CHAPTER 2

SCP, NEIO and Beyond

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"No one who is other than eclectic, methodologically speaking, has any business in the field of industrial organization.", Edward Mason

2.1 Introduction

The relationship between firm behavior and market structure has been a central focus of study in the field of industrial organization (IO). This emphasis is reflected in the manner in which some economists have defined IO, namely as the study of firm behavior in imperfectly competitive markets.[1] Historically, the discipline's emphasis on firm behavior and market structure is, to a large extent, influenced by the work of a group of economists at Harvard in the 1930s. Edward Mason and his PhD student Joe S. Bain formulated a framework for empirical analysis called the *Structure-Conduct-Performance* (SCP) that attempted to describe how key aspects of market structure relate to each other. Stephen Martin summarizes this framework approach succinctly:

> "The central hypothesis (of the SCP framework) is that observable structural characteristics of a market determine the behavior of firms within that market, and that the behavior of firms within a market, give structural characteristics, determines measurable market performance."[2]

The SCP paradigm became the dominant framework for empirical work in IO between the early 1950s until the early 1980s. Its influence only began to wane in the 1980s with the emergence of game theoretical analysis of oligopolistic markets - an approach labeled as the `New Industrial Organization' (NIO). The body of empirical associated with this approach is known today as the *New Empirical Industrial Economics* (NEIO).

The chapter provides a survey of the SCP, NEIO and developments beyond. There have been some excellent surveys of empirical work in IO, for example, Martin (2002) and Schmalensee (1989). We draw from this body of literature (rather than re-inventing the wheel) but at the same time attempt to extend the body of this literature to include new research that has emerged since these survey papers were written.

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[1] For example:

"Industrial organization or industrial economics is the study of the operation and performance of imperfectly competitive markets and the behavior of firms in these markets." (Church and Ware (2000), p.7)

"Industrial organization is concerned primarily with the intermediate case of oligopoly, that is, competition between
a few firms." (Cabral (2000), p.3)

[2] Martin (2002), p.119.

The outline of the chapter is as follows. Section 2.2 provides a review of the structure-conduct-performance paradigm. This is followed by a review of the empirical literature on SCP in Section 2.3. The new empirical industrial organization is discussed Section 2.4 while Section 2.5 reviews developments beyond the SCP and NEIO. Section 2.6 concludes.

2.2 Structure-Conduct-Performance

(a) Origins: Debate on Theory and Empirics

The origin of the SCP paradigm can be traced to the work of the Harvard economist Edward Mason in the 1930s. The theoretical work of Mason's colleague Edward Chamberlin provided inspiration for both Mason and his student Joe Bain to study empirically how pricing and production policies of firms (especially large ones) are determined. Mason (1939)'s (p.63) starting point was that market share is important in determining production and pricing policy of a firm. In the 1930s, there were generally two approach in understanding pricing policies of firms, namely:

1. Theoretical approach - involving the use of oligopoly and monopolistic models to derive production and pricing policy of a firm.

2. Empirical approach - involving the correlation between observed prices and other economic variables representing differences in market structure

Mason argued that empirical analysis is essential to ensure that the theories of firm are useful. This is because theories are based on mathematical constructs such as demand and cost functions which are not ascertainable (in Mason's words, p.64). Thus, it is not that theories are not important, rather their relevance cannot be determined without empirical observations. This leads to the question of the set of empirical observations that are useful.

Interestingly, Mason argued that the price and production decisions of a firm is influenced by both the internal organization of the firm as well as market structure. Internal organization here refers to group relationships within the firm which exerts influence on the firm's policy.[3] According to Mason, market structure is a multidimensional concept that is specified and measured by variables such as product characteristics, cost and production characteristics, and the number and market shares of buyers and sellers in the market. There are also other factors that influences firm behavior such as industry life-cycle and the characteristic of the distribution channels. The relevance of these factors are discussed by use of anecdotal evidence from different types of industries such as automotive, steel, rubber tyre, distributive trade and construction materials.

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[3] The emphasis on group relationship within firms is similar to the behavioral theories of the firm that was developed in the 1950s and 1960s. See Simon (1955) and Cyert and March (1963).

