

**Competition vs. Monopoly: An Input-Output Analysis of Profit Rates and Markups for
the U.S. Economy: 1958-1977**

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I. Introduction¹

The end of the nineteenth century and the early twentieth century witnessed significant growth of large corporations, trusts and mergers. This led to the development of several theories addressing the issue of competition for capitalist economies: imperfect competition, finance capital, monopolistic competition, markup pricing and several decades later, the theory of monopoly capitalism. For many, both Neo-Classical and Marxist theorists, the era of 'free competition' had ended and the economy was seen as being dominated by 'monopolies' and 'oligopolies'.

This paper first contrasts the development of the theory of competition in Marx with that of the theory of perfect competition. Then, theories of imperfect competition, monopolistic competition and markup theories are assessed; identifying the explicit or implicit theory of competition upon which these latter theories are based. The fourth section of the paper presents the methodology used for an empirical analysis of competition employing an I-O database at the 2-digit level for five benchmark years: 1958, 1963, 1967, 1972, and 1977 and presenting the calculation of prices of production, profit rates and markups. The fifth section presents an empirical analysis of profit rates, concentration ratios and entry barriers and contrasts this with previous empirical studies. The sixth section and conclusions summarize the empirical results of this study and evaluate the implications for theories of competition and monopoly.

The main results showed that hierarchies of profit rates were not fixed over the twenty-year period with 60-70% switching from above average to below average or vice versa, providing support for the tendential equalization of the general rate of profit. Secondly, plots of profit rates with concentration ratios, instead of showing a clear positive correlation, resulted in a scatter plot. In the case of the capital-output ratio and entry barrier variables there was a negative correlation with profit rates and differential markups, the exact opposite of what is predicted by markup, oligopoly, and monopoly capitalism theories. The overall implication of the results is that competition, in the Marxian sense, cannot be ruled out as being present in the modern U.S. economy, in contrast to the claims of 'oligopoly/monopoly' theorists.

II. Development of Theories Of Competition

On the one hand, the Classical theories of competition of Smith and Ricardo provided the basis for Marx's theory of competition and on the other hand, Neo-Classicals refer to

¹ This paper is derived from my dissertation at the New School for Social Research and much of the material came out of discussions with my advisors: Willi Semmler, Anwar Shaikh and Michel Juillard (Cooney, 1990).

Smith as the precursor to the theory of perfect competition. The theory of competition in Marx is rooted in understanding real behavior of firms and industries within an actual capitalist economy, while the model of perfect competition is a conception based on ideal behavior, not based on the behavior of actual capitalist firms. It turns out that most developments in economics concerning competition or monopoly stemmed from this latter trajectory, even those attempting to present a critique of perfect competition.

Although Smith's theory of competition is claimed to be a precursor to the theory of perfect competition, there is substantially more continuity between the Classical theory of Smith and Ricardo with Marx, than with the later Neo-Classical theory, primarily reflected by the emphasis on the sphere of production and the associated long-run prices. Both Smith and Ricardo conceived of natural prices as centers of gravity around which market prices fluctuated, in contrast to the equilibrium concept of price, which dominates Neo-Classical theory. Moreover, their conception of a uniform rate of profit did not imply that it would be attained for all industries and firms simultaneously, but rather would only be achieved as a result of a dynamic process over time.

1. Marx's Theory of Competition

Marx presents competition as an inherently antagonistic process, the real nature of which is expressed through the rivalry among firms. Ironically, Marx's analogy of capitalist competition with war is not echoed by contemporary economists but rather by the representatives of the business world. An important advance by Marx is the breaking down of competition into its two moments: one within and the other between industries. In the following passage Marx makes explicit reference to these:

What competition brings about, first of all in one sphere, is the establishment of a uniform market value and market price out of the various individual values of commodities. But it is only the competition of capitals in **different** spheres that brings forth the production price that equalizes the rates of profit between those spheres. The latter process requires a higher development of the capitalist mode of production than the former.²

The law that prevails between industries is the equalization of profit rates such that the proportion between realized profit and advanced capital is the same for all spheres of production over time, but there is a hierarchy of profit rates within an industry due to the equalization of selling prices and varied firms costs.

² Marx, 1967, p.281.

In contrast to much of the comparative static analysis in economics, Marx presented competition as a dynamic process whereby capital flows from industries with low rates of return into industries with high rates of return. This leads to a change in relative output proportions, and brings about supply and demand imbalances, which subsequently lead to changes in relative market prices and profit rates. The following is a general statement by Marx regarding the formation of the general rate of profit.

With the whole of capitalist production, it is always only in a very intricate and approximate way, as an average of perpetual fluctuations which can never be firmly fixed, that the general law prevails as the dominant tendency.³

Marx argues that in competition, "everything appears upside down", and without having worked up from the abstract value relations which underlie all more concrete phenomena, one can arrive at erroneous conclusions. He argued that it is in fact the value relations, which govern more concrete relations, in particular, the prices of production. But in competition, what is observed on the surface conceals the essential, inner laws. The seriousness of the problem of taking appearances as representing the innermost laws cannot be overstressed.

Marx's concept of competition derives from his theory of the behavior of the capitalist firm. The basic driving force for economic growth is the firm's goal to expand and grow, although it is the inter-firm competition that leads to the particular dynamics observed. As the process of competition plays itself out, the old firms decline and the centralization of capital leads to more intense rivalry and competition among the survivors. Firms are conceived as taking an active, not a passive role, trying to anticipate their rivals' reactions to their actions.

As mentioned above, the theory of perfect competition also stemmed from classical theory but as seen in the next section, is in stark contrast to the theory of competition in Marx.

2. Theory of Perfect Competition

For perfect competition, it is generally assumed that there exists an infinity of infinitesimal firms which exhibit price-taking behavior. This is to insure that individual firms will decide on the level of output that they will produce but not on the selling price. In addition, homogeneity of product and independent decision-making by firms are assumed. So any type of collusion or agreement must be excluded and the assumption of perfect information for both consumers and firms is often added. It is further assumed that there is

³ Ibid., p.261.

freedom of entry and exit and therefore no barriers to entering or leaving an industry.

Associated with this is the assumption of perfect mobility of resources.

