

Glick, Mark; Ochoa, Eduardo M.

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Competing Micro Economic Theories
Of Industrial Profits:
An Empirical Approach

by

Mark Glick* and Eduardo M. Ochoa

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*The Jerome Levy Economics Institute Fellow

I. Introduction

Contrary to the impression given by most textbooks, microeconomics is not a homogeneous discipline. At least two major alternative theories exist which account for the long-run behavior of industrial prices and the allocation of resources between economic sectors in ways which are distinct from standard neoclassical explanations. Both Post Keynesian and Classical (Marxian/NeoRicardian) approaches to economics have developed a growing literature on microfoundations in recent years (see, e.g. Eichner, 1985; Dumenil & Levy, 1985).

The coexistence of three apparently incompatible theories is an anomaly for any scientific discipline. In the case of microeconomics this might be explained, in part, by an absence of an orthodox literature which submits their economic theory to comparisons with alternative approaches, thus lending credence to such alternatives (Eichner, 1985, p. 178). Moreover, orthodox theory has been remiss in applying the "correspondence test," i.e., the generation of empirically testable hypotheses, to its own predictions.

It has been argued that neoclassical economics has been more concerned with comprehensiveness and coherence than with realism (see, e.g., the arguments in Dumenil & Levy, 1986). Post-Keynesian and The New Classical microeconomics, since they are relatively new disciplines, have also largely focused on theoretical development at the expense of empirical testing. Another reason for the lack of efforts such as this one in the past may have been the lack of reliable data. Recent efforts by the Bureau of Economic Analysis have now produced consistent industry-level data on an establishment basis, including profit variables and assets at replacement-cost valuations. Earlier empirical studies were forced to construct rough

industry aggregates from small firm samples and to use book values of assets.

If economics is to advance as a social science, diverse accounts of contemporary economic phenomena should be subjected to comparative empirical testing. In this paper a first attempt is made to appraise empirically one aspect of these three competing microeconomic theories: their explanations of industry-level profit differentials.

Each theory provides a different explanation of the profit margin on sales. Since all three theories recognize that costs are included in output price, focusing on the determinants of the markup in effect provides a basis for testing the theories of unit price. However, as will be seen, our results do not provide a clear empirical differentiation. The alternative predictions are embedded in complex economic theories which are capable of developing alternative scenarios to explain the evidence presented below.

Nevertheless, this evidence can help direct future theoretical work into relevant directions. Further empirical work must begin to test the actual mechanisms posited by the theories and possibly even deeper aspects of each approach. We only skim the surface of such a research program in our second set of empirical results concerning investment. Hopefully, the real value of this research is that it will act as a base for further and deeper "correspondence tests" of these three competing theories.

The first section of this paper summarizes the theoretical background. The following section discusses the econometric methodology and data sources used. The last two sections present the empirical results and assess their relevance.

II. Competing Microeconomic Approaches to Industrial Profit

This section attempts to theoretically distinguish three competing microeconomic theories: The Neoclassical, the Post-Keynesian, and the Classical Theory. In doing so we will try to explain both what the theory establishes concerning industry-level profits in equilibrium and what variables are usually used to explain deviations from this hypothesized condition.

A. Neoclassical Theory of Profit

Neoclassical theory envisions the firm as the economic entity which hires the services of the various factors of production and combines them to supply goods for a market. The sole motive for this is the maximization of profits. In the presence of variable unit costs, this single condition suffices to determine the level of output and the composition of inputs used in its production. The profit maximization criterion means that the firm will continue to expand output as long as the marginal cost of producing one more unit is less than the marginal revenue obtained by its sale. Thus the mass of profits are being maximized, not profits relative to any other magnitude.

Profits in neoclassical theory (sometimes called economic profit) are defined--as in all other theories--as the excess of revenues over cost. Costs are here understood to include the returns to capital employed, i.e., interest. In this conception of the firm, capital is typically not seen as an asset owned by the firm on which returns must be maximized, but as a factor of production whose services are hired for a price called interest. Profits in excess of interest costs are thus not a return to any factor of production, but a form of rent which will accrue to the firm if it is able

to sell its output above its cost. This can occur only under two circumstances: disequilibrium or a noncompetitive market structure.