In the concluding part of his paper, Mason (1939) drew up a framework for the analysis of production and pricing policy of a firm:

> "The argument ... runs from differences in market structure to differences in price response, and from differences in price response to the consequences of these differences for the functioning of the economy." (p.73-74)

Thus, elements of the SCP paradigm were already present in the Mason's work in the 1930s. During this period, Mason also lamented the lack of empirical work in this area:

> "Although a good deal has been written both on the effect of restrictive policies on the distribution of resources and the effect of price policies on fluctuations in employment and output, *very little has been done to formulate tests of undesirable price behavior applicable to public action.* Specifically, what sort of tests are indicative of the existence of a price sufficiently high to restrict output and investment below desirable levels?" (p.74, italics added.)

Mason challenge for future empirical-policy work was subsequently taken-up by his Ph.D. student, Joe S. Bain. Despite being inspired by the work of Mason, the research methodologies of the master and his student were a bit different. Bain used industry-level data - an approach which Mason was a bit skeptical of. In contrast, Mason was more in favour of case studies involving specific firms or industries. It was Bain's work which proved to be more influential in charting the course of empirical IO after the 1930s.

(b) The Structure-Conduct-Performance Paradigm

What is the Structure-Conduct-Performance (SCP) Paradigm? As the name suggests, the paradigm comprises of three major elements:

1. **Structure** - which refers to market structure. The variables that are used to describe market structure includes seller concentration, degree of product differentiation and barriers of entry. These variables can be further classified into two classes, namely:[4]

    (a) Intrinsic structural variables - those determined by the nature of products and available production and marketing technologies.

    (b) Derived structural variables - those determined by firms and government such as barriers of entry, seller and buyer concentration and product differentiation.

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[4] See Schmalensee (1989), p.954

This distinction may be important if intrinsic structural variables are exogenously determined, thus making them suitable candidates as instrumental variables.

2. **Conduct** - which refers to a firm's behavior. The variables used to capture firm behavior include pricing strategies, collusion, advertising, research and development and capacity investment. Some have interpreted conduct as whether firms collude or compete.

3. **Performance** - which refers to outcome or equilibrium assessed in terms of allocative efficiency. The variables mostly used to measure performance are profitability and price-cost margin.

The SCP paradigm posits specific causal relationships between market structure, conduct and performance. In particular, market structure determines conduct and conduct in turn determines performance:

$$\text{Structure} \longrightarrow \text{Conduct} \longrightarrow \text{Performance}$$

Furthermore, market structure is determined by a variety of other factors that can be classified as either demand or supply factors (see **Figure 1**). Supply factors include the location and availability of essential raw materials, nature of production technology, degree of work force unionization, durability of product etc.[5] Demand factors include price elasticity of demand, availability of substitutes, growth and variability of demand etc.[6]

Critiques of the SCP paradigm points out that the causality between structure and conduct can run the other way round i.e, firm's conduct (e.g. predatory behavior or entry deterrence) can shape the market structure within which the firm operates in. This implies that market structure is endogenously determined:

$$\text{Structure} \longleftrightarrow \text{Conduct} \longrightarrow \text{Performance}$$

Some contend that the relationship between conduct and performance is also weak. For example, one can further argue that performance can affect conduct:

$$\text{Structure} \longleftrightarrow \text{Conduct} \longleftrightarrow \text{Performance}$$

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[5] Scherer and Ross (1990), pp.5-6
[6] Ibid, p.6

For example, firms with substantial accumulated profits can incur losses in the short-term to drive out rival firms. If this is true, the SCP has low predictive power.