An individual firm cannot be allowed to have an effect on the market price, therefore, it must be sufficiently small so that its output does not constitute a significant share of the total industry output. If it were otherwise, individual firms could lower their prices and take all the customers away from other firms in the industry. This is directly related to the perfectly elastic demand curve, which, in effect, implies that demand does not provide a limit to the level of output for the firm. Rather, it will be determined strictly by its cost curves and their intersection with the market price or marginal revenue curve. What is interesting is that such behavior implies that firms are necessarily passive and therefore rivalry between firms is assumed away.

There is no battle over market share; the inherent antagonistic nature of capitalist competition is not to be found. All considerations on firm strategies come to be associated with imperfect competition; the decision-making involved with innovation is simply abstracted from. The treatment of technical change is analogous to the wave of a magician's wand. Once any individual firm introduces a new technique whereby prices could be lowered, the whole industry adopts the new technique instantaneously. In Marx's analysis of competition within an industry, the hierarchy of techniques comes to play a crucial role, but in perfect competition such crucial concrete aspects are abstracted from. By strictly scientific considerations the model of perfect competition seems to have employed the power of abstraction one step too far, abstracting from the essence, namely competition, which it is supposed to explain.

3. Theory of Imperfect Competition

As it became more and more apparent that the model of perfect competition was simply inadequate for the analysis of real economies in the early 20th century, several attempts were made to provide an alternative.⁴ They set out to develop a means by which to analyze actual firm behavior, in particular, the growth of trusts, mergers, and collusion. The body of theory, which developed, came to be known as imperfect competition, even though Chamberlin shuns this term.⁵ The term suggests that the actual phenomena are imperfect, when in fact it is the original theory of perfect competition, which is flawed in its ability to analyze the real world. This led to the association of elements that represent competitive behavior in the real world with imperfect competition and monopoly. Since the latter term

⁴ See Robinson(1933), Chamberlin(1933).

⁵ See Chamberlin (1962). Preface to the First Edition.

implies the absence of competition, many aspects of real competition came to be identified with their opposite.

Chamberlin argued that the treatment of monopoly and perfect competition as being mutually exclusive is inadequate for the analysis of actual firms. Instead, he proposed a hybrid theory, which incorporated both monopolistic and competitive elements in analyzing firm behavior, which he defined as 'monopolistic competition'. Chamberlin argued that a theory of competition had to incorporate actual competitive behavior and that the majority of such behavior does not correspond to perfect competition. However, in spite of such insight, he ends up falling into the trap of identifying phenomena, which are the opposite of perfect competition as 'monopoly,' when in fact they are an outcome of competition.

Robinson does not criticize the theory of perfect competition to the extent that Chamberlin does. Although she is quite critical of orthodox theory and the concept of perfect competition, her analysis is derived from standard Neo-Classical theory. Imperfect competition comes to mean the analysis of the two poles of perfect competition and monopoly and the techniques needed for the cases that lie between the poles. The analysis of monopoly derives directly from perfect competition and marginal analysis and does not bring one much closer to understanding the real workings of competition for actual economies.

In general, economists associated with the theory of imperfect competition were addressing the inadequacies of the theory of perfect competition and were attempting to provide an analysis, which could explain elements, which had been excluded by Neo-Classical theory. Instead of making a clean break with the theory of perfect competition, they tried to patch it up to make it work better. Unfortunately, using the same flawed foundation of Neo-Classical economics to develop an alternative to perfect competition will still produce a distorted edifice by which to understand competition in the real world.

The next section examines the influence of theories of competition on the development of markup and monopoly theories, as the theoretical contributions of Kalecki, Steindl, and Baran and Sweezy are considered.

III. Development of Markup and Monopoly Theories⁶

1. Kalecki's Markup Theory

Although the concepts of markup and degree of monopoly were first presented by Kalecki in his earlier works, they are more often associated with the later work, Theory of

⁶ Unfortunately, due to space limitations, the discussion of Eichner's markup theory, as well as Hilferding's contribution is not included, though it was in the dissertation chapter upon which this section is derived.

Economic Dynamics (1954), which was a combined and updated version of his two previous books. The basis underlying markup price theory is the discretionary power of firms over prices and profits. In other words, prices are established by large firms or oligopolies, which have the power to decide how large a markup over costs they will charge. Formally, Kalecki expressed markup prices as:

$$p = \mu + np \quad (1)$$

where p is the individual firm's price, \bar{p} is the average price for the industry, u is prime costs, m is the individual firm's markup on prime costs and n is the proportion to which the industry's average contributes to the individual firm's price (subject to the constraint that $n < 1$). According to Kalecki, the coefficients m and n characterizing the price-fixing policy of the firm reflect what may be called the degree of monopoly of the firm's position.⁷

For an individual firm the degree of monopoly is defined as $m/(1-n)$. In the case of an industry where m and n vary by firm, the average industry price is defined as:

$$\bar{p} = \frac{\bar{m}}{1-\bar{n}} u \quad (2)$$

In similar fashion, \bar{m} , \bar{n} , and \bar{u} represent the industry averages of these variables. Kalecki argues that the process of concentration is the main cause of increases in the degree of monopoly. He describes the large firms in an industry as setting the price, which other firms then come to adopt. The second major cause is the development of sales promotion through advertising and selling agents, etc. Thus price competition is replaced by competition in advertising campaigns, etc. These practices also will obviously cause a rise in the degree of monopoly.⁸ The other two factors Kalecki cites are: the influence of changes in the level of overheads in relation to prime costs upon the degree of monopoly, and the significance of the power of trade unions.⁹

Although a potentially controversial point, one must examine what is the basis of Kalecki's concept of competition. In order to argue about the abolition of competition, it is necessary to have a clear understanding of what the characteristics are which would be associated with competition itself. Competition for the Classics and Marx implied the equalization of industrial profit rates. A consequence of this equalization is that industries with higher capital investment would also have to have larger profit margins.¹⁰ The rate of profit for a firm can be expressed as the total sales (pQ) minus total costs (kQ) divided by

⁷ Kalecki, 1954, p.13.

⁸ Ibid., p.17.

⁹ Ibid. p.17.

