Industry Analysis

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(Revised: October 2014)
Setting the Stage

Macro Analysis

Porter’s Five Forces

Industry Analysis

Market Structure
Conduct
Performance

Brandenburger Nalebuff Value Net

Internal Analysis

Strategic Analysis
Industry Analysis

- Industry analysis is useful for understanding a firm's economic context

- Industry analysis helps in
  - Assessing the profitability of an industry
  - Identifying the strategies that are most likely to be profitable
  - Forecasting the likely behaviour of rivals

- Industry analysis provides the context in which strategy is formulated
Industry Analysis

- Porter’s Five Forces and Brandenburger – Nalebuff Value Net provide a structure for performing an industry analysis.

- Porter’s Five Forces and Brandenburger – Nalebuff Value Net are primary useful
  - For identifying the relevant participants in the market and
  - Assessing their influence on the market outcome

- Structure – Conduct – Performance model, as part of Industrial Organization, is somehow more general and includes also
  - Traces relationships among the three market elements
  - Provides a structure for analyzing and evaluating strategic choices

- Note:
  - In managerial economics, the emphasis is upon the firm, the environment in which the firm finds itself, and the decisions which individual firms have to take.
  - In industrial economics (or industrial organization), the emphasis is upon the behavior of the whole industry, in which the firm is simply a component.
Market Definition
Market Definition

- Market and industry are terms often used interchangeably.

- What is a market?

- A market is the collection of **buyers (demand)** and **sellers (supply)** that, through their actual or potential interactions, determine the price of a product or set of products. In other words, a market is **the “place” where price is determined.**
Market Definition

- But what is really a market?
  - Which demand and which supply?

- What products one should include?
  - The market for automobiles
    - Should we include light trucks, SUVs?
  - The market for soft drinks
    - What are the competitors for Coca Cola and Pepsi?
  - With whom do McDonalds and Goodies compete?
    - Hilton’s Byzantino?

- Is geography (location) important?
  - Some products are too expensive to transport
    - Hence geography may set market’s boundaries
  - But customers can move
    - What is the relevant market for a beach or ski resort?
Market Definition

To answer these questions, we need to consider both demand and supply substitutability.

**Demand Substitutability**
- When deciding whether Product B is in the same market as Product A, one should start by asking whether buyers of Product A might instead purchase Product B if the price of A rises substantially above that of Product B.
- In other words, are Products A and B close substitutes from the point of view of consumers?
- If the answer is yes, then the prices of Products A and B will be determined together (at the same market).
- Cross price elasticity of demand: \( \varepsilon_{AB}^D = \frac{P_A \partial Q_A}{Q_A \partial P_B} \)
  - High demand substitutability means that this cross price elasticity is high.

**Supply Substitutability**
- Even if there is little or no demand substitutability, two products could be in the same market if there is a high supply substitutability.
- Why? Because high supply substitutability between Products A and B means that an increase in the price of Product A would lead producers of Product B to shift some of their production to Product A, and thereby limit the price increase.
- Cross price elasticity of supply: \( \varepsilon_{AB}^S = \frac{P_B \partial Q_A}{Q_B \partial P_B} \)
  - High supply substitutability means that this cross price elasticity is high.
But by defining a market by closeness in substitutability implies another question “How close is close?”

- If we define a market in a narrow sense, it is likely that there will be fewer producers
  - e.g. the market for air travel to Santorini
- A broader definition of the market often gives us more choice
  - e.g. the air transport industry

In sum, market definition poses real problems

- Existing methods represent a reasonable compromise

After all why one needs to define strict and consistent market boundaries?

- Academic research
  - Intellectual organization of the way one thinks about economic activity
- Public policy (antitrust)
  - Mergers’ licensing
  - Imposing fines for illegal behavior
- But firms’ managers may just need a rather rough definition of their market
  - Understand actual competitors
    ... but also potential competitors
  - Understand product characteristic boundaries and geographical boundaries to set prices, advertising budget, investment decision
    ... but technology that affects these boundaries is evolving
Structure – Conduct – Performance Model
Structure – Conduct – Performance Model

- Industrial Organization’s model to trace the relationship between the structure of a market, the behavior of the firms and their performance in that market.