2.3 Empirical Research in SCP

(a) Methodological Issues

Theory and Econometric Specifications

The theoretical connection between market structure, conduct and performance can be formalized using a Cournot duopoly model. It can be shown that there is a direct link between the Lerner Index (L) and various variables such as a firm's (firm i in our example) market share (s_i), price elasticity of demand (ε) and its conjectural variation (λ_i):

$$L_i = \frac{P(Q)-MC(q_i)}{P(Q)} = \frac{s_i}{\varepsilon}(1 + \lambda_i) \qquad (1)$$

where $\lambda_i = \dfrac{dq_j}{dq_i}$

Theoretically, the conjectural variation variable λ_i measures the output response of the firm's rivals. Scherer and Ross (1990) further suggests that it is also a measure of the degree of coordination (or collusion) between firms in the industry. The conjectural variation variable is determined by other factors:[7]

$$\lambda_i = f_1(C_j, B_j, X_{ij}) \qquad (2)$$

where C_j is a measure of seller concentration, B_j a set of entry barrier measures and X_{ij} other industry or firm characteristics affecting the conjectural variation. The above equation provides the link between market structure and conduct. Substituting the second equation into the first, we obtain a link between structure and performance (the Lerner Index) for firm i:

$$L_i = f_2(s_i, \varepsilon, C_j, B_j, X_{ij}) \qquad (3)$$

In reality, the Lerner Index may not be observable. If there is a correlation between the Lerner index and measures of profitability (π_i), the above equation can be reformulated as:

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[7] See Scherer and Ross (1990), p.412

$$\pi_i = f_2(s_i, \varepsilon, C_j, B_j, X_{ij}) \tag{4}$$

The industry-level version can be written as:

$$\pi_j = f_3(C_j, B_j, X_j) \tag{5}$$

It should be clear from the above specifications that the empirical test of the SCP entails testing for the relationship between structure and performance, taking conduct as either a black box or theoretically proven. The hypothesis underlying the above specifications is that concentration determines profitability.[8]

Measuring Performance

A key issue in the empirical literature in SCP is the measurement of performance. A number of measures of performance have been used. Theory suggests that the Lerner index is a good measure of the extent of a firm's market power:

$$\text{Lerner Index} = \frac{\text{Price} - \text{Marginal Cost}}{\text{Price}}$$

When the Lerner index > 0, firms are said to have market power. However, it is not always possible to derive the Lerner index empirically. It may be difficult to obtain marginal cost data. Furthermore, firms may have numerous products, each priced differently.

A measure or performance that is conceptually closest to the Lerner index is the price cost margin (PCM):

$$\text{PCM} = \frac{\text{value added} - \text{payroll}}{\text{value of shipments}} \tag{6}$$

where value added is calculated by substracting input cost from total sales.

One weakness of using the PCM as a measure of performance is that it requires controlling for the normal rate of return on capital across different industries.

Another measure of performance that has been used is Tobin's q ratio which measures the ratio of firm's stock market value to replacement cost of capital:

$$q = \frac{M_c + M_p + M_d}{A_r} \tag{7}$$

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[8] This hypothesis is sometimes known as the collusion hypothesis.

where M_c is the market value of ordinary shares, M_p market value of preference shares, M_d outstanding loan capital and A_r total assets at replacement cost. When $q > 1$, firms have intangible resources or advantages that are not captured in asset valuation such as market power. The advantages of using the Tobin q ratio is that it captures all available information on a firm's future profitability (adjusted for risk). However, it suffers from some severe limitations such as limited coverage (only listed firms which biases the results towards larger firms), subjective and volatile valuation of firms and the difficulties in estimating replacement cost.

Finally, accounting measures of performance are also used. There are various versions:

$$\pi_1 = \frac{profit}{revenue} \tag{8}$$

$$\pi_2 = \frac{profit}{capital} \tag{9}$$

$$\pi_3 = \frac{profit}{equity} \tag{10}$$

$$\pi_4 = \frac{profit}{net\ worth} \tag{11}$$

$$Market\ Value\ of\ Equity = \frac{equity}{revenue} \tag{12}$$

The major source of data for this approach is published annual reports or financial statements. In this approach, profits can be defined as profits before or after tax. If the accounting data short used covers only a short period, it can be affected by heavy discretionary investment expenditures (R&D, marketing) in a given year. The use of accounting data also engender further debate about the appropriate depreciation method (straight line or accelerated) to be used. Firms may also differ significantly from one anther in terms of their gearing ratio (debt-to-equity ratio). There is also debate on whether inflation should be taken into account via the use of historical or replacement cost.