¹⁰ This point was made by Shaikh in "The Phenomena of Marx's Notion of Competition" (1984 mimeograph).

total capital advanced (K), where k represents unit costs analogous to Kalecki's u. In formal terms, $r = (pQ - kQ)/K$. If both the numerator and denominator are then divided by total sales, the rate of profit is expressed as the ratio of the profit margin to the capital sales ratio:

$$r = \frac{(pQ - kQ)/pQ}{(K/pQ)} = \frac{(p - k)/p}{(K/pQ)} = \frac{m'}{(K/pQ)} \quad \text{where } m' \text{ is}$$

the profit margin and (K/pQ) is the capital-sales ratio. This has particular relevance for the association by Kalecki of positive profit margins with 'semi-monopolistic price formation' or the absence of competition when in fact their dispersion is a necessary result of competition. One could not argue that Kalecki is deriving his results based upon the theoretical conception of competition as developed by the Classics and Marx, but rather from that of perfect competition. This is substantiated by direct references to perfect competition itself.¹¹

Unfortunately, as Kalecki attempts to explain the discrepancies between the concept of perfect competition and the real world he comes to conflate actual capitalist competition with the concept of perfect competition.

2. Steindl's Contribution

A major extension of Kalecki's theoretical approach is the work of Josef Steindl in Maturity and Stagnation in American Capitalism (1952). Although Kalecki had made reference to capacity utilization or excess capacity, it is Steindl who places it at the center of his analysis in attempting to analyze an economy dominated by oligopolies. Steindl argues that the existence of higher levels of excess capacity is due to the holding back of output by oligopolies in order to maintain a certain selling price and a higher profit margin. The oligopolists are described as setting the price as they choose, and though acknowledging the fact that potential competition comes to play a role in the determination of a limit to price, he downplays this threat and refers to the kinked demand curve.¹²

Steindl presents a critique of orthodox analysis and also identifies the limitations of the theory of imperfect competition. He presents an argument about the interrelationship of excess capacity, price rigidity and oligopolies, basically arguing that the growing oligopolization leads to price leadership or price fixing, which then effects capacity utilization. Steindl argues that this leads to an increase in excess capacity, which at an aggregate level can cause a reduction or stagnation in investment.

¹¹ Op. cit., p.13.

¹² Steindl, 1952, p.16.

It was established above that a necessary result of competition was the correlation of capital output ratios with profit margins. This implies that higher profit margins are associated with heavier, more technically advanced industries with larger capital outlays. It is a consequence of competition that 'normal' levels of capacity utilization are below the 'full' capacity level where reserve capacity is tapped in order to be able to expand output and increase market share in periods associated with a rapid increase in demand. Industries with such flexibility in capacity in order to meet a rapid increase in demand with an immediate increase in output will tend to have fewer price fluctuations and smoother prices. It then follows that the very same industries, which have higher profit margins and are more capital-intensive, will also be those that have a higher level of reserve capacity and lower price variation. However, rather than concluding that this phenomenon is a result of competitive forces at work, Steindl would consider this as evidence of the absence of competition.

A final point, particularly relevant for the empirical analysis below, is that Steindl predicts a positive correlation between profit margins and concentration, and he seems to imply that this is also the case for profit rates. He argues that the equality of profit rates between industries will be substantially limited since the assumption of the long-run mobility of capital is not valid. Although Steindl's work implies a greater understanding of Marx's theory of competition and the nature of capitalist competition, he appears to also be influenced by the theory of perfect competition when identifying what phenomena he associates with competition.

3. Baran and Sweezy and the Theory of Monopoly Capital

In discussing debates around competition and monopoly, especially in the context of Marxist economics, the seminal work of Baran and Sweezy should be considered. Unfortunately, since this paper is concentrating on an empirical analysis of profit rates, markups and prices of production using an I-O framework, due to space constraints, a proper theoretical treatment of the work Monopoly Capital is not possible here. Thus, only a brief summary of points with relevance to the empirical issues examined in this paper will be addressed.¹³

According to Baran and Sweezy it is expected that monopolized or 'oligopolized' industries will be more concentrated, have higher profitability, i.e., higher profit margins and profit rates. They argue that because of the existence of 'monopolies', profit rates would not be subject to a process of equalization as under competitive capitalism, but rather a stable

¹³ For a full discussion of the theoretical contribution of Baran and Sweezy, see Chapter 3, Cooney, 1990.

hierarchy of profit rates would exist over time. The empirical evidence in section VI of this paper provides counter evidence to these predicted phenomena of 'monopoly capitalism'.

A particular problem in the analysis of the behavior of 'monopoly' capitalists is the conception that since they decide the prices at which commodities are sold, they have the power over their prices, profits, etc. It is clear that there is confusion between a decision on the part of a capitalist to set a price and the ability to insure her/his profits. Any experienced businessperson knows that setting a price does not guarantee the level of profits anticipated or desired. There are numerous factors, which come into play beyond the control and power of individual monopoly capitalists, e.g., competitors' strategies, input prices, financial markets, etc. Nothing is a given in the market and so a capitalist may set a price (valid for 'competitive' capitalism as well) but there is no guarantee that the total product will be realized in order to valorize the capital invested.

The same problems of determination occur for both theories of markup pricing as well as for the theory of monopoly capitalism. It also appears that both sets of theories derive their conception of competition substantially from that of perfect competition and not from a marxist conception of competition. The main point, which this paper is attempting to examine empirically, is whether competition, in a marxist sense, is still present in modern economies. The next section lays out the methodology employed for the calculation of prices of production, market profit rates, markups and market power variables in order to empirically evaluate this issue.

IV. Calculation of Prices of Production and Markups

A major goal of this research is to identify the specific empirical phenomena, which allow one to distinguish between the theory of competition in Marx and theories of monopoly or markup pricing. As pointed out in section III, both sets of theories predict similar results but derive opposite conclusions regarding the functioning of competition. One means by which to discern between the competing hypotheses is by examining the hierarchy of market profit rates. For Marx, a hierarchy of profit rates is always expected to exist; however, the ranking of the different industries is expected to change. If this hierarchy were to remain fixed over a period of 'fat and lean years',¹⁴ this would correspond to 'monopoly' in Marx. This should not be confused with a short run business cycle, but rather with a cycle corresponding to the lifetime or turnover of capital stock.

¹⁴ Marx refers to "fat and lean years" for the period needed for the equalization of profit rates (Op cit., Ch. 10).

