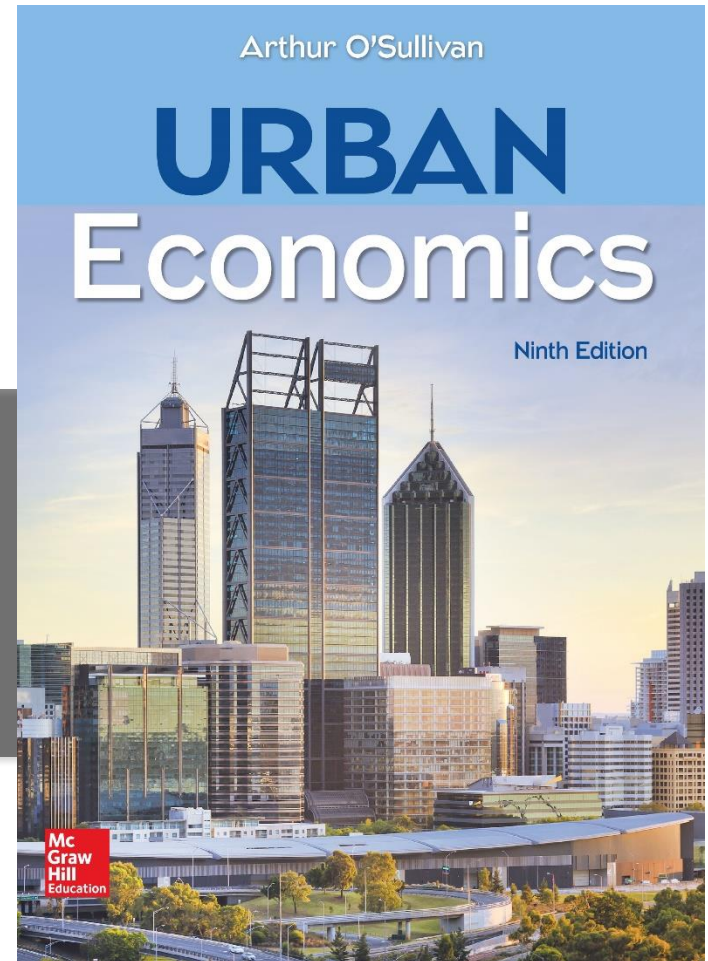


CHAPTER 4

Key Agglomeration Economies



Agglomeration Economies: Introduction

- Firms cluster in cities to exploit external economies of scale in production.
- The two types of agglomeration economies are:
 1. Localization economies
 2. Urbanization economies

Types of Agglomeration Economies

- Agglomeration economies generate relatively low production costs for firms that cluster.
- The cost advantages of clustering generate large concentrations of employment.
- The four types of agglomeration economies are:
 1. Sharing intermediate input producers
 2. Tapping a common labor pool
 3. Improving skills matching
 4. Sharing knowledge

