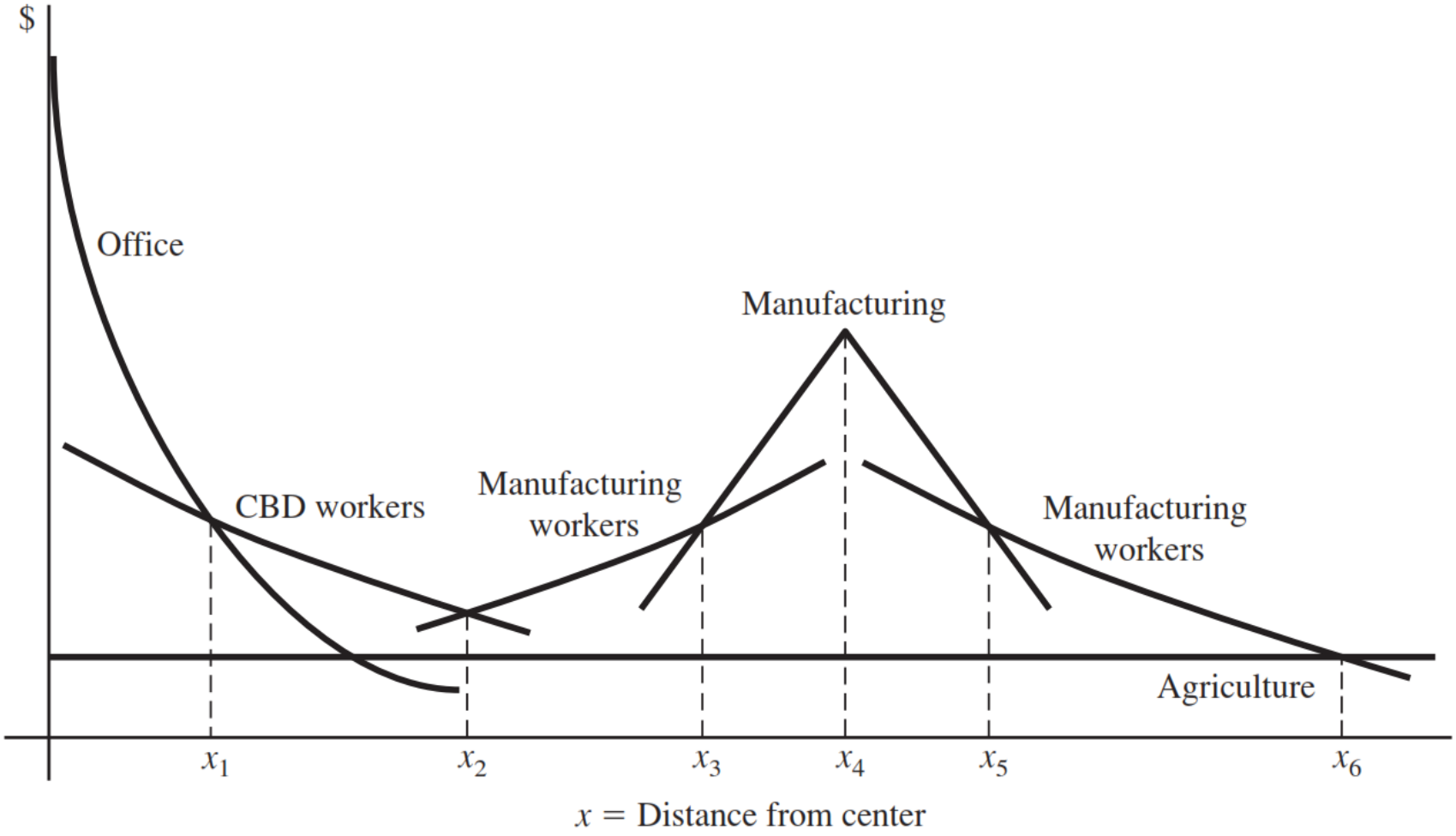
6. Spatial distribution of Employment and residence

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)

6. Spatial distribution of Employment and residence



Source: Directly quoted from O'Sullivan (2012)

6. Spatial distribution of Employment and residence

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)