As seen above in section III, markups on costs are portrayed as a gauge for 'oligopoly'. Two sets of markups were calculated: the first set are referred to as competitive markups, since they are based upon prices of production, and the second set are referred to as actual markups since they are based on actual or market prices. Lastly, differential markups were calculated as the actual markup minus the competitive markup.

In Marx, it is the category of production prices, which represents the result of competition between industries, in other words, those prices which correspond to a uniform rate of profit across industries. By calculating prices of production using an Input-Output (I-O) framework, there are several advantages and disadvantages. Most significantly, it provides an additional empirical test, which incorporates the whole economy, since all intersectoral relations are taken into account in the determination of sectoral prices and the uniform rate of profit. However, I-O analysis results in simultaneous solutions, which are snapshots of an economy and are not able to capture the full dynamics of a capitalist economy. Using I-O tables implies the limitation of a small set of points, corresponding to the individual benchmark years, unless one attempts an interpolation between those years.

Perhaps the greatest limitation of using national I-O tables for addressing the issue of competition between industries is that the dynamics of competition for industries does not simply operate within national boundaries. Especially today, even more than for the I-O years used in this study, industries are global and thus one would need to carry out an analysis for all countries to be comprehensive. Such a colossal project is not feasible given the lack of availability and compatibility for much of the necessary data.

The database used is essentially composed of I-O tables at roughly the 2-digit level, capital stock and depreciation matrices, and employment and compensation vectors.¹⁵ There were a total of 72 industries used for price of production calculations, however, only the 50-51 sectors (depending on the year) in manufacturing were used for subsequent analysis, which involved concentration ratio data, which isn't available for non-manufacturing sectors.

1. Calculation of Prices of Production¹⁶

The formula used for prices of production (p) for an intersectoral linear production model is:

$$p=pA + wL + rpK \quad (3)$$

¹⁵ For a more generally available summary of the development of the I-O database used for this research, see Appendix A in Shaikh and Tonak (1994), which is derived from Appendix A in Cooney, 1990.

¹⁶ A more extensive and detailed presentation is available in Cooney, 1990; also see Ochoa, 1984.

where A is the I-O coefficient matrix, w is the real wage rate, L is the vector of direct labor coefficients, K is the capital stock matrix and r the uniform rate of profit. Since circulating constant capital must also include depreciation (D), the expression becomes: $pA + D$. The real wage rate w is defined as the product of the price vector and b : the bundle of commodities constituting the real wage, i.e., $w=pb'$. To obtain b , the ratio of the sectoral PCE (personal consumption expenditure) to the sum of all sectoral PCEs is calculated for each industry and then multiplied by the minimum wage (w_{\min}).

The latter modification arises from the adjustment of the direct labor coefficients, which used wage rates as weights for the reduction of all labor to unskilled, and of average intensity. Thus, the adjusted labor coefficient vector a_o was obtained using the following formula:

$$a_o = (w_i \cdot L) / w_{\min} \quad (4)$$

The resulting matrix $[b' \cdot a_o]$ represents the quantity of good i required for workers' consumption in order to produce one unit of output j . The minimum wage corresponded to the lowest sectoral wage rate calculated from the employment and compensation data. The normalized labor coefficients' vector represents the amount of labor time of minimum intensity and skill directly required to produce one unit of each sector's product.

The A matrices are derived from the benchmark I-O transaction tables. The expression for the capital advanced not only includes the total fixed capital but also that portion of total circulating capital which is advanced: $(A + b'a_o) \langle t \rangle$ where $\langle t \rangle$ is the diagonal matrix of turnover times. Unfortunately, the best approximation for this is the inventory-sales ratio data only available for 1963. The final equation for prices of production is therefore as follows:

$$p=p(A + b'a_o + D) + rp(K + (A + b' a_o) \langle t \rangle) \quad (5)$$

If A' is defined as $(A + b'a_o + D)$ and K' is defined as $(K + (A + b' a_o) \langle t \rangle)$, then:

$$p=pA' + rpK' \quad (6) \quad \text{and therefore} \quad p(I-A') = r pK'.$$

The resulting characteristic equation is: $p = r pK'(I-A')^{-1} \quad (7)$

where the eigenvalue corresponds to the reciprocal of the uniform rate of profit. The resulting solution to the above equation provides the ratios of the individual prices of production to their corresponding market prices. In the case of values greater than one, which implies that the price of production is greater than the market price, the respective

sector is of below average profitability. Likewise, a value less than one implies that a sector has a profit rate above the average.

A second set of calculations was also carried out with the modification of subtracting indirect business taxes (g) from profit. The modified form of equation (5) is:

$$p=p(A + b'a_o + D) + g + rp(K + (A + b'a_o) <t>) \quad (8)$$

Prices of production corresponding to equation (5) and any other calculations based on them are referred to as PROFPTAX- (profit plus taxes) since indirect business taxes are not subtracted from profits, while prices of production corresponding to equation (8) and any subsequent calculation are referred to as PROFIT- which have removed indirect business taxes from profits.

The procedure followed for the calculation of the prices of production was based on the analysis conducted by Ochoa (1984). Prices of production were calculated for each I-O year: 1958, 1963, 1967, 1972, and 1977. The market profit rates were calculated separately from prices of production, but modifying eq. (5) above such that:

$$m=m(A + b'a_o + D) + m[K + (A + b'a_o) <t>] <r> \quad (9)$$

Since the solution to the equation of prices of production is actually the ratio of prices of production to market prices, the vector m above is all ones. Therefore eq. (9) is actually a set of 72 independent equations, each with exactly one unknown (r_j). The resulting equation can then be solved for each industry:

$$1 = \sum_i (A_{ij} + b_i a_{oj} + D_{ij}) = r_j \sum_i [K_{ij} + (A_{ij} + b_i a_{oj}) t_j]$$

thus

$$r_j = \frac{1 - \sum_i (A_{ij} + b_i a_{oj} + D_{ij})}{\sum_i [K_{ij} + (A_{ij} + b_i a_{oj}) t_j]} \quad (10)$$

For PROFIT the formula becomes:

$$r_j = \frac{1 - g_j - \sum_i (A_{ij} + b_i a_{oj} + D_{ij})}{\sum_i [K_{ij} + (A_{ij} + b_i a_{oj}) t_j]} \quad (11)$$

The calculated market profit rates were plotted over time in order to examine whether the hierarchy of profit rates stayed constant or how they changed. Although the time period is barely twenty years, this comparison will provide a more comprehensive view of the whole economy compared to most studies examining differential profit rates.