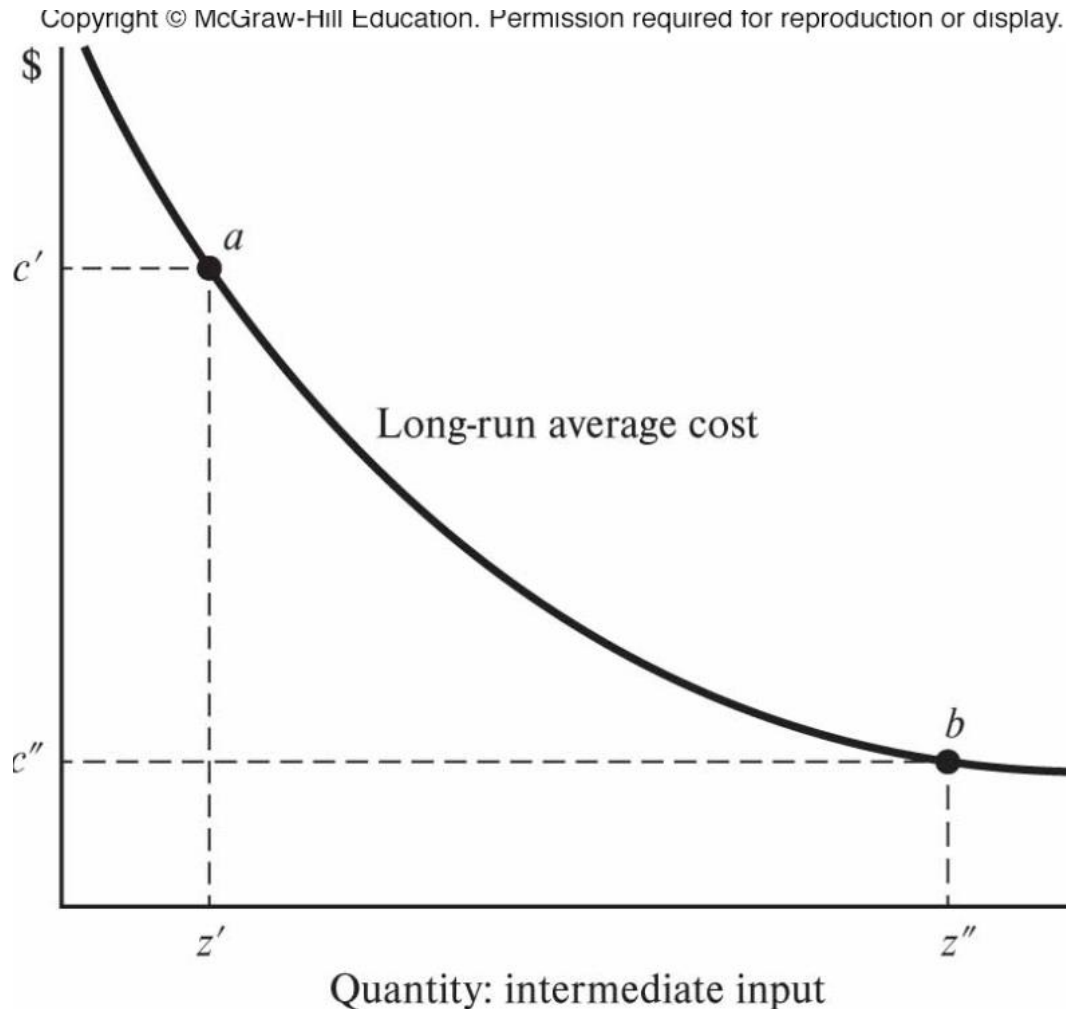
1. Sharing Intermediate Input Producers

The first type of agglomeration economy discusses how some firms cluster around producer of intermediate inputs.

- An **intermediate input** is something produced by one firm and used by a second firm as an input to the production process.
- Firms cluster to share the producer of an intermediate input if:
 - Economies of scale
 - Face time

What are the implications of the two conditions? Let's discuss.

Sharing an Intermediate Input: Average Cost of an Intermediate Input



Sharing Intermediate Input Producers: Example

- Dressmakers cluster around a button maker (Vernon, 1972).
 - Face time is required to design and fabricate unique button suitable for a particular dress.
 - Dressmaking firms are small and nimble.
 - Scale economies in button production are large relative to demand per dressmaking firm.

What other examples can you think of? Let's discuss.