There is no consensus on which is the best measure of performance. The choice of measure obviously depends on data availability and the desired aggregation level of analysis i.e. industry, firm or plant.

Measuring Concentration

The theoretical link between the Lerner Index (L) and market share (s_i) implies that we can measure market power by measuring market concentration:

$$L_i = \frac{P(Q) - MC(q_i)}{P(Q)} = \frac{s_i}{\varepsilon}(1 + \lambda_i) \qquad (13)$$

where s_i is firm i's market share, (ε) is price elasticity of demand, (λ_i) its conjectural variation and $\lambda_i = \frac{dq_j}{dq_i}$. Since s_i is directly related to the Lerner index, an obvious measure of concentration is the total market shares (Σs_i) of firms. One such measure is the **concentration ratio** which measures the total market share of a given number of (m) firms with the largest market shares:

$$CR_m = \Sigma s_i \qquad (14)$$

One critique of the concentration ratio is that it does not take into account the distribution of market share across all firms in an industry. A concentration index that does not share this weakness is the **Herfindahl-Hirschman Index** (HHI):

$$HHI = \Sigma s_i \qquad (15)$$

The HHI is also directly related to the Lerner index. For an industry with n firms, the industry's weighted average Lerner index is:

$$L = \Sigma s_i L_i$$
$$= \Sigma \frac{s_i^2 (1 + \lambda_i)}{\varepsilon} \qquad (16)$$

If we assume that for all firms, $\lambda_i = \lambda$, then:

$$L = \frac{(1 + \lambda) HHI}{\varepsilon} \qquad (17)$$

The CR and HHI are the two most commonly used concentration indices used in empirical SCP studies. There are other measures of market concentration that are used to measure the degree of inequality in firm size distribution. These measures include the Hannah-Kay index, Gini Coefficient and the Entropy Index.[9] Debates on the choice of which concentration measures to used have revolved around correlation between the different measures and the sensitivity of these measures to changes in the number of firms and market shares.

Other Independent Variables

Aside from industry concentration, the functional specification for SCP includes barriers to entry as an explanatory variable for performance. Barriers of entry can be either

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[9] For a discussion see Lipczynski et al. (2005), chapter 6.

structural or strategic in nature. Structural barriers of entry are exogenously determined. They include scale economies and product differentiation. In contrast, strategic barriers of entry arise from strategies that deter entry (e.g. limit pricing) or force rival firms to exit (predatory pricing). The empirical literature on SCP has concentrated mostly on quantifiable structural barriers of entry.

One such barrier to entry is the **minimum efficient scale** (MES) of production in relation to the size of market demand. This has been measured by the ratio of sales of plants at the midpoint of industry plant size distribution to total industry sales. An alternative measure is the **cost disadvantage ratio** which is the ratio of value-added per worker in plants below MES to that in larger plants. Another type of barrier to entry that is widely used in empirical SCP studies is **product differentiation** which is proxied by the ratio of advertising expenditure to sales. Other independent variables that have been used in empirical investigation of SCP includes buyer concentration (which affects seller's profit margins), industry growth (to capture industry disequilibrium), ratio of imports to domestic production or consumption (to capture the influence of imports), and geographic dispersion measures (to capture the effect of regional or local markets).

(b) Empirical Results

Early Work

The empirical work on the SCP paradigm has evolved over time since its inception in the early 1950s. A key characteristic of most empirical work on SCP is the use of inter-industry cross-section data. The founding body of literature on SCP associated with Joe Bain's were published in a series of papers (Bain (1951) and Bain (1954)), and culminating in the publication of his book titled *Barriers to New Competition* in 1956.

Bain (1951)'s work relied mostly on the use of descriptive statistics to relate market concentration (CR8) to firm profitability (π):

$$\pi = f(CR8) \tag{18}$$

Bain used the eight-firm concentration ratio (CR8) to measure market concentration:

$$CR8 = s_1 + s_2 + \ldots + s_8 = \Sigma s_i \tag{19}$$

where s_i is the market share of i-th largest firm.