2. Markup Calculations

Markup prices were calculated by using the mapping outlined by Semmler.¹⁷ Markups based on prices of production (p) are referred to as competitive markups (CMU). The mapping is then :

$$p = pA^* (I + \langle m \rangle) \quad (12)$$

where A^* includes both unit material and unit labor costs or $A + b'a_0$. Alternatively expressed as:

$$pA\langle m \rangle = \langle ? \rangle \quad (13)$$

where $\langle ? \rangle$ represents profits. Since the p are given, the vector of markups $\langle m \rangle$ can easily be solved for. Using equation 12 above but with a unit vector of ones, the actual markups (AMU) were calculated. Differential markups were calculated as the difference between the actual and the competitive markups:

$$DMU = AMU - CMU \quad (14)$$

The vector of these deviations is effectively comparable to the differentials between market rates of profit and the average rate of profit.

V. Empirical Analysis of Profitability, Concentration Ratios and Entry Barriers

1. Previous Empirical Studies on Differential Profitability

From the early fifties on, there were many empirical studies addressing the relationships between market structure, prices, and profitability. The debate is identified as beginning with the seminal article of J.S. Bain (1951), where the concentration-profit hypothesis was first tested empirically. Associated with Bain and others is the attempt to show that the most oligopolized industries were actually receiving monopoly profits. The majority of studies use a combination of standard market structure variables. The most widely used are industrial concentration, entry and exit barriers, the degree of collusion, and firm size. The most common measure used for profitability is profit rates, though some authors use other measures, such as profit margins, price-cost margins, etc

Concentration Ratios and Entry Barriers

The predominant independent variable used to explain profit rate differentials is the concentration ratio for an industry, the most common examples being CR4 and CR8, defined as the percentage share of the value of shipments of the largest four or eight firms, respectively, within an industry. The second most generally referred to explanatory variable is that of entry barriers. They are described as either particular structural characteristics of an industry or as the result of various strategies pursued by the established firms in an industry.

¹⁷ Semmler, 1984., p.154.

The standard types of entry barriers described are product differentiation, economies of scale, absolute cost advantages of established firms, and prohibitively heavy capital requirements.

Capital-output ratios have often been used to test for entry barriers due to heavy capital requirements. Though a high capital-output ratio may be a necessary condition for entry barriers, it is not a sufficient condition. A very capital-intensive production process may still correspond to a relatively low total capital outlay.

The first set of studies examined the relationship between profit rates and concentration ratios and for example, in the oft-cited study by Bain in 1951, profit rates were regressed on CR8 ratios and yielded a rather weak result. In his words:

The hypothesis in brief is that the average profit rate of firms in oligopolistic industries of a high concentration will tend to be significantly larger than that of firms in less concentrated oligopolies or in industries of atomistic structure.¹⁸

Bain's research was criticized by a number of authors for several reasons.¹⁹ Brozen points to serious shortcomings with respect to Bain's data: the short time period (1936-1940) and low the number of industries. From a total of 340 industries, Bain ended up using only 42.²⁰ This certainly limits the degree of generality of the empirical results obtained by Bain. Secondly, Bain uses a critical value of 70% for the concentration ratio, arguing that profitability is significantly higher in industries with a CR8 value above 70%. Brozen contends that this value is arbitrary and not the consequence of a specific theoretical hypothesis. In addition to examining the effect of concentration ratios on profitability, Bain (1956) also introduced entry barriers as explanatory variables; sometimes referred to as the CR-EB-p hypothesis. In this article, the economies of scale variable did the best in terms of explaining differential profit rates. Overall, the studies of Bain and others²¹ have shown a positive correlation between profit rates and concentration, although the statistical results have often been quite weak.

2. Calculations of Concentration Ratios and Entry Barriers for the I-O database

In order to examine both the concentration-profit rate hypothesis as well as the CR-EB-p hypothesis, both concentration ratios and entry barriers were constructed for use with the I-O database. Data for both CR4 and CR8 data were aggregated and the resulting series contained 52 sectors for 1972 and 1977, but only 51 sectors for 1958, 1963 and 1967.

¹⁸ Bain (1951, p.294).

¹⁹ See Brozen (1971), Demsetz (1973).

²⁰ Op. cit., pp.303-304.

²¹ Bain(1951), Stigler(1957), Mann(1966).

It has been argued²² that entry barriers exist when as a result of economies of scale, the minimal size plant corresponds to a substantial percentage of the industry's output. Therefore, such a case could correspond to a higher proportion of capital stock relative to the national economy, as well as a high capital-output ratio, as well as highly concentrated. Therefore, to construct a reasonable measure of entry barriers, the product of the capital-output ratio and the relative proportion of total capital stock is divided by the proportion of firms in an industry. Formally, the first measure of entry barriers (EB1) is as follows:

$$EB1 = \frac{k_i}{q_i} \frac{k_i}{S k_i} \frac{S n_i}{n_i} \quad (15)$$

where (k_i/q_i) is the industry's capital-output ratio, $(k_i/S k_i)$ is the ratio of the capital stock of an industry to the overall capital stock in the economy, and $(n_i/S n_i)$ is the ratio of the number of firms in an industry to the total number of firms in the economy. In order to separate out the effect of concentration and thus avoid problems of correlation with concentration ratios, a second measure of entry barriers was also constructed:

$$EB2 = \frac{k_i}{q_i} \frac{k_i}{S k_i} \quad (16)$$

This section presented the rough contours of previous research on differential profitability, especially for concentration ratios and entry barriers, followed by the calculations necessary to generate data series compatible with the I-O database presented in section IV. The next section presents the main empirical results and their evaluation in the context of theories of competition.

VI. Empirical Results And Evaluation

This section presents the key graphic results relevant for the discussion contrasting the markup and monopoly theories with that of Marx's theory of competition. The time series to be considered are the market rates of profit, the actual, competitive and differential markups. As there are a total of four variables (ROP,AMU,CMU,DMU) for 51 industries, only a small sample of graphs will be shown and only key results discussed, due to space limitations.²³

1. Market Rates of Profit

Examination of industrial profit rates over time can be argued to be the best measure by which to assess the degree to which interindustry competition is present or not in a capitalist economy and to what extent a tendency for the equalization of profit rates exists or

²² See Bain(1956), Mann(1966).