2. Tapping a Common Labor Pool

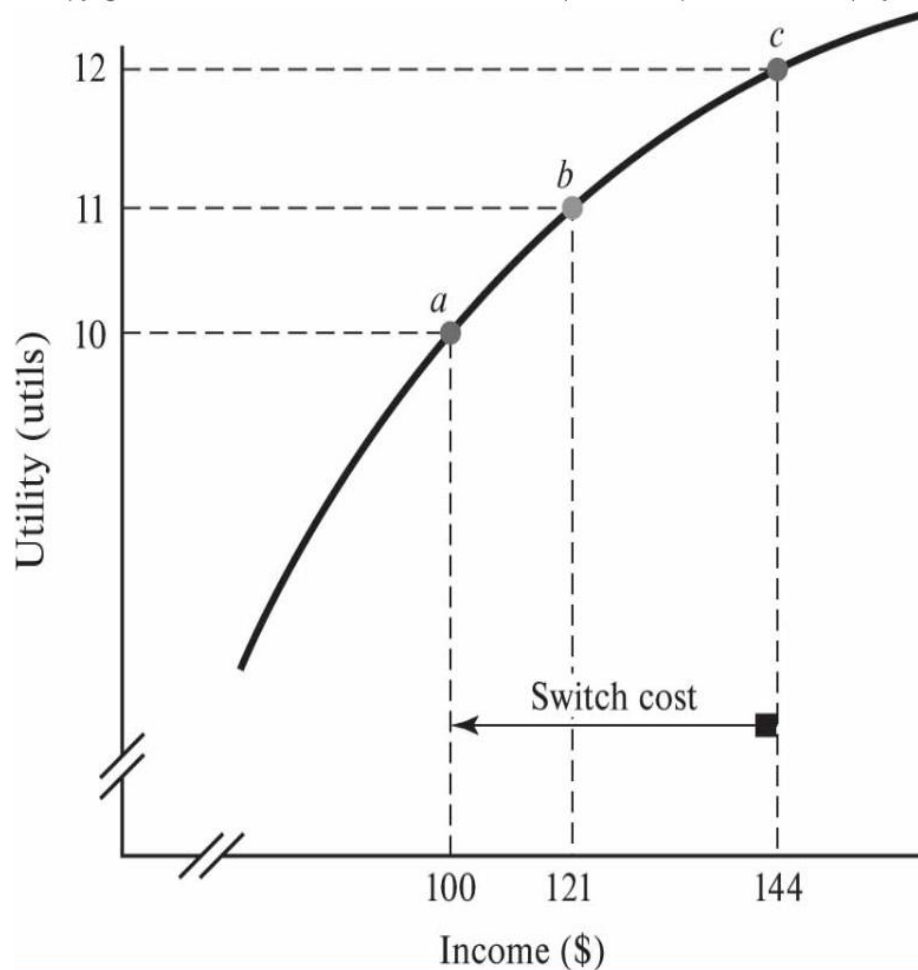
The second type of agglomeration economy discusses how some firms cluster to share a pool of workers to reduce the costs of transferring workers from unsuccessful firms to successful firms.

- Market conditions for this type of agglomeration economy are as follows:
 - Demand per firm varies from one period to the next.
 - Workers move from declining firms to rising firms.
 - Total market demand is constant over time.
- Clusters facilitate transfer of workers for lower search and relocation cost.

Tapping a Common Labor Pool: Labor Pooling Generates a Lower Wage

- *For workers mobile between cities, what is required to achieve a Nash equilibrium in workplace choice?*
- *How can we use the concept of certainty equivalent to translate the expected utility of the risky isolated job into dollars?*

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3. Improving Skills Matching

The third type of agglomeration economy is related to the matching of workers and jobs.

- Workers and firms are not always perfectly matched. Skill mismatches require expensive worker training to better match workers and jobs.
- Key assumptions of classic model of labor matching include:
 - variation in worker skills
 - economies of scale in production
 - firm skill requirements
 - training cost

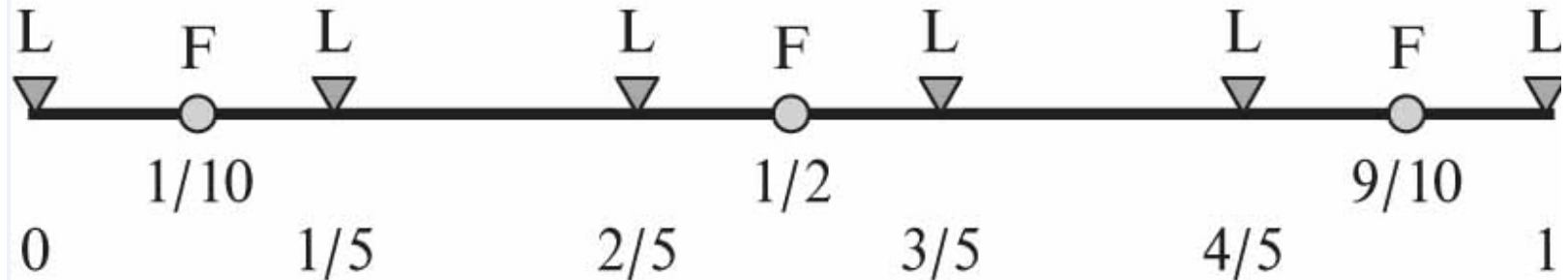
Agglomeration Economies: Labor Skills Matching

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4 Laborers and 2 Firms



6 Laborers and 3 Firms



3. Improving Skills Matching (cont.)

- The formula below illustrates the agglomeration economies associated with improved matching of workers and firms as a city's workforce grows. In general, if the number of workers in the city is n , the average skills mismatch (m) is calculated as:

$$m = 1/2 (n - 1)$$

- As n increases, the skills mismatch decreases ($m = 1/6$ for $n = 4$ and $m = 1/10$ for $n = 6$), decreasing training costs.