- Markets have three elements:
  - Market structure
  - Market conduct
  - Market performance
Structure – Conduct – Performance Model

Basic Conditions

Structure → Conduct → Performance
Basic Market Conditions

Market Supply
- Raw materials
- Technology
- Product durability
- Value/weight
- Business attitudes
- Unionization

Market Demand
- Price elasticity
- Rate of growth
- Substitutes
- Marketing type
- Purchase method
- Cyclical and seasonal demand
The structure of a market is the set of conditions and characteristics that describe and define the market type. 
- i.e. organisational and other characteristics of the market

Focus on those characteristics of a market which affect the degree of competition between firms and their strategic decisions (e.g. Pricing etc)

To describe market structure economists consider:
- Number of sellers and buyers
- Size distribution of sellers and buyers
- Extent of product differentiation
- Barriers to entry
- Degree of vertical integration
- Cost structures
- etc.
Product Homogeneity or Differentiation

- **Homogeneous goods**
  - Essentially the same physical characteristics
  - Associated with perfect competition
  - Potential for different grades
    - E.g. steel, cement, coal, fresh fruit

- **Differentiated (non – homogeneous) goods**
  - Products differentiated (on their physical characteristics) from their competitors
  - Branding
  - Packaging and marketing

- **Strong product differentiation and brand loyalty allows firms to charge higher prices**
  - Demand become less price elastic
  - Reduction in the cross – price elasticity of demand
Nature of Costs

- Entry costs into a market
  - Capital costs will vary from industry to industry
  - e.g. a natural monopoly

- Sunk costs
  - These are costs that are not recoverable
    - Advertising and marketing
    - Depreciation of capital equipment
  - High sunk costs makes a market less contestable

- Natural cost advantages
  - Location advantages
    - Close to ports, access to cheaper labour
  - Ownership of important raw materials
  - Control of the supply chain through vertical integration
# Market Structures in Economic Theory

<table>
<thead>
<tr>
<th></th>
<th>Perfect Competition</th>
<th>Monopolistic Competition</th>
<th>Oligopoly</th>
<th>Monopoly</th>
</tr>
</thead>
<tbody>
<tr>
<td><strong>Number of Firms</strong></td>
<td>Many</td>
<td>Many</td>
<td>Few</td>
<td>One</td>
</tr>
<tr>
<td><strong>Product Differentiation</strong></td>
<td>Identical</td>
<td>Different</td>
<td>Identical or Different</td>
<td>No Close Substitute</td>
</tr>
<tr>
<td><strong>Entry Barriers</strong></td>
<td>None</td>
<td>None</td>
<td>Moderate to Difficult</td>
<td>Blocked</td>
</tr>
<tr>
<td>Market Structure</td>
<td>Description</td>
<td>Examples</td>
<td></td>
<td></td>
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<tr>
<td>----------------------------------</td>
<td>-----------------------------------------------------------------------------</td>
<td>----------------------------------------------------------------------------------------------</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Fragmented</td>
<td>Many small firms usually owner operated ones with a small number of employees</td>
<td>e.g. jewelleries; restaurants</td>
<td></td>
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</tr>
<tr>
<td></td>
<td>Monopolistic Competition (and Perfect Competition ?)</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Loose Oligopoly</td>
<td>Five or more major players</td>
<td>e.g. cigarettes; mobile phones; TV sets; stereo electronics</td>
<td></td>
<td></td>
</tr>
<tr>
<td></td>
<td>Oligopoly</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Tight Oligopoly</td>
<td>Two or three major firms</td>
<td>e.g. Coke and Pepsi; Boeing and Airbus; Cosmote, Vodafone and Wind</td>
<td></td>
<td></td>
</tr>
<tr>
<td></td>
<td>Oligopoly</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Dominant Firm</td>
<td>A single large firm and, perhaps, a fringe of small competitors</td>
<td>e.g. Microsoft in OS; De Beers in diamonds; PPC</td>
<td></td>
<td></td>
</tr>
<tr>
<td></td>
<td>Oligopoly (and Monopoly?)</td>
<td></td>
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</tr>
</tbody>
</table>
Market Conduct

Conduct refers to the behaviour, policies, and strategies used by the firms in the industry.

To describe firms’ conduct economists consider:
- Pricing behaviour
- Product strategy and production
- Research and development
- Advertising
- Promotion and marketing
- Distribution
- Legal tactics
- Merger activity
- etc.