6. Spatial distribution of Employment and residence

Urban Sprawl

- A number of government **policies** in the **United States encourage low densities** in large metropolitan areas.
  - Congestion externalities
  - Mortgage subsidy
  - Underpricing of fringe infrastructure
  - Zoning

European Policies

- Electricity cost
- Zoning policy on large retailers
- Agricultural subsidies
- Mass-transit infrastructure
- Prices of private vehicle and gasoline

Source: Directly quoted from O'Sullivan (2012)

7. Evidences of Thailand

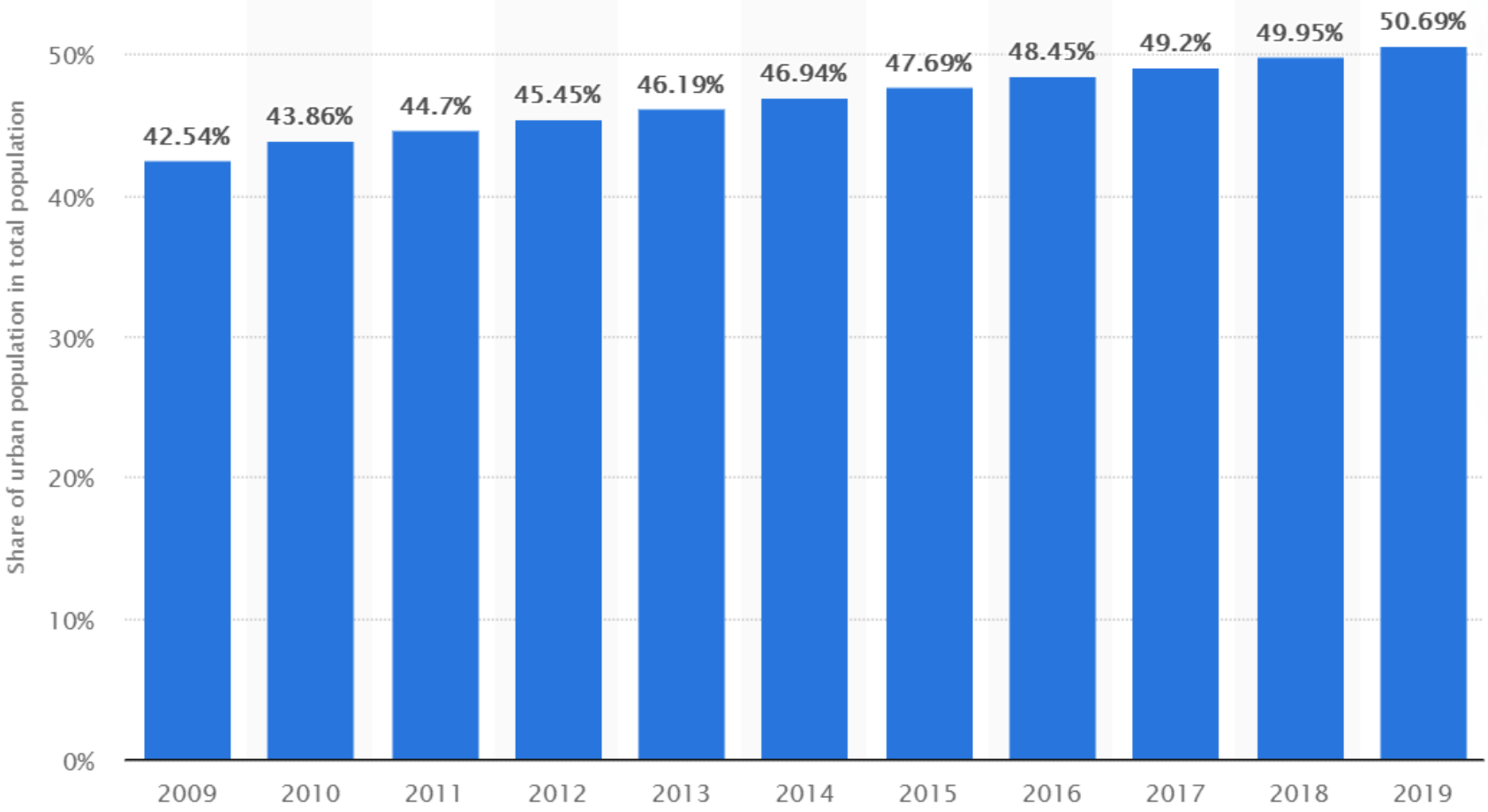
Urbanization in Thailand is dominated by the Bangkok urban area

- 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.