²³ There are a total of 34 of these graphs available in Appendix E, Cooney, 1990.

not. The market rates of profit calculated according to equations 10 and 11 were plotted for the five benchmark years spanning the 19-year period: 1958-1977.²⁴ There were a total of ten industries, which had profit rates consistently above the average, and nine, which had rates consistently below the average. This implies that the remaining 32 industries (~63%) crossed over the average rate of profit at some point during the period from 1958-1977. As an example, the market profit rates for sectors 40-44 are shown in Figure 1 below.²⁵

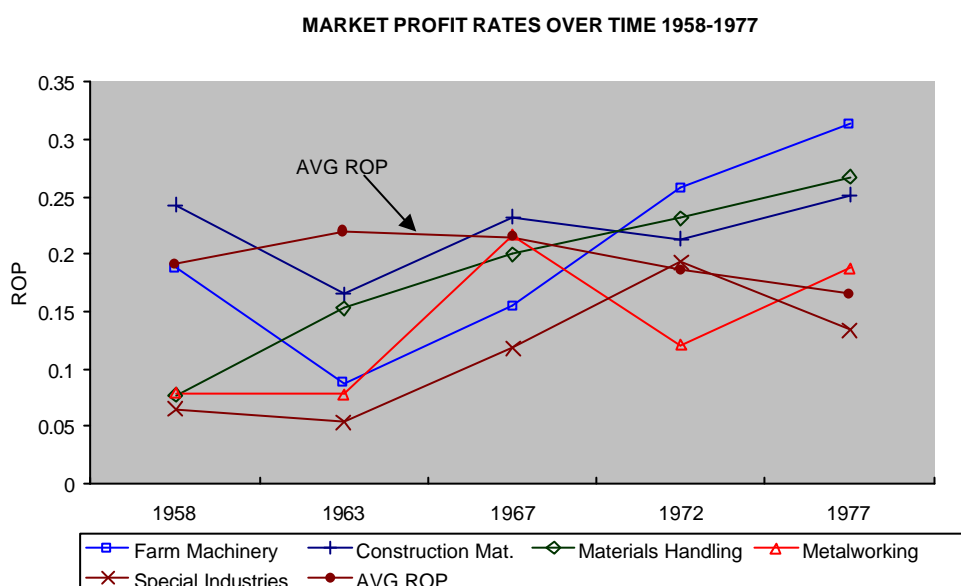


Figure 1: Market Profit Rates-Sectors 40:44 1958-1977 PROFIT

2. Differential Markups²⁶

The movement of differential markups around the zero axis is a reflection of competition between industries, as in the case of market rates of profit. The overall ordering of the differential markups is quite similar to the profit rates, although DMU was more often below zero over the period considered. For the PROFIT analysis there were a total of 7 industries which had differential markups consistently above zero while 8 were consistently below it, namely, a total of 15 industries which stayed either above or below the average, and 36 (~70%) which switched from above average to below or vice versa.

3. Profit Rates and Differential Markups vs. CR's, K/Q

²⁴ See section IV above for the basis of the two sets of calculations with respect to indirect business taxes.

²⁵ For a full listing of the names of industries, see Table 5.1 in Cooney, 1990.

²⁶ Once again due to space limitations, only the results of differential markups are being discussed since the DMU provides the best measure of the presence of competitiveness among the markup variables.

In Figure 2 below, the plot of the rate of profit versus concentration ratios is quite revealing, since the rate of profit does not have a monotonically increasing relationship with the concentration ratio, as predicted by the majority of the literature.