In his study, Bain defined profitability in terms of rate of return on equity:

$$\pi = \frac{\text{net profit after tax}}{\text{net worth}} \tag{20}$$

His analysis indicates that average industry profitability tend to be higher in concentrated industries.

Subsequently, Bain (1956) extended his work by including barriers of entry:[10]

$$\pi = f(\text{CR4}, D_1, D_2) \tag{21}$$

where CR4 the four-firm concentration ratio, D_i for $i=1,2$ are dummy variables denoting different levels of barriers to entry. Bain classified industries into three classes of barriers of entry by subjectively evaluating factors such as scale economies, product differentiation and absolute cost advantages. In the study, industries with high barriers of entry tend to exhibit higher profitability. Bain's studies went on to inspire many econometric analyses of the SCP in the 1960s and 1970s.

Subsequent Work

One of the most important work during this period is that of Comanor and Wilson (1967) which became a classic reference for **industry-level** econometric analysis of the SCP. The basic econometric specification adopted in the paper was as follows:

$$\pi = \beta_0 + \beta_1 \text{ASR} + \beta_2 \log(\text{ACR}) + \beta_3 \log(\text{RGD}) + \beta_4 D_{\text{LOC}} + \varepsilon \tag{22}$$

where:

- π is profitability (measured in terms of after tax profits as a percentage of shareholder's equity)
- ASR is advertising-sales ratio - a variable to capture product differentiation
- ACR is absolute capital requirements - the amount of capital required for entry at minimum efficient scale
- RGD is rate of growth of demand - to emphasize the long-run effects of growth in demand
- D_{LOC} is a dummy variable used to identify local market industries

Another important contribution to the empirical literature on SCP in the 1960s was that of Collins and Preston (1969) who used an alternative definition of performance, namely, price-cost margin (PCM) which was defined as:

$$\text{PCM} = \frac{\text{value added} - \text{payroll}}{\text{value of shipments}} \tag{23}$$

The specification used by Collins and Preston (1969) was:

$$\text{PCM} = \beta_0 + \beta_1 \text{CR4} + \beta_2 \text{GEO} + \beta_3 \text{COR} + \varepsilon \tag{24}$$

where:

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[10] Also note that Bain used the CR4 in his subsequent work.

- CR4 is the four-firm concentration ratio

- GEO is a measure of geographic dispersion derived from the sum of the absolute differences between the percentage of value of shipments accounted for by establishments in each region and the percentage of population in that region

- COR is gross book value of assets divided by total value of shipments

In general, the econometric specification for **firm-level analysis** is similar to industry-level specification (ala Comanor and Wilson (1967)) except that additional variables are use do capture the impact of firm characteristics. Such variable include market share (as distinct from concentration ratio) and firm size (measured in terms of asset size). An example of such specification can be found Shepherd (1972)**:**

$$\pi = \beta_0 + \beta_1 MS + \beta_2 GROUP + \beta_3 \log(SIZE) + \beta_4 ASR + \beta_5 GROWTH + \varepsilon \qquad (25)$$

where:

- π is profitability (measured in terms of after tax profits as a percentage of shareholder's equity)

- *MS* is market share of a firm

- *GROUP* is residual market share i.e. concentration ratio – *SHARE*

- *SIZE* is net total assets

- *ASR* is advertising-sales ratio - a variable to capture product differentiation

- *GROWTH* is growth in revenues at minimum efficient scale

- *RGD* is rate of growth of demand - to emphasize the long-run effects of growth in demand

- D_{LOC} is a dummy variable used to identify local market industries

Many of empirical studies on SCP conducted in the 1960s and 1970s including those cited above provided some support for the SCP hypothesis that concentration is a determinant of profitability.[11] However, the significance of concentration is reduced when barriers to entry variables are included as independent variables. This is because concentration is correlated to barriers to entry variables such as MES and capital

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[11] For good surveys of the empirical findings in SCP see Schmalensee (1989), Scherer and Ross (1990), Hay and Morris (1991), Weiss (1991) and Martin (2002).

requirements. Variables representing barriers to entry that have been found to be statistically significant determinants of profitability include advertising intensity, product differentiation and growth of demand.