7. Evidences of Thailand

Thailand: Urbanization from 2009 to 2019



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

7. Evidences of Thailand

Rapid expansion of area and population

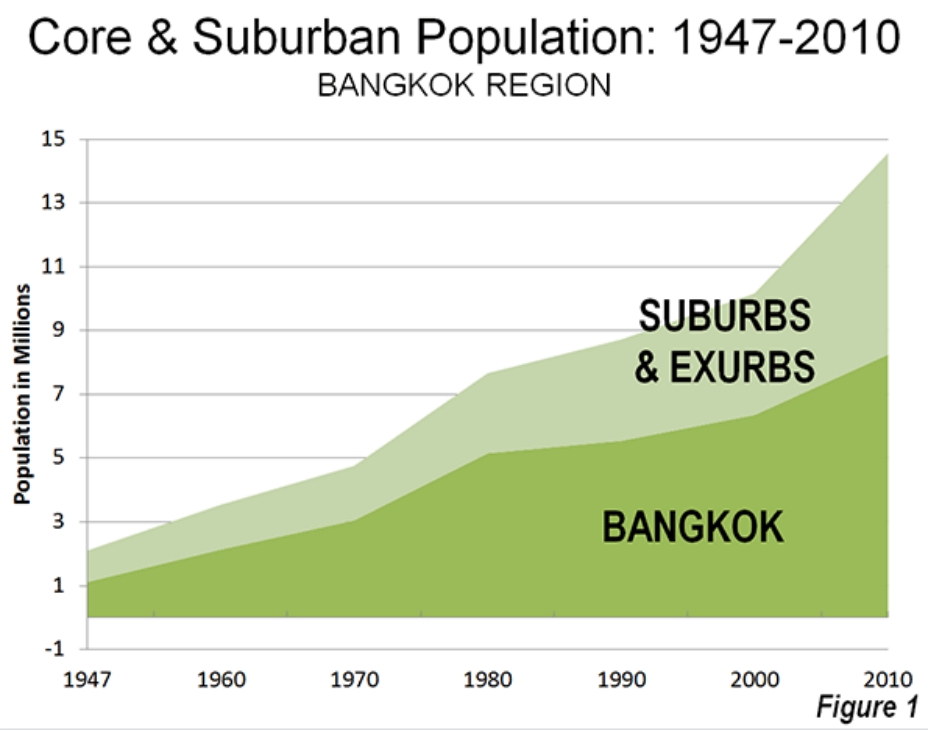


Figure 1

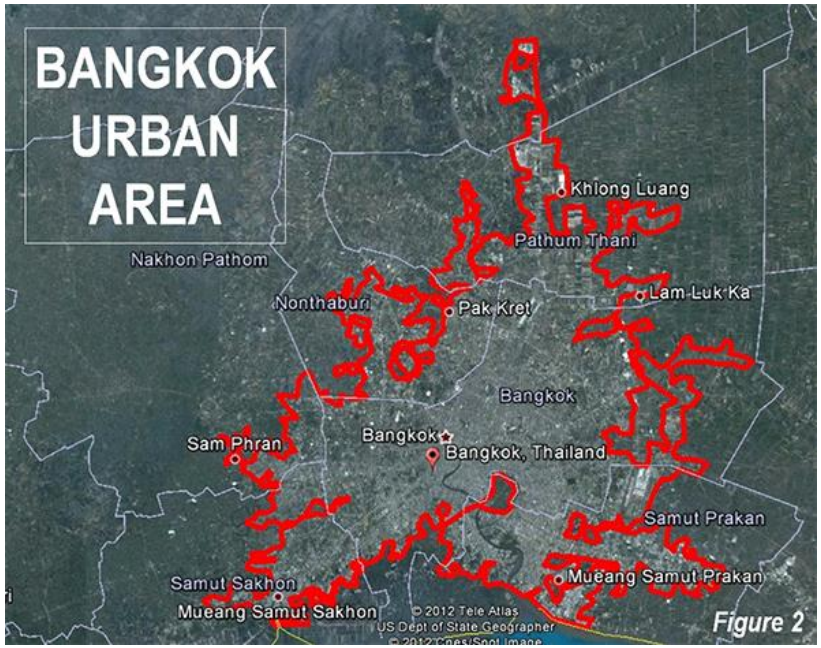
Cox(2012) states the following key issues of urbanization of Bangkok and its suburban areas as follows.