4. Sharing Knowledge

The fourth agglomeration economy involves the benefits of sharing knowledge and promoting innovation.

- The sharing of knowledge provides an incentive for firms to cluster as innovation leads to lower costs and higher profit.
- Knowledge spillovers could occur within an industry (localization economies), but the spillovers often cross industry boundaries (urbanization economies).

What are the key ideas of Alfred Marshall's classic description of knowledge spillovers?

Benefits of Urban Size

In addition to the four types of agglomeration economies that increase productivity and decrease production cost, three other advantages of city size generate lower wages production cost.

- Joint labor supply: better job opportunities for two-earner households
- Learning: increase in human capital through learning through imitation
- Social interactions: better matching of hobbies and social interests

Equilibrium Size of a Cluster

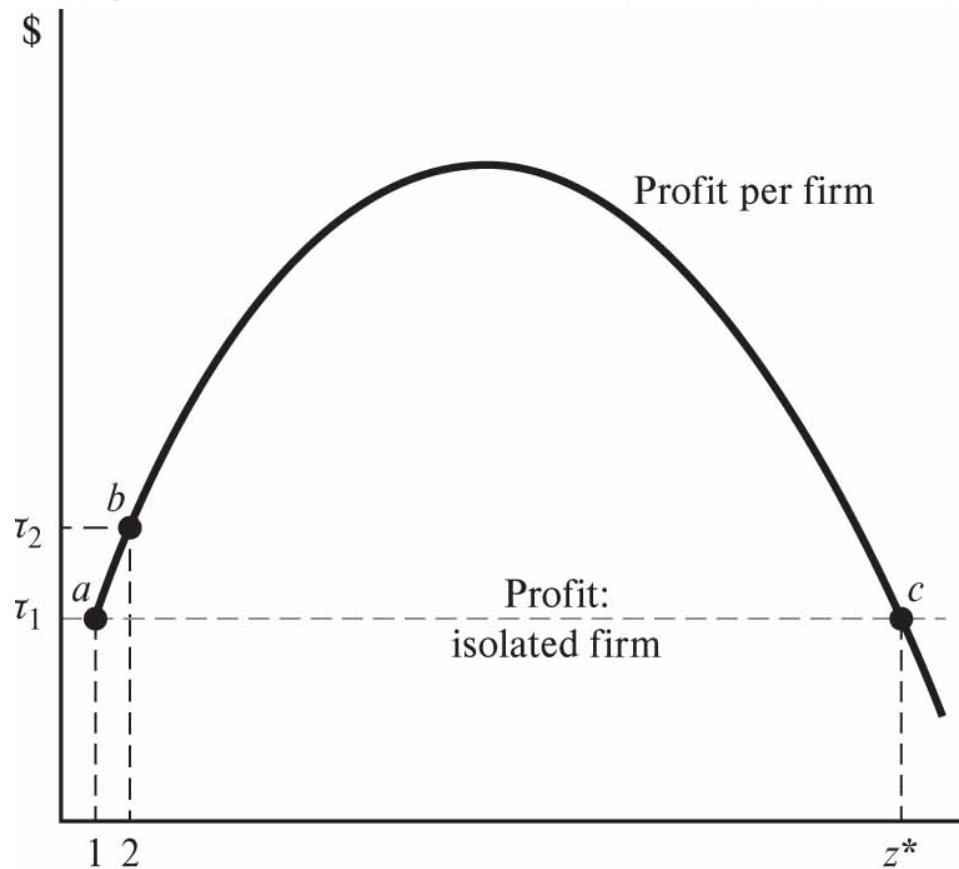
- Agglomeration economies generate external benefits that provide an incentive for firms to cluster.
- The clustering of firms increases total employment, generating agglomeration diseconomies that at least partly offset agglomeration economies.