This raises the issue of the concept of competition and monopoly in neoclassical theory. Competition, according to neoclassical analysis, is a state rather than a process. The structure of the market (number of firms, their size and distribution) determines whether or not any individual firm has the ability to affect the market price by varying its own output levels. A competitive market in this view is one in which firms do not have this ability, whereas any markets in which firms are able to do this to some extent are considered noncompetitive markets.

[INSERT FIGURE 1 HERE]

In a competitive market, therefore, demand price will equal marginal revenue, so that equating marginal revenue to marginal cost in effect will equate price to marginal cost (figure 1). It is possible for competitive firms to make profits in the short run (i.e., when the market is in disequilibrium). This occurs when the market demand is strong enough relative to market supply that the market price is higher than the firm's minimum average cost. Under these conditions, as shown in figure 2, setting output so that marginal revenue (price) equals marginal cost will yield total revenues in excess total costs, i.e., profits.

[INSERT FIGURE 2 HERE]

In the long run, however, the existence of profits in any industry will attract new firms. The subsequent increase in supply will shift the market supply curve to the left (as shown in figure 3) and drive market prices down. This process will continue as long as there are any economic profits being realized. Eventually, the market price will be driven down to the point where it is equal to the firm's average total cost (as well as marginal cost). Profits in neoclassical theory are therefore assumed to disappear in competitive long-run equilibrium.

[INSERT FIGURE 3 HERE]

It is worth emphasizing in this context that the adjustment process in neoclassical equilibrium¹ is based on the pursuit of economic profit by firms, not on the pursuit of the highest rate of return on investment. This is so because the returns to capital are fully included as interest costs

¹At least in its Marshallian variants. In Walrasian general equilibrium, there is no adjustment process as such. Rather, the auctioneer insures that complete intertemporal equilibrium exists at every instant in all industries. The indispensable role of the auctioneer makes the apparently more general Walrasian theory an extremely special case (Dumenil & Levy 1985).

whether the firm owns the capital--in which case the interest is the opportunity cost--or the firm borrows it. There is therefore no particular reason to divide profits by any denominator. Specifically, there is no reason to divide profits by total assets, or by equity, or even by sales. This point is explicitly made by Long and Ravenscraft in their comment on Fisher & McGowan (Long & Ravenscraft 1984):

...if capital markets are competitive, the residual of revenues over all costs (including the normal return to capital) accrue to the entrepreneurship function, not to capital. It still makes sense to envision firms moving into areas where the returns are highest, but it makes no sense, from this perspective, to divide the profit residual by some measure of capital.

A noncompetitive market is, in contrast, characterized by firms which individually perceive demand curves which slope downward to some extent, either because the firm is a significant fraction of the entire market or because of product differentiation (figure 4). Therefore the firm's marginal revenue curve is distinct from, and lies below, the demand curve. Equating marginal revenue to marginal cost in this case means that marginal cost lies below price and the level of output is below the level which would have been produced by a competitive firm (hence the familiar welfare conclusions against noncompetitive market structures by neoclassical theory).

[INSERT FIGURE 4 HERE]

This understanding of competition and monopoly naturally led Lerner to develop his index of market power:

$$I = \frac{P - MC}{P}$$

This index gives a direct measure of the extent to which firms set their output levels below and prices above those which equate price to marginal cost. It ranges in value from 0 for competitive firms to 1 for pure monopolies with zero marginal cost.

Unfortunately, the Lerner index cannot discriminate between cases of imperfect competition and true oligopoly. As is well known, free entry in the former case means that price will be above marginal cost even though economic profits have been driven to zero by the influx of firms (although there will exist underutilization of resources). It thus becomes questionable to what extent a positive Lerner index can by itself be taken to mean a degree of monopoly power. This prompted Fisher to state in his reply to Long & Ranvenscraft's comment (Fisher 1984): "An industry with a high Lerner measure and low economic rate of return does not strike me as ripe for antitrust action."

Moreover, the Lerner index cannot be directly used when undertaking empirical studies of pricing and market structures, since data on marginal costs are not available. Using profit margins as a proxy for the Lerner index amounts to substituting average total cost for marginal cost in the formula above. This is usually justified by assuming long-run equilibrium

and constant returns to scale, which makes average cost equal to marginal cost.

Using the profit rate on assets as a proxy requires the further assumption that the capital-output ratio and the capital-to-other-assets ratio is uniform across firms, as we show below.

