Oligopoly and Product Differentiation

1. The Nature of Oligopoly

An oligopoly is a market structure in which a **small number of firms** dominate. Each firm's decisions influence and are influenced by those of its competitors. This mutual interdependence creates a rich set of strategic possibilities.

Oligopolistic markets are common in industries where economies of scale or scope make it costly for many firms to coexist—for example, automobiles, airlines, and telecommunications. **Entry barriers**, such as large fixed costs, brand loyalty, or technological know-how, reinforce this concentration.

Firms in oligopolies must **think strategically**: they cannot assume market prices are given. Instead, they anticipate how rivals will respond to changes in prices, quantities, or products. **Game theory** provides the main analytical tools to study these interactions. Unlike monopoly or perfect competition, outcomes in oligopoly depend on expectations, timing, and coordination among firms.

Oligopolistic reasoning can also apply to sectors like **healthcare**. In many regions, hospital markets are highly concentrated, with a small number of providers serving large populations. Hospitals compete not only on price (where allowed) but also on quality, reputation, waiting times, and range of services. The strategic interdependence between hospitals—especially in settings with limited capacity or public funding—makes them behave much like firms in other oligopolistic industries.

2. Core Models of Oligopoly

2.1 Cournot Competition (Quantity Competition)

In the **Cournot model**, each firm *simultaneously* chooses how much to produce, assuming competitors' outputs remain constant. Because total industry output determines price, each firm must balance the trade-off between producing more (to gain market share) and depressing the price (which lowers profit).

Equilibrium arises when every firm produces the quantity that maximizes its profit given the others' choices. The result is an intermediate market outcome: price exceeds marginal cost, and firms earn positive profits. However, as the number of firms grows, the outcome converges toward perfect competition—prices fall, and profits shrink.

This model captures industries where capacity or quantity decisions are key, such as heavy manufacturing, energy production, or commodity chemicals.

In the **hospital context**, a Cournot-like interpretation may apply to capacity competition. Hospitals decide on the number of beds, services, or treatment volumes, anticipating how rivals will allocate their resources. Total regional capacity affects waiting times and

reimbursement rates. Each hospital's expansion can reduce others' demand, creating a strategic balance similar to Cournot equilibrium.

2.2 Bertrand Competition (Price Competition)

In the Bertrand model, firms compete directly on price rather than quantity. If products are perfectly identical and firms have the same costs, intense *undercutting* drives prices down to marginal cost—yielding the so-called **Bertrand paradox**, where even two firms can replicate perfect competition.

Real-world markets, however, rarely behave this way. Capacity constraints, slow adjustment of production, and product differentiation limit the ability of firms to undercut rivals indefinitely. When prices cannot instantly adjust or when consumers perceive differences between products, competition softens, and firms sustain markups.

The Bertrand framework helps explain industries where pricing is frequent and flexible—like retail, airlines, or online services—while highlighting the importance of differentiation and market frictions.

In healthcare systems with private or semi-private provision, competition is often softened by quality differences, insurance contracts, and patient preferences. Patients may not choose purely on price, so hospitals differentiate through reputation, technology, and perceived quality.

3. Product Differentiation

Product differentiation allows oligopolistic firms to reduce direct price competition by offering goods that consumers perceive as distinct. Even small differences in brand, quality, or design can grant firms a degree of market power. Differentiation explains why multiple firms can coexist profitably without driving prices to cost.

3.1 Types of Differentiation

Horizontal differentiation arises when consumers have varied preferences—different "ideal points" along a taste or location spectrum. For example, two cafés might sell coffee at similar prices, but customers choose based on ambiance or convenience.

Vertical differentiation, by contrast, involves quality differences that all consumers agree on, though willingness to pay differs. A premium smartphone and a budget model coexist because consumers value performance differently.

In healthcare, both forms of differentiation are evident.

3.2 Classic Models

Hotelling's Linear City Model describes two firms choosing locations along a line representing consumer preferences. Each firm attracts customers near its position but faces a trade-off: moving closer to the rival increases potential market share but intensifies price

competition. In equilibrium, firms often cluster near the center—though this can vary depending on transportation costs or differentiation strength.

Salop's Circular Model generalizes this to many firms distributed around a circle, avoiding the "edge" effects of Hotelling's line. It shows that greater differentiation (interpreted as higher "distance" between products) reduces price competition and allows firms to charge higher markups.

Vertical differentiation models show how firms can coexist by serving distinct consumer segments. Even when one firm offers a superior product, lower-quality producers survive by targeting price-sensitive buyers.

Hospitals can be interpreted within these models. In the Hotelling framework, hospitals' locations (geographic or specialization-based) define their catchment areas. Patients tend to choose the nearest or most convenient option, but some may travel farther for higher perceived quality. Vertical differentiation applies to differences in quality, accreditation, or technology—factors that shape both patient choice and funding.

In all these frameworks, product differentiation plays a central role: it shapes market power, influences the intensity of rivalry, and determines how many firms a market can sustain. Oligopoly and differentiation together explain most real-world market structures—neither fully competitive nor purely monopolistic.