Types of firms’ conduct
- Price competition
- Non price competition
  - Product Line
  - Product quality
  - Advertising
  - Research and Development
  - Other marketing variables
### Market Conduct and Firms’ Strategic Decisions

#### Some of the strategic variables in firms’ portfolios

<table>
<thead>
<tr>
<th>Product features and quality</th>
<th>Vertical integration</th>
</tr>
</thead>
<tbody>
<tr>
<td>Product marketing and positioning</td>
<td>Mergers and acquisitions</td>
</tr>
<tr>
<td>Product line</td>
<td>Service provision</td>
</tr>
<tr>
<td>Product standardization</td>
<td>Warranties</td>
</tr>
<tr>
<td>Production technology</td>
<td>Financial leverage and debt</td>
</tr>
<tr>
<td>Research and development</td>
<td>Government relations</td>
</tr>
<tr>
<td>Cost reduction investments</td>
<td>Corporate divisions and internal organization</td>
</tr>
<tr>
<td>Branding</td>
<td>Flow of internal communications</td>
</tr>
<tr>
<td>Geographical market</td>
<td>Accounting system</td>
</tr>
<tr>
<td>Distribution channels</td>
<td>Inventory levels</td>
</tr>
<tr>
<td>Pricing</td>
<td>Advertising</td>
</tr>
<tr>
<td>Legal tactics</td>
<td>etc.</td>
</tr>
</tbody>
</table>
Market Performance

- Performance refers to the economic outcomes that result from the market structure and the firms’ conduct.

- To evaluate an industry’s performance economists consider
  - Productive efficiency
  - Allocative efficiency
  - Equity
  - Technological advancement
  - Employment
  - etc.
Market Performance Indicators

- **Price indexes**
  - Trends in real price levels over time
- **Level of business profits**
  - Evidence of excess profits
- **Spending on research and development**
  - Pace of technological advance and innovation
- **Labour productivity in the industry**
The Causal View of S-C-P Model

**Basic Conditions**

Supply: Raw materials, Technology, Product durability, Product value, Other product attributes (weight etc), Business attitudes, Unionization

Demand: Price elasticity, Rate of growth, Substitutes, Marketing type, Purchase method, Cyclical and seasonal demand

**Market Structure**

- Number of sellers & buyers
- Product differentiation
- Barriers to entry
- Cost structures
- Vertical integration

**Conduct**

- Pricing behaviour
- Product strategy
- Research & development
- Advertising
- Legal tactics

**Performance**

- Productive efficiency
- Allocative efficiency
- Technological progress
- Full employment
- Equity

Supply and demand conditions influence market structure, which in turn affects conduct. Conduct, in turn, impacts performance.
The conduct of firms in a market can affect market structure
  - e.g. merger and takeover activity

The actual performance of firms in the market affects conduct as well as market structure
  - e.g. rising dominance of best performing firms
Public Policy and the S–C–P Model

Basic Conditions

Market Structure

Conduct

Performance

Government
Public Policy

- **Government can directly affect market structure**
  - By limiting entry (taxi, notaries etc)
  - By granting monopoly rights (lignite extraction)
  - By patent protection

- **Government can directly affect market conduct**
  - By price controls (drugs)
  - By regulating advertising (drugs, toys)

- **Government can directly affect market performance**
  - By taxation on firms’ profits
Public Policy

- Competition (antitrust) policies
- Regulation policies
- Taxation and subsidizations
- Trade regulations
- Price and wage controls
- Investment incentives
- Employment incentives
- Macroeconomic policies
- etc.
Porter’s Five Forces Model
Porter’s Five Forces Model

- Porter’s Five Forces is a tool to understand the profitability of an industry

- What is the threat to profits from...?
  - Competitors
  - Suppliers
  - Buyers
  - Substitutes
  - Entrants

- All these forces attempt to capture the ability of others to expropriate some or all of a firm’s profits
  - ... by aiming at the prices in the industry

- Note: Competitors is an internal force that affect prices, while suppliers, buyers, substitutes and entrants are external forces
Porter’s Five Forces Model

- Suppliers
- Suppliers
- Rivalry with Competitors
- Substitutes
- Buyers
- Entrants
Rivalry with competitors dissipates industry profits through low prices.