- **After 2000**, the **annual population growth** of Bangkok has been **2.5 times that of 1980-2000**.
- The Bangkok region – which includes the provincial level city of Bangkok and the provinces of Samat Prakan, Samut Sakhon, Pathum Thani, Nonthaburi and Nakhon Pathom – had a **population of 15 million in 2010**.
- Interestingly the growth has arisen in suburban areas. During 2000 and 2010, the **city expanded by 30%**, while the **suburban provinces grew by 66%**.

Cox(2012) is available at www.newgeography.com/content/003367-the-evolving-urban-form-bangkok

7. Evidences of Thailand

Rapid expansion of area and population (continued)



Cox(2012) also indicates the following main characteristics of Bangkok and its suburban areas .

- The urban area covers approximately 900 square miles (2,330 square kilometers).
- It has a population density of the urban area of16,200 per square mile (6,200 per square kilometer).
- It is noted that this density is **1.5 times** that of the **Paris urban areas** and more than **2.5 times** that of **the Los Angeles**.

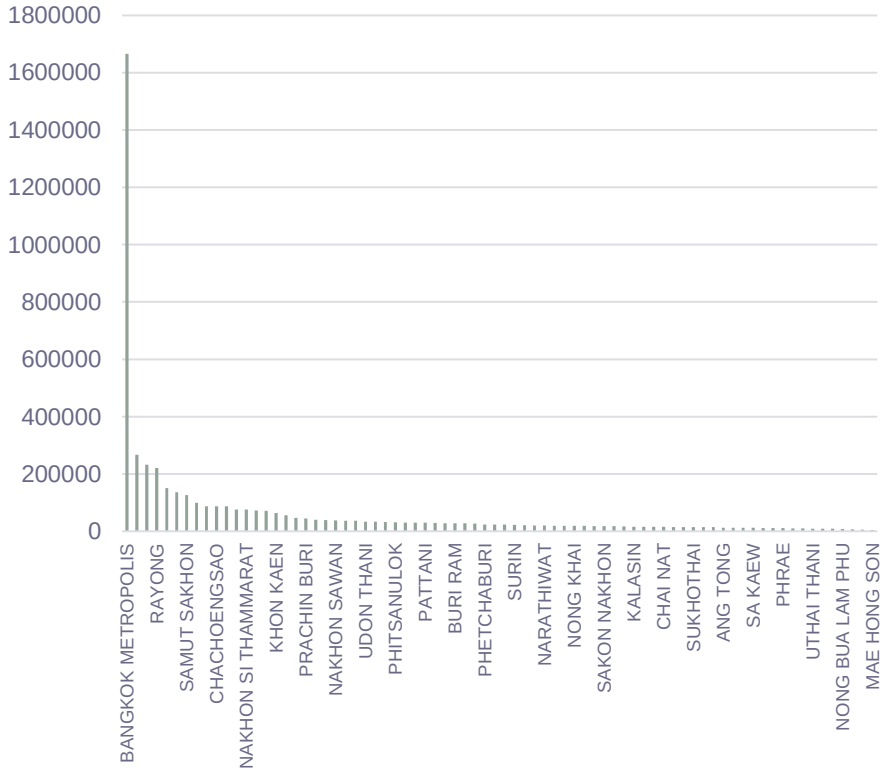
Cox(2012) is available at www.newgeography.com/content/003367-the-evolving-urban-form-bangkok