Between the late 1970s and early 1980s, the empirical literature on SCP began taking a different turn. Harold Demsetz (1974)'s influential critique of the SCP hypothesis in 1974 prompted scholar to examine the relationship between profitability and profitability. Essentially, Demsetz argued along the `Chicago School' lines that the observed profitability-concentration relationship could be due to large firms in high-concentration industries having high profits due to their large market shares. The empirical evidence supporting this alternative (profitability-sales) hypothesis seems to be stronger in inter-industry studies compared to intra industry studies.[12]

Another direction in which the SCP literature has headed to is the use of simultaneous equation modeling.[13] This approach has been adopted to take into account the multiplicity of causality between the different variables in the SCP framework. As expected, the importance of concentration as a determinant of profitability is further diminished in such studies. Such studies have also highlighted the importance of indirect effects of variables such as advertising and R&D.

Finally, the 1980s also saw the emergence of more formal (mathematical) theorizing in the field of industrial organization which led to an empirical methodology in IO very different from that adopted in the most SCP studies. This approach is today known as the `New Empirical Industrial Organization' (NEIO). The next section discusses this in greater detail.

2.4 New Empirical Industrial Organization

Unlike the empirical literature on SCP, which was primarily based on cross-section studies, the New Empirical Industrial Organization (NEIO) focuses on econometric testing of particular aspects conduct in single industries with the objective of detecting market power or changes in the collusive-competition behavior of firms.[14] The approach entails the construction of explicit structural models that provide theoretical analysis of how firms would behave under different market structures. Data would then be used to estimate the behavioral equations in these models. The results are then used to infer conduct in the industry.

For example, recall that:

$$L_i = \frac{P(Q)-MC(q_i)}{P(Q)} = \frac{s_i}{\varepsilon}(1 + \lambda_i) \tag{26}$$

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[12] See Schmalensee (1989), p. 984
[13] See Hay and Morris (1991)'s discussions in pp. 239-244
[14] See Bresnahan and Schmalensee (1987).

where s_i is firm i's market share, (ε) is price elasticity of demand, (λ_i) its conjectural variation and $\lambda_i = \dfrac{dq_j}{dq_i}$. Re-writing the above equation, we obtain the following:[15]

$$P(Q) = MC(q_i) - \frac{dP}{dq_i} \left(1 + \frac{dq_j}{dq_i} \right) \tag{27}$$

The conduct of the firm in terms of its conjectural variation (dq_j / dq_i) can then be inferred if we are able to obtain estimates of marginal cost ($MC(q_i)$) and the slope of the industry demand curve (dP / dq_j). Once the value of the conjectural variation can be estimated, conduct of the firm can be inferred (see **Table 1** below).

Table 1 : Conjectural Variations Under Different Conduct

Behavior	1 + (dq_j / dq_i)	(dq_j / dq_i)	Lerner Index
Price Taking	0	-1	0
Cournot	1	0	$1/(2\varepsilon)$
Cartel	2	1	$1/\varepsilon$

Source: Church and Ware (2000), p. 441

The NEIO approach has been applied to a number of industries. The include: automobiles, rubber, textile, electrical machinery, tobacco, food processing, banks, coffee, aluminium, retail gasoline, soft drinks and long-distance telephony. [16] Substantial market power have been detected in some of the industries studied. Collusive strategies have also been detected in some cases (e.g. trigger strategies in railroads).

2.5 Beyond SCP and NEIO

The empirical research underlying the SCP paradigm as well as the NEIO are essentially premised upon optimizing firms in equilibrium settings. As such, such studies may not capture industry dynamics. for example, firms enter, grow and exit industries over time. This would imply that the observed profit rate at a given point in time may not be long-run equilibrium profits. Thus, profitability and concentration relationship may be spurious. This critique has led to acloser examination of dynamic structure-performance relationships that uses time series data to control for disequilibrium effects. One line of such research is the **persistence of profitability** literature. The pioneering of work of Yale Brozen (1971) provide impetus for a series of industry-level and firm-level studies on the persistence of profitability since the 1970s.[17] In the industry-level studies, it was found that profits converge to long run equilibrium between 4-10 years. Firm-level studies found that there were no convergence of profits towards an average value. In other words, profits persisted in both the short-run and long-run.