**Characteristics of the market that threaten profits through fierce rivalry:**
- Many sellers
- Homogeneous products
- Low buyer switching costs
- Low buyers search costs (shop for price)
- Large and infrequent sales (lumpy sales)
- Excess industry capacity and/or declining demand
- Cost structure with high fixed costs and low marginal costs

**Measures of rivalry**
- k-firm Concentration Ratio
- Herfindahl - Hirschmann Index (HHI)
Force 2: Threat of New Entrants

- Entry lowers market share and affects rivalry

- Characteristics of the market that threaten profits by making entry easy:
  - No economies of scale and/or low minimum efficient scale relative to the size of the market
  - No learning or experience curve
  - Easy access to inputs materials
  - Necessary technology is readily available (patents and intellectual property not important)
  - No strong brand identity or reputation for incumbents
  - Low consumers’ switching costs
  - Low exit and sunk costs
  - No governmental regulations

- Note: A large entry cost is not an entry barrier. Large costs often reinforce other entry barriers, by making the risks larger

- Measures of ease of entry
  - Estimated cost of entry at minimum efficient scale
  - Time to recoup initial investment
Substitutes are analogous to entry, but with a different product instead of a different producer.

Characteristics of a product that threatens profits by substitutability:
- Fulfils the same customer need (whether or not a similar product)
- Similar performance characteristics, availability, ease of use, etc.
- Similar cost per unit of usage

Measures of substitutability:
- Cross price elasticity: $\frac{\% \Delta Q_Y}{\% \Delta P_X}$
  - If the cross price elasticity is positive, $X$ and $Y$ are substitutes.
  - If the cross price elasticity is negative, $X$ and $Y$ are complements.
- SSNIP test (antitrust): Would a 5-10% increase in the price of good $X$ increase the demand for $Y$? If so, the products are substitutes.
Force 4: Power of Suppliers

- Suppliers’ power is the ability of suppliers to extract profits by obtaining high prices

- Characteristics of the market that threaten profits through supplier power:
  - Relatively few suppliers
  - Inputs are difficult to substitute
  - Firm must make specific investments in order to use inputs purchased from supplier
  - Supplier has the ability to integrate forward

- Note: Just because an input is vital or critical does not mean that there is supplier power

- Measures of suppliers’ power
  - Price - cost margin of supplier
Force 5: Power of Buyers

- Buyers’ power is the ability of buyers to extract profits by obtaining low prices
  - If buyers can switch to alternate suppliers, they can negotiate favourable terms through the threat of switching
  - If buyers don’t value the good highly, they can credibly threaten not to buy the good at all

- Characteristics of the market that threaten profits through buyer power:
  - Relatively few buyers (each a large fraction of sales)
  - Firm must make specific investments in order to serve the needs of the buyers
  - Buyers have the ability to integrate backward into supplying their own inputs

- Note: Buyer power is related to rivalry with competitors (lumpy sales, low switching cost, low search costs, etc. tend to increase buyer power).

- Measures of buyers’ power
  - Conceptually, would like to measure difference between willingness to pay and price.
  - Practically, no general way to do this.
The Brandenburger – Nalebuff Value Net

CO-OPETITION
The Value Net is an analytical strategy tool based on added value and game theory

- What are the sources of value in a firm’s interactions?
- How can a firm increase the total value created?
- How can a firm increase its own added value, and the share it gets as profits?

Brandenburger - Nalebuff six forces are:
- Suppliers
- Buyers
- Competitors
  - Sellers of substitutes
  - Potential entrants
- Complementors
Brandenburger – Nalebuff Value Net

- Suppliers
- Company
- Customers
- Competitors (Substitutes & Entrants)
- Complementors
The vertical axis (suppliers-company-customers) is the basic source of value (or economic surplus) creation

- Total economic surplus along this axis is the customers valuation, minus suppliers’ costs of production, minus firm’s production costs (not counting input costs)
- The price the firm charges its customers and the price suppliers charges the firm determines how this surplus is divided
Competitors reduce firm’s added value along the vertical axis

- A competitor reduces firm’s added value to customers
  - Another airline serving the same route (same product)
  - Aluminium recycling and extraction (different products)

- A competitor reduces firm’s added value to suppliers
  - Two pharmaceutical firms competing to license from a biotech firm
  - Electric utilities and coal contracts
Complementors increase firm’s added value along the vertical axis

- A complementor increases firm’s added value to customers
  - Game developers are complementors for video game systems
  - Nearby restaurants are complements for a ski resort

- A complementor increases firm’s added value to suppliers
  - If two airlines buy the same planes from Boeing, they share the R&D expense
  - When there are two gas stations with the same brand in a island, its cheaper for the the supplier to serve them
Concept of Competition
Two concepts of competition

- “Real” concept of competition is defined in behavioral terms, i.e. as a progress of rivalry
- Analytical concept of perfect competition refers to a given state or situation