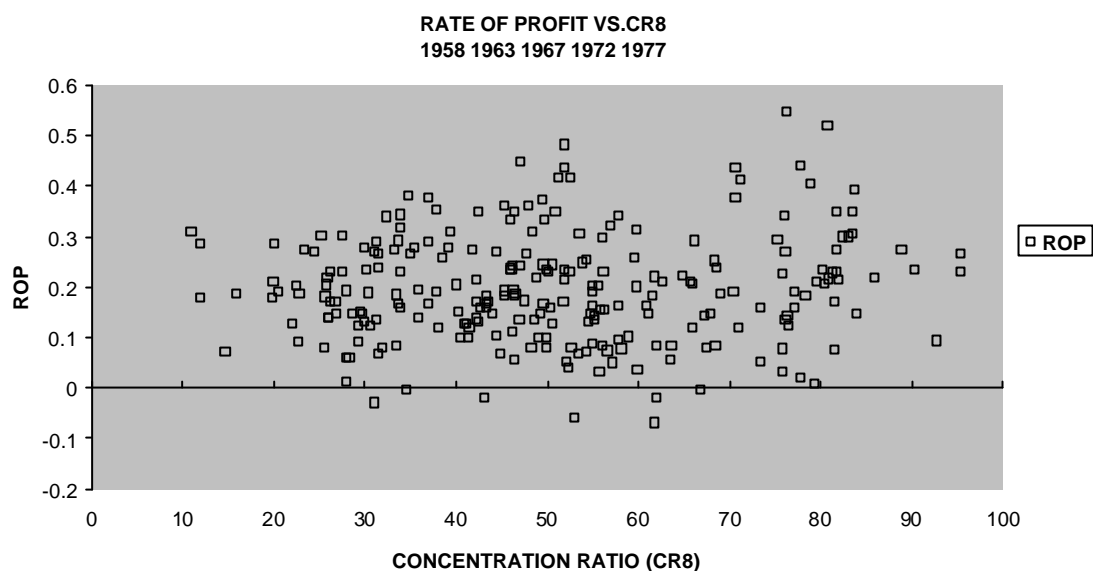


Figure 2: Rate of Profit vs. CR8 - Pooled Data 1958-1977 PROFIT

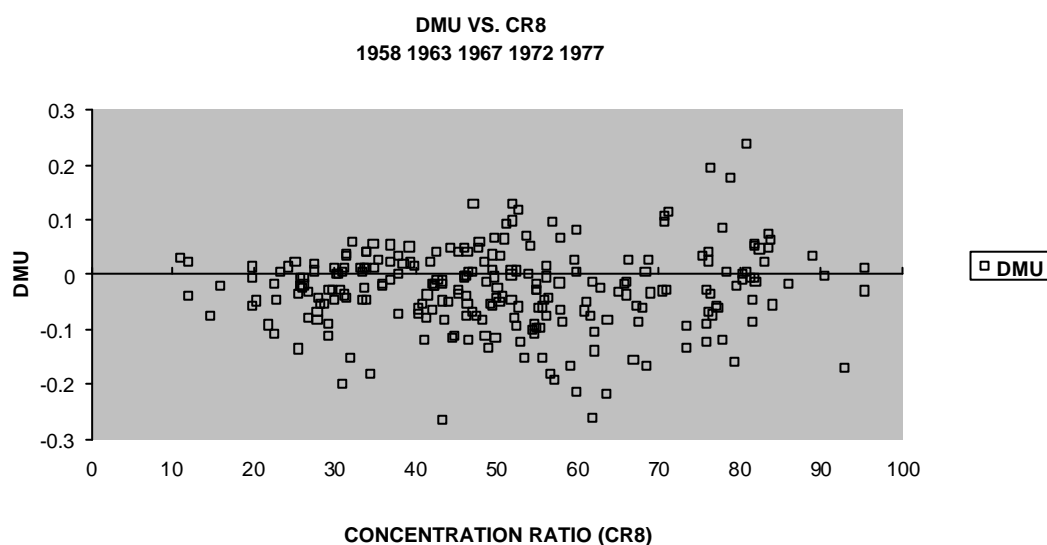


Figure 3: Differential Markups vs CR8 - Pooled Data 1958-1977 PROFIT

In the case of the differential markups (See Figure 3 above), a lack of a relationship with concentration is even more evident and the points seem to be scattered randomly.

In addition to concentration ratios the relationship of profit rates and markups with capital output ratios, as a proxy for entry barriers was also in contrast to much of the literature. Since the DMU are defined as the difference between the actual and competitive

markups, a more positive correlation between competitive markups and the capital-output ratio in contrast to that of actual markups resulted in a negative correlation between the differential markups and the capital-output ratio. This downward trend is evident in Figure 4 below.

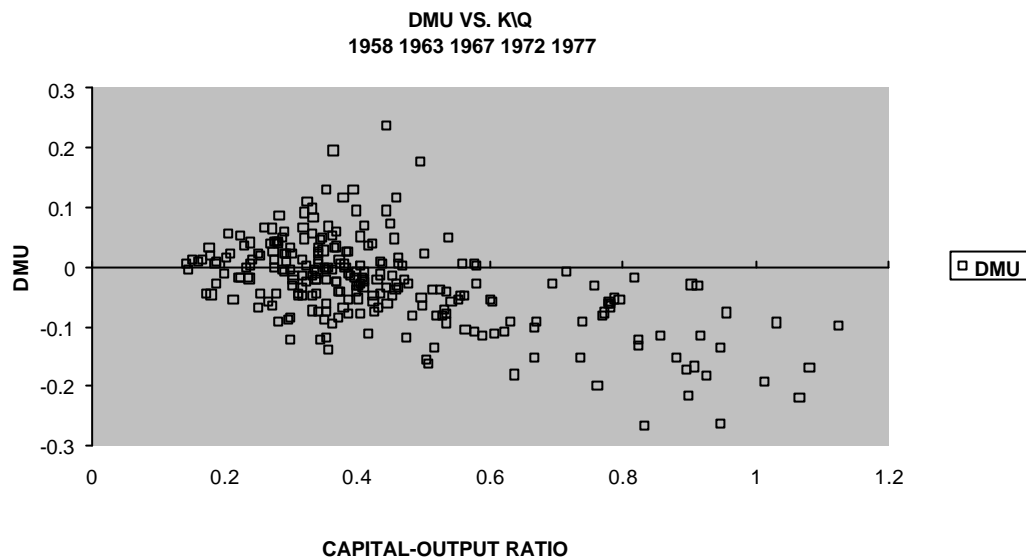


Figure 4: Differential Markups vs Capital Output Ratios Pooled Data 1958-1977

Last, but not least is the relation between the rate of profit and the capital-output ratio. A downward trend is clearly evident though with more dispersion for low values of the capital-output ratio (see Figure 5 below). The plots between variables for individual years yielded the same basic results as pooled data plots, which are merely a composite of all the individual years. Any result, which was evident for a number of individual years, would, except in a very rare case, also be evident for the plot of pooled data.

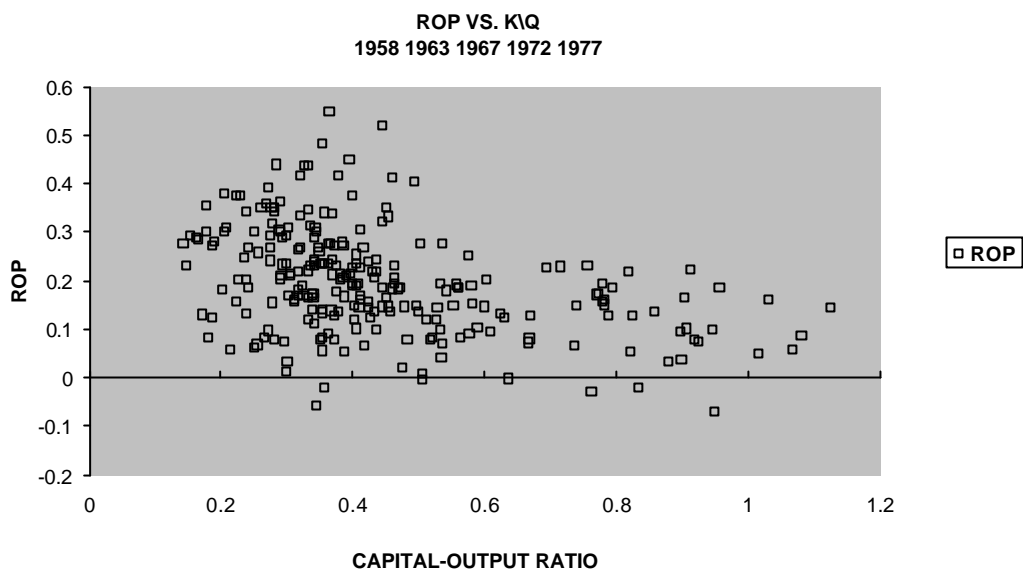


Figure 5: Rate of Profit vs. Capital Output Ratio 1958-1977

VII. Summary of Results and Conclusions

The main graphic results presented were profit rates and differential markups. The first and primary concern was whether industrial hierarchies remained the same, or to what extent they changed. In the case of sectoral profit rates, there were a total of 33 (64.7%), which crossed over the average. For differential markups, there were 36 industries (70.6%) that switched over the average during the twenty-year period.