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[15] See Church and Ware (2000), p.441. and **?**, p.444
[16] For a detailed survey, see Bresnahan (1989).
[17] For a brief survey of this literature, see Lipczynski et al (2005), pp.341-346.

Another line of research that examines industry disequilibrium is the literature on firm turnover and mobility.[18] The early theoretical motivation for this line of research inquiry took the form of the **Law of Proportionate Effect** (LPE) or **Gibrat's Law** which states that the expected value of the increment to a firm's size in each period is proportional to the current size of the firm.[19] The implication of LPE is that the limiting distribution of firm size is lognormal. The empirical literature on LPE between the 1950s and 1970s seemed to support Gibrat's Law. However, a few studies in the 1980s suggest that the distribution of firm size is not lognormal in more complete data sets.[20]

In relation to the SCP paradigm, the LPE suggest a possible link between concentration and mobility and turnover. Empirical studies have studied the causality between concentration and mobility and turnover in both directions.[21] The results appear to be inconclusive and not definitive given the small number of studies. The LPE literature has also generated studies that incorporates explicit treatment of the process of change - in particular the interactions between random disturbances and structural factors that include barriers to entry (e.g. MES and sunk cost).[22] An alternative approach to the use of structural factors is to embed the random processes within an industry life-cycle model driven by technological change (innovation) and diffusion.[23] Again, there have been relatively few studies based on these approaches - possibly due to the intensive data requirements of such studies.

There has been some attempts to review the IO literature for developing countries. For example, Tybout (2000) observes that the highly skewed distribution of firm size in developing countries is due to the presence of small geographically diffuse markets and the predominance of consumer goods industry. Interestingly, Tybout's survey of the empirical literature suggests that manufacturers in developing countries are not necessarily inefficient. An interesting line of empirical studies on developing countries' experience is the impact of policy changes (e.g. trade liberalization) on firm performance in terns of price-costs mark-up and productivity.

2.6 Conclusion

The empirical literature in IO is well established covering a period of at least 50 years. Within this period, two distinct methodological frameworks for empirical IO can be discerned, namely the SCP paradigm and the NEIO. The SCP paradigm dominated empirical IO between the 1950s and early 1980s and had significant influence on policymaking especially in the area of antitrust. However, since the 1980s mainstream

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[18] For a recent survey of the literature, see Caves (1998). Caves used the term firm turnover to cover three processes: births and deaths of firms, variations in sizes and market shares of survivor firms (mobility) and changes in control of firms.

[19] The origins of the Law of Proportionate Effect can be traced back to Robert Gibrat's work in 1931. See Sutton (1997) and Lipczynski et al (2005), pp.264-273

[20] See Cabral and Mata (2003).