Stigler (1987) describes competition as:

- “a rivalry between individuals (or groups or nations), and it arises whenever two or more parties strive for something that all cannot obtain”
Breadth of Competition

Its breadth encompasses all sorts of:

- **Forms of rivalry**
  - market trading, auctions, races, wars of attrition etc

- **Instruments of rivalry**
  - prices, advertising, R & D, takeover bids, effort levels etc

- **Objects of rivalry**
  - profits, market share, corporate control, promotion, prizes, survival etc

- **Types of rivals**
Effects of Competition

Competition was shown to improve efficiency in many circumstances

- Makes organizations internally more efficient by sharpening incentives to avoid sloth and slack

- Causes efficient organizations to prosper at the expense of inefficient ones

- Competition to innovate is the major source of gains in productive efficiency over time
“More Competition”

- The identification of competition with rivalry does not in any way presume that “more competition” is necessarily good or an end in itself
  - The existence of scale economies provide a possible case for limiting competition (e.g. telecommunications, energy)

- Meanings of “more competition”
  - Greater freedom of rivals
  - Increase in the number of rivals
  - Move away from collusion towards independent behavior between rivals
  - The reward for obtaining the thing for which all are striving, or the penalty for failing to obtain it, is increased
Economic Efficiency

- The fundamental economic problem is a scarcity of resources
- Economic efficiency is about a society making optimal use of these scarce resources to satisfy wants and needs
  - Optimal production and distribution of these scarce resources
- Normally the market mechanism is good at allocating optimally these inputs
  - ... but there are occasions when the market can fail (market failures)
- There are several types (concepts) of efficiency
  - All concepts link to how well a market allocates the scarce resources to satisfy society
Types of Economic Efficiency

Productive efficiency
- Is achieved when producers minimise the wastage of resources in their production processes
  - i.e. the maximum number of goods and services are produced at the lowest possible cost
- Occurs when the output is produced at minimum average total cost

Allocative efficiency
- Is concerned with whether society is producing the goods and services that match its needs and preferences and which it places the greatest value on
  - i.e. goods and services are produced according to consumer preferences
- Occurs when the value that consumers place on a good or service (reflected in the price they are willing and able to pay) equals the cost of the resources used up in production
  - ... i.e. the required condition is that the price of the good equals marginal cost of production (p=MC)
Types of Economic Efficiency

**Dynamic efficiency**
- Refers to efficiency over time
  - e.g. a factory in 1920 would be very efficient for that time period, but by comparison would now be inefficient
- Dynamic efficiency involves the introduction of new technology and working practices to reduce costs over time

**Static efficiency**
- Efficiency at a given point in time
Types of Economic Efficiency

**X efficiency** (Liebenstein)
- Is concerned with the motivation (incentives) of management to achieve the best results in the most economic way
- Occurs when the output of firms is the greatest it can be, given inputs
  - e.g. in highly competitive markets managers are motivated to produce as much as possible at the lowest cost
- Occurs when firms do not have incentives to cut costs,
  - e.g. a monopoly which makes supernormal profits may have little incentive to get rid of excess labour
  - Therefore, a firms average cost may be higher than necessary

**Technical efficiency**
- Refers to how much output can be obtained from a given input or a specific combination of inputs
  - Maximum technical efficiency occurs when output is maximised from a given quantity of inputs
  - Note: The simplest way to differentiate productive and technical efficiency is to think of productive efficiency in terms of cost minimisation by adjusting the mix of inputs, whereas technical efficiency is output maximisation from a given mix of inputs.
Types of Economic Efficiency

Pareto efficiency
- Is concerned with the distribution of the scarce resources
- It is defined as a situation where it is not possible to redistribute resources and make one party better off without making another party worse off

Kaldor–Hicks efficiency
- Captures some of the intuitive appeal of Pareto efficiency, but has less stringent criteria
- Under Kaldor–Hicks efficiency, an outcome is more efficient if those that are made better off could in theory compensate those that are made worse off and lead to a Pareto optimal outcome
- The compensation does not actually have to occur (there's no presumption in favour of status-quo) and thus, a more efficient outcome can in fact leave some people worse off
Types of Economic Efficiency

**Distributive efficiency**
- Is concerned with allocating goods and services according to who needs them most
- Therefore, requires an equitable distribution

**Social efficiency**
- Takes externalities, i.e. consequences of an economic activity (costs or benefits) that are experienced by unrelated third parties, into consideration
- Occurs at an output where the social cost of production equals the social benefit
Measure of Market Concentration
Market Concentration

- Concentration refers to the amount of market power held in the hands of a few firms

- **Factors Influence Concentration**
  - Number of firms
  - Distribution of output among firms

- **Reason for concentration measures**
  - Compare concentration among industries
  - Regulation and antitrust
  - Optimal managerial decisions
N-Firm Concentration Ratio

- The sum of market shares of the top $N$ firms in the defined industry.

$$CR_N = \sum_{i=1}^{k} S_i$$

- $N$ is normally taken to be 3, 4 or 8.