- *What would happen if there were an increase in the number of workers in a cluster?*
- *What would be the effects of an increase in population density?*

Equilibrium vs. Efficient Cluster Size

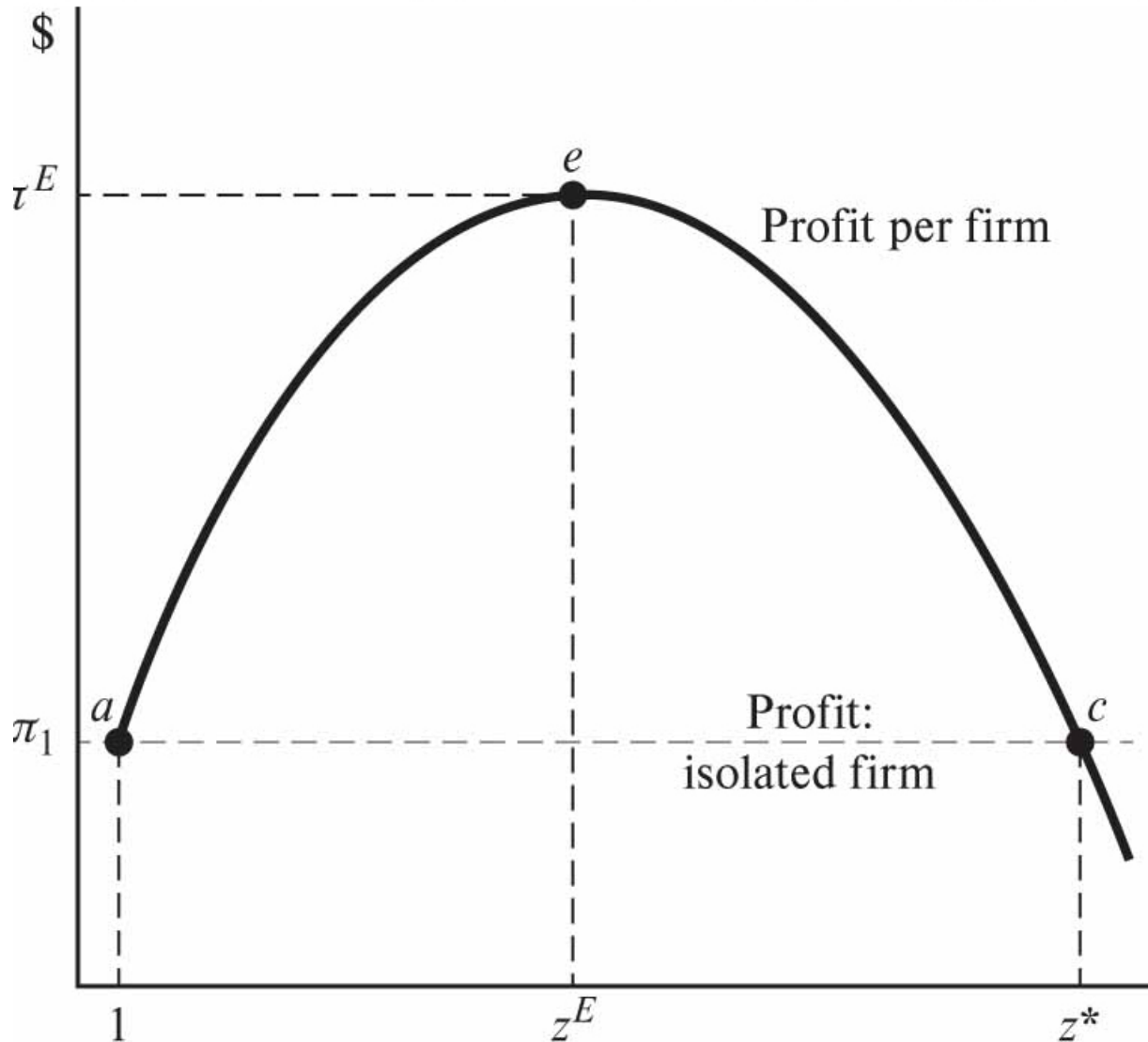
Profit and Cluster Size

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Equilibrium vs. Efficient Cluster Size

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Evidence for Agglomeration Economies

Research in the last few decades provides evidence that the clustering of firms in cities increases worker productivity, promotes the development of new production facilities, and increases employment.

- *How does clustering of firms in cities affect the productivity of workers?*
- *How does clustering of firms in cities promote the development of new production facilities?*
- *How does clustering of firms in cities increase employment?*

Economic Impacts of Million-Dollar Plants

A study by Greenstone, Hornbeck, & Moretti (2010) explored the effects of a large manufacturing plant on a metropolitan economy.