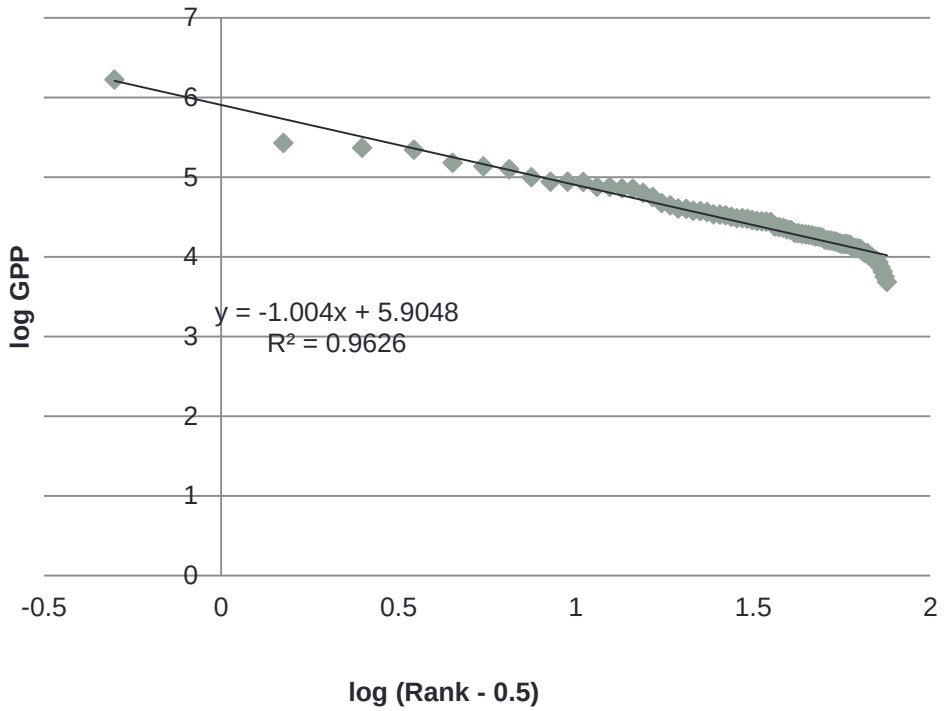
7. Evidences of Thailand

- **Concentration of industrialization surrounding Bangkok**
  - Therefore, in the first phase of industrial development, the largest financial return on manufacturing activities and related services was mainly from the concentration within Bangkok's suburban areas**.**
- **Urban-rural migration and remittance**
  - The urban-rural migration does not only incur the expansion of Bangkok and its suburban areas, but it does indirectly influence the rural development through remittances.