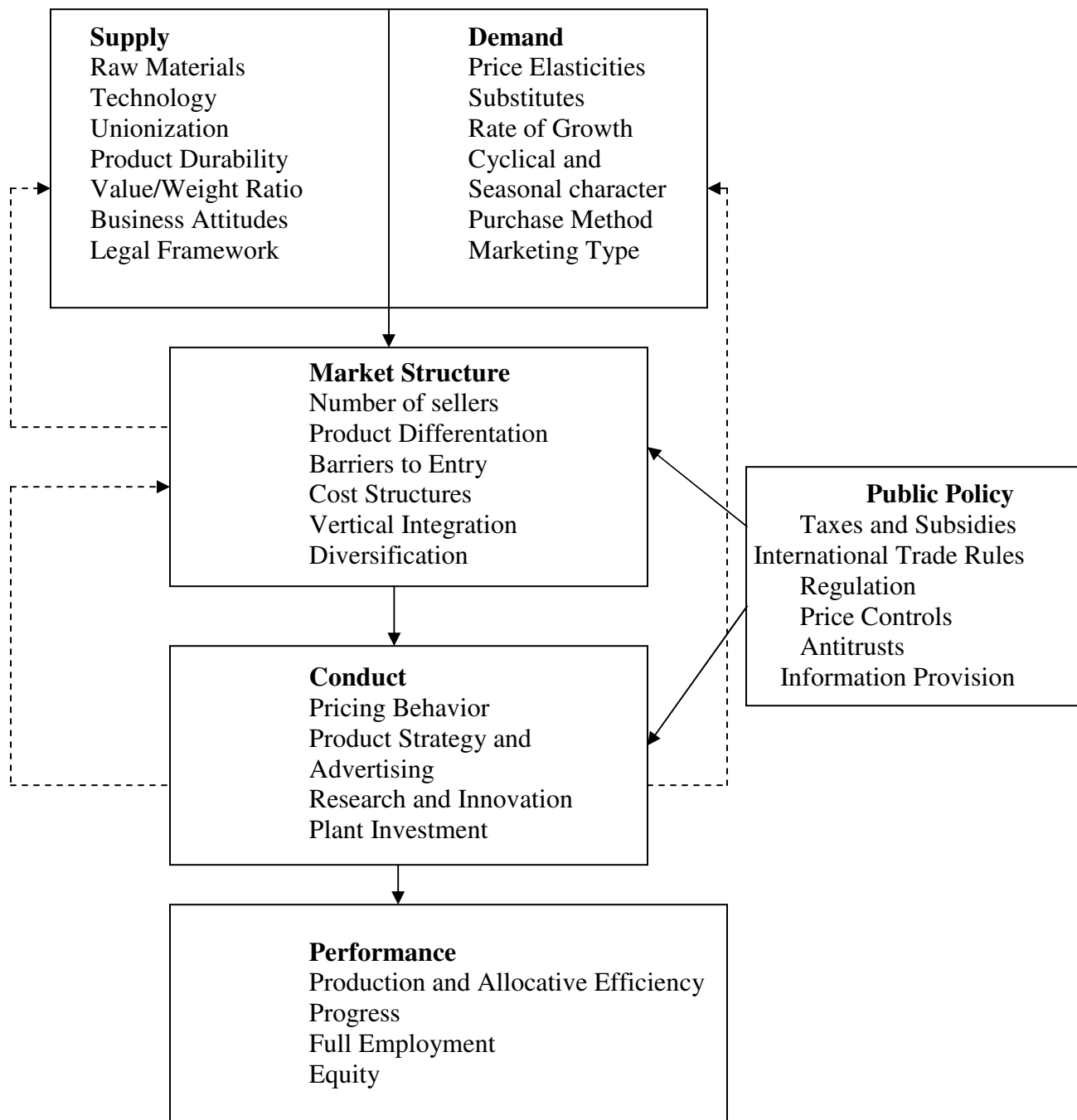[21] Caves (1998), p.1964

[22] For example, see Sutton (1997).

[23] For example, Klepper (1996).

IO economists have carried out less empirical studies to test SCP. Even though the NEIO has dominated the empirical IO literature in the past two decades, the number of NEIO studies is far less that the number of SCP-based studies that have been carried out thus far. It should also be noted that the SCP paradigm has evolved or led to new areas of research. These include investigations on stochastic dynamic models (LPE, Lifecycle models). Much of the literature on developing countries's experiences continues to be based on the SCP paradigm. In comparison, NEIO and new variants of LPE have not had much impact in this area. This is likely to be rectified in the future as the quality of data in developing countries improves.

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Supply	**Demand**
Raw Materials	Price Elasticities
Technology	Substitutes
Unionization	Rate of Growth
Product Durability	Cyclical and
Value/Weight Ratio	Seasonal character
Business Attitudes	Purchase Method
Legal Framework	Marketing Type

Market Structure
Number of sellers
Product Differentation
Barriers to Entry
Cost Structures
Vertical Integration
Diversification

Public Policy
Taxes and Subsidies
International Trade Rules
Regulation
Price Controls
Antitrusts
Information Provision

Conduct
Pricing Behavior
Product Strategy and
Advertising
Research and Innovation
Plant Investment

Performance
Production and Allocative Efficiency
Progress
Full Employment
Equity

Source: Scherer and Ross (1990), p.5

Figure 1: The Structure-Conduct-Performance Paradigm