The main conclusion which these results suggest is that even over just twenty years industrial hierarchies are not nearly as stable as the 'oligopoly/monopoly' theorists would have one believe. Much of the previous research considered in section 5, considered rather small time spans, often for just a year or two. Examining market structure and profitability over a longer period yields a rather different view. In fact, it is feasible that over an even longer period, say 35-40 years, the percentage of industries which would have profit rates or differential markups crossing over the average could be close to 80 or 90 percent.

The empirical data used for this analysis correspond to the most concrete level available and thus more concrete factors, such as political lobbying or other more concrete factors impact their values.²⁷ They are in fact much more concrete than the level of abstraction that correspond to Marx's discussion of the tendency of the equalization of profit rates. In this sense, the empirical results provide evidence, which suggest that competition between industries is still present in the modern U.S. economy. At the very

²⁷ For example, the pharmaceutical industry has one of the strongest lobbies in Washington and their rate of profit was the highest overall for the period considered in this research.

least they call into question those that claim competition to be absent from the present-day U.S. economy. Although several industries (15-18) exhibited non-competitive behavior, it should be kept in mind that this result is also dependent on the time span, which was available, in addition to more concrete factors.

The dominant hypothesis of empirical research on differential profit rates is that they are positively correlated with concentration. As pointed out above, the two main graphs²⁸ of profit rates vs. concentration (CR8) do not reveal a clear relationship. In Figure 3 there is a substantial scatter of points and by no means is a monotonically increasing relationship between profitability and concentration evident.

The second main relationship presented above was that between profitability and differential markups with the capital-output ratio. In both Figure 4 (differential markups) and Figure 5 (profit rates) there is a clear negative correlation with capital-output ratios. The scatter of points for the latter is very similar to that of differential markups, though with an even higher degree of scatter, particularly for lower capital-output ratios.

This result is in contradiction to that predicted or expected by several empirical researchers.²⁹ Although entry barriers are distinct from capital-output ratios, they are in general considered to be strongly correlated. The position of markup as well as oligopoly/monopoly theorists is that higher profitability and markups will be associated with higher levels of the capital-output ratio and entry barriers. Therefore, a negative correlation between market profit rates and differential markups with capital-output ratios is empirical evidence, which counters their claims or predictions.

As discussed above, as large entry barriers would limit entrants from certain industries to protect profits, the argument has been made that these entry barriers can turn into exit barriers. Over a period of time, as an industry has a slump or profitability decline, firms may try to get out, but already have substantial capital invested in the form of physical plant. The example of the steel industry in the US is a good example. Those industries with particularly high capital-output ratios often are more concentrated so that the average firm is larger than the economy-wide average. Such firms may have a better chance at weathering the storm and are less vulnerable to takeovers and bankruptcy compared to smaller firms. While smaller firms faced with similar circumstances may easily disappear, the larger firms in declining capital-intensive industries may last longer.

²⁸ See Figures 2 and 3.

²⁹ See Bain (1954), Mann (1966), Comanor and Wilson (1967), for example.

At this point, this is merely a hypothesis and should be verified by carrying out empirical research with individual firm and industry data.

The negative correlation between profitability and capital-output ratios may have the source of its explanation in the nature of the capital-stock data. As anyone working with input-output data knows, there are several sources of errors and questionable assumptions used. The case of capital stock (matrices aside) is known as always being a strong candidate for a potential source of error. There is some work being conducted on examining the effect of different algorithms and techniques used for estimating capital stock; however, such options are not available at present. Though it is critical to be aware of specific deficiencies, empirical research cannot be held in suspension until an 'immaculately clean' I-O database becomes available.³⁰

Implications for Theories of Competition

The main aim of this research has been to conduct an empirical analysis so as to assess to what extent competition is present in the modern U.S. economy and to draw out implications with respect to different theories of competition, theories of markup, and theories of oligopoly and monopoly. The plots of profit rates with almost two-thirds (64.7%) of industries having their profit rates shift from being above average to below average or vice versa between 1958 and 1977, is the strongest result in that it contrasts with the conception that industrial hierarchies are simply fixed and stable.

A second major result was the lack of a clear relationship between profit rates (or differential markups) with concentration, and the scatter of points strongly contrasts with what is assumed in both mainstream and marxist circles. All the points with high concentration and low profitability are enough to contradict the usual claim regarding the profitability of high concentration industries. This is direct proof against the theory of perfect competition and those arguing that a decrease in the number of firms clearly implies increased profitability.

In spite of concern regarding the sources of error in the capital-output ratio, the negative correlation evinced between it and profitability lends support to the exit barrier thesis. Nevertheless, this result calls into question the claim that capital-intensive industries, those with 'entry barriers', are always going to be those with higher profitability. This is not only a claim made by Bain and his followers³¹, but is also made

³⁰ For a discussion of possible sources of error in the different data used see the Appendices, Cooney, 1990.

³¹ See Section V above.

by markup theorists from Kalecki and Steindl to monopoly capitalism theorists, e.g., Baran and Sweezy.

The empirical results of this research can by no means be seen as free from error, nor do they provide an absolute proof of the superiority of Marx's concept of competition in contrast to theories of markup pricing and monopoly capitalism. However, these results lend credence to the claim that competition, as Marx conceived it, is still present in the U.S. economy.

A major limitation of this project is examining the competition between industries for only one national economy, when in fact, the determination of industrial profit rates and prices of production truly need to be empirically validated internationally. Such an immense project requires several collaborators, assuming that it is possible to pull all the necessary data together and make the sundry sources of data compatible. However, given such limitations, the attempt in this paper to provide an empirical assessment is arguably legitimate despite major limitations, as is often the case with empirical research.

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