7. Evidences of Thailand

Provincial GDP (GPP) 1998

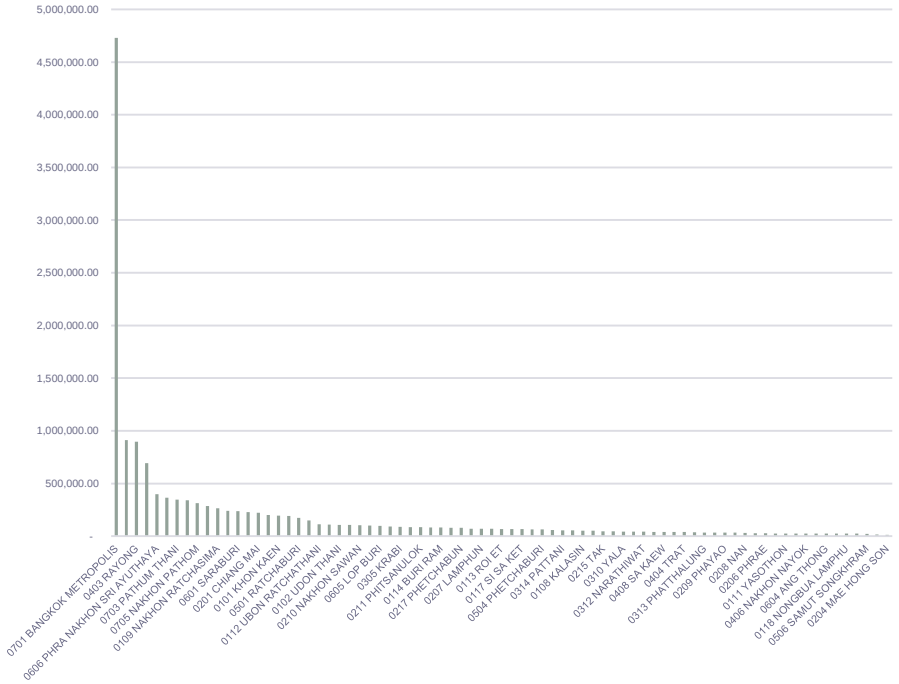


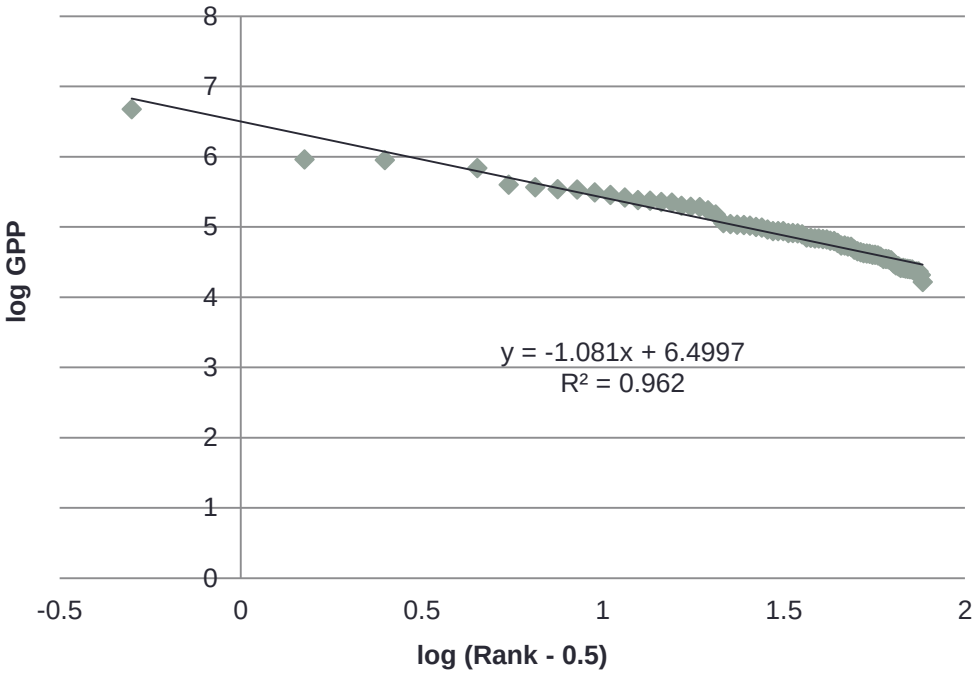


Source: NESDC

7. Evidences of Thailand

Provincial GDP (GPP) 2017

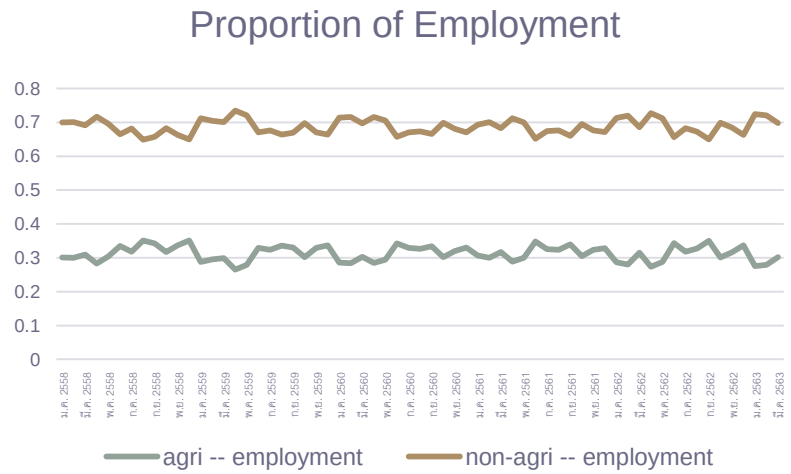