- *What elements does the study focus on?*
- *How is worker productivity affected in existing manufacturing plants in the context of agglomeration economies?*
- *How does the location of a million-dollar plant affect wages?*

Knowledge Spillovers

- As per research summarized by Carlton and Kerr (2015), knowledge spillovers cause firms to cluster and increase the number of firms (firm births) and total employment.
- The studies drew the following additional conclusions:
 - The largest knowledge spillovers occur in the most innovative industries.
 - Knowledge spillovers are highly localized.
 - Knowledge spillovers are more prevalent in industries with small, competitive firms.

Single Industry Clusters

- When external economies in production are confined to firms in a specific industry, these “localization economies” can generate large clusters of firms producing the same product.
- In the United States, the most famous industry clusters are:
 - carpets in Dalton, Georgia (41 percent of national employment in carpets)
 - costume jewelry in Providence, Rhode Island (55 percent)
 - elevators in Indianapolis, Indiana (20 percent)
 - video production in Los Angeles, California (44 percent)

Industry Clusters (1 of 3)

Industry	Metropolitan Area	2015 Employment	Location Quotient	Industry	Metropolitan Area	2015 Employment	Location Quotient
Software Publishers	Seattle, WA	53,800	12.3	Investment banking & securities	New York, NY	53,888	5.71
	San Francisco, CA	20,700	3.9		Chicago, IL	8,381	1.52
	San Jose, CA	16,900	6.91		Bridgeport, CT	3,782	8.42
	Atlanta, GA	12,300	2.16	Ship building & repairing	Virginia Beach, VA	26,232	59.61
	Madison, WI	8,900	10.17		Mobile, AL	5,645	49.15

Industry Clusters (2 of 3)

Industry	Metropolitan Area	2015 Employment	Location Quotient	Industry	Metropolitan Area	2015 Employment	Location Quotient
Motion Pictures & Video	Los Angeles, CA	106,800	11.74	Ophthalmic goods	Los Angeles, CA	2,953	2.82
	New York, NY	35,500	2.48		Rochester, NY	1,924	29.63
	New Orleans, LA	2,900	3.33		Dallas, TX	1,837	2.28
	Bridgeport, CT	2,300	3.3		Tampa, FL	1,355	6.73

Industry Clusters (3 of 3)

Industry	Metropolitan Area	2015 Employment	Location Quotient	Industry	Metropolitan Area	2015 Employment	Location Quotient
Sound Recording	New York, NY	3,076	2.94	Aerospace products	Seattle, WA	91,424	12.67
	Los Angeles, CA	2,718	4.09		Los Angeles, CA	49,934	2.48
	Nashville, TN	1,936	19.23		Dallas, TX	32,121	2.79
Insurance Claims	Los Angeles, CA	3,257	1.86		Wichita, KS	28,062	27.52
	Atlanta, GA	2,382	2.43		St. Louis, MO	16,228	3.57
	Las Vegas, NV	1,030	3.04				

Corporate Headquarters and Functional Specialization

- Corporations locate their headquarters in cities to exploit agglomeration economies that cross industry boundaries (urbanization economies).
- Corporations cluster to share firms that specialize in providing information that is vital to corporate decisions.
- Corporations cluster in cities to share firms providing business services.

Corporate Headquarters and Functional Specialization (cont.)

In the last several decades, the specialization of cities has undergone a fundamental shift.

- Large cities have become increasingly specialized in managerial functions.
- Smaller cities have become more specialized in production.

Why did these changes in functional specialization occur?

Agglomeration and the Product Cycle: The Radio Industry in New York

- Agglomeration economies contribute to the development of new products.
- A study by Vernon (1972) identifies the radio industry in New York as an example of an industry that benefited from agglomeration economies in its early design and development stage.

What are the key takeaways from the study?

Nursery Cities

Nursery cities are defined as large diverse cities that provide a nurturing environment for early product design and development.

- Diverse cities foster innovation, while specialized cities facilitate efficient production.
- Duranton and Puga (2001) provide evidence regarding relocating firms:
 - French firms: 7/10 relocated from diverse to specialized city
 - highest frequency of relocation for innovative industries
- Industries with “mature” products have less to gain from diversified cities and relocate to reduce production costs.