- Linear function of firms’ market shares
- Insensitive to unequal market shares
Herfindahl – Hirshman Index

- The sum of the squared market shares of all firms in a given industry

\[ HH = \sum_{i=1}^{k} (s_i)^2 \]

- Convex function of firms’ market shares
- Sensitive to unequal market shares
**CR₄ vs. HH: An Example**

<table>
<thead>
<tr>
<th></th>
<th>s₁</th>
<th>s₂</th>
<th>s₃</th>
<th>s₄, s₅</th>
<th>s₆ ... s₈</th>
<th>s₉, s₁₀</th>
<th>CR₄</th>
<th>HH</th>
</tr>
</thead>
<tbody>
<tr>
<td><strong>Industry 1</strong></td>
<td>60%</td>
<td>10%</td>
<td>5%</td>
<td>5%</td>
<td>5%</td>
<td>0</td>
<td>80</td>
<td>0.385</td>
</tr>
<tr>
<td><strong>Industry 2</strong></td>
<td>20%</td>
<td>20%</td>
<td>20%</td>
<td>20%</td>
<td>0</td>
<td>0</td>
<td>80</td>
<td>0.2</td>
</tr>
<tr>
<td><strong>Industry 3</strong></td>
<td>100/3</td>
<td>100/3</td>
<td>100/3</td>
<td>0</td>
<td>0</td>
<td>0</td>
<td>100</td>
<td>0.333</td>
</tr>
<tr>
<td><strong>Industry 4</strong></td>
<td>49%</td>
<td>49%</td>
<td>0,25%</td>
<td>0,25%</td>
<td>0,25%</td>
<td>0,25%</td>
<td>98,5</td>
<td>0.4802</td>
</tr>
</tbody>
</table>

**Industries 1 and 2**
- CR₄ suggests that they are concentrated equally
- HH identifies that industry 1 is more concentrated than industry 2

**Industries 3 and 4**
- CR₄ suggests that industry 3 is more concentrated than industry 4
- HH identifies that industry 4 is more concentrated than industry 3
**Other Concentration Measures**

**Lorenz curve and the Gini coefficient**

- A Lorenz curve is used to show the share of the industry accounted for by various proportions of firms. The Gini coefficient can be derived from the Lorenz curve, i.e.

\[
G = 1 - \frac{\sum_{i=1}^{N} \sum_{j=1}^{i} s_j}{0.5N \sum_{i=1}^{N} s_i}
\]

The value of G is determined by the extent to which the Lorenz curve deviates from the line of absolute equality (\(G = 0\) indicates that all firms are of equal size, while \(G = 1\) indicates that a single firm dominates the industry).

**Hannah and Kay index**

- where \(a\) is a parameter that depends on the importance one wishes to attach to the larger firms in the industry (larger \(a\) implies more importance to larger firms).

\[
HK = \sum_{i=1}^{k} (s_i)^a
\]

where \(a\) is a parameter that depends on the importance one wishes to attach to the larger firms in the industry (larger \(a\) implies more importance to larger firms).
Other Concentration Measures

Entropy coefficient

\[ E = \sum_{i=1}^{k} s_i \log \frac{1}{s_i} \]

is a measure that quantifies the degree of uncertainty in a given industry (the lower the value of \( E \), the greater is the certainty of the established firms that they have a captive market).

Variance of logarithms of firm sizes

\[ VL = \frac{\sum_{i=1}^{N} (\log s_i - \bar{s})}{N} \]

where \( VL \) measures the inequality in firm sizes (many industries have firm size distributions that correspond closely to the log normal distribution).
Limitations of concentration measures

- Correct definition of the industry
  - National, regional, or local?
  - University’s refectory, restaurants in islands

- Global Market
  - Foreign producers excluded
  - Beer producers, oil refineries