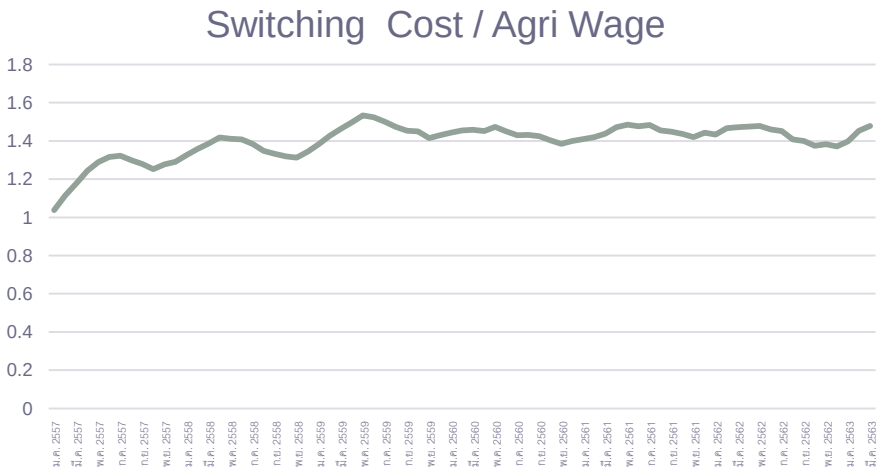


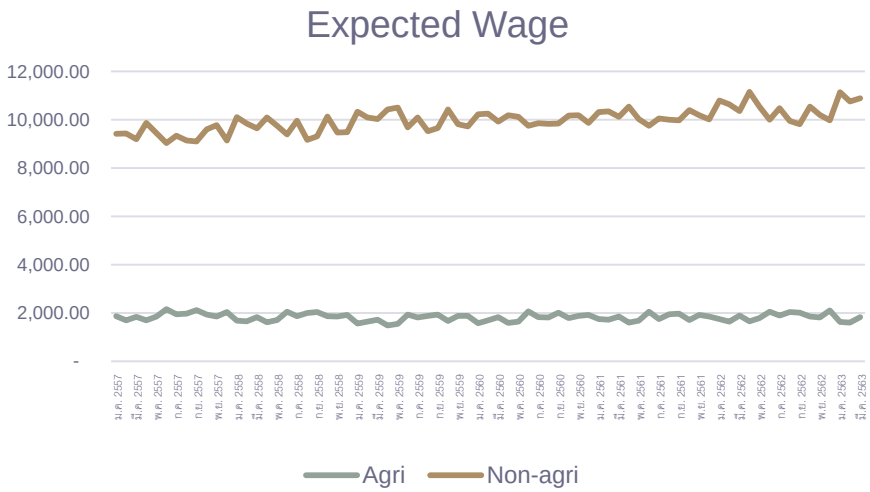
Source: NESDB and Puttanapong (2018)

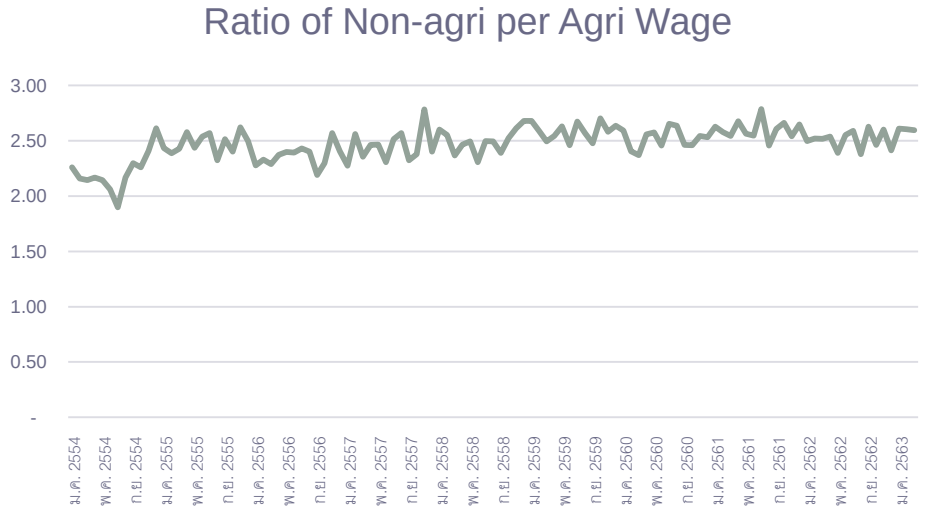
7. Evidences of Thailand

Urban-rural migration









Source: NSO and Puttanapong (2014)