The rate of profit on assets R is given by

$$R = (P - AC)Q/A$$

where P is unit price of output, AC its average cost, Q is the output level, and A total assets. Then assuming $AC = MC$, we have the following expression for the Lerner index:

$$I = (P - AC)/P = R(A/k) (k/Q)/P = kR$$

where K is capital. Thus the proportionality factor k will be constant across industries whenever the above-mentioned conditions hold.

It follows that the only justification for the use of the profit margin by neoclassical theory is either as an approximation of the Lerner index assuming $MC = AC$ (i.e., when there are constant returns to scale), or as a way of normalizing economic rents for purely econometric reasons. There is, however, no theoretical justification for the use of the rate of profit as either a measure of resource allocation or of the degree of firm or industry monopoly.

The actual use of these measures in the applied literature raises serious problems. Profit margins as well as profit rates can well be positive in competitive markets whenever they are not in long-run equilibrium, even though the Lerner index (and their market power) is zero.

The mere existence of profit margins could therefore be either evidence of departures from long-run equilibrium or from competitive market structures.

All empirical studies of industry pricing have found significant profit margins (and profit rates) to be the norm for all industries, and ours is no exception. Short of attributing these to continual disequilibrium effects--a proposition inimical to the spirit of neoclassical theory--most observers and theorists have instead adopted an ex post facto theory of "normal profits" as the returns to the entrepreneurial factor of production. Theorists can subsume this return under costs and thus rescue their claim that (economic) profits are eliminated in long-run equilibrium. Applied researchers have subsequently concentrated on interindustry differentials as indicators of monopoly power rather than on absolute levels of profit (see e.g. Qualls, 1974). They did this on the assumption that a certain level of profit margin (or rate) in the firm or industry data was due to this entrepreneurial factor.

As pointed out above, however, there is no theoretical reason to suppose that the amount of entrepreneurial input per unit of output is uniform across industries. And yet this is what is assumed when one expects to find a uniform profit margin in competitive industries as a return to this factor (a similar argument can be made for profit rates). From a neoclassical standpoint, we would expect under competitive equilibrium conditions a random distribution of profit margins with a mean value which is not significantly different from zero and with individual deviations from this mean uncorrelated to any explanatory variables. Specifically, after interest costs are subtracted together with all other costs from the firm's

gross revenues, there should be no significant correlation with capital or total assets.

To the extent that noncompetitive conditions exist in some markets and the market power is in fact being exercised, there should in contrast be a correlation between variations in profit margins and some independent measure of departure from competitive market structure, such as concentration ratios. From a neoclassical point of view, then, we would expect the following relation to hold:

$$PR = \beta_0 + \beta_1(\text{conc. ratio}) + u$$

where PR is total profits net of interest costs but including "normal profit," β_0 is the mean profit level and u is a random term. We would expect $\beta_0 = 0$, and $\beta_1 > 0$.

In practice, no neoclassically-inspired studies have used total profits as a variable. This would be quite intractable econometrically, since industries vary in size by several orders of magnitude, leading to problems of heteroschedasticity. It also seems paradoxical in theoretical terms, since it implies that a firm would prefer to undertake a huge investment over a tiny one as long as it yielded a few dollars more of total economic profit. We will therefore also consider profit margins in the equations above, so that the following equation will be estimated:

$$PR/Q = \beta_0 + \beta_1(\text{conc. ratio}) + u$$

B. The Post-Keynesian View of Industrial Profits

Post-Keynesian economic theory is not yet a well defined, generally accepted body of results like the neoclassical theory explained above. It

has, nevertheless, attracted considerable attention, due to the fact that it attempts to build into the core of its theory a realistic analysis of the behavior of large industrial corporations in advanced market economies. While a number of economists who disagree on a number of issues have contributed to this project, an account of their common views can be presented.

Most Post-Keynesians generally divide the contemporary market economy into two sectors. The first sector consists of those industries which supply primary materials (i.e., agriculture, mining, forestry, and fisheries). This sector is characterized by a large number of producers and rigid supply in the short run. Output in this sector is largely resource-constrained; its markets clear by means of flexible, even volatile, prices. The second sector, which we will concern ourselves with below, consists of those industries which produce manufactured goods. This sector is characterized by large-scale enterprises, oligopolistic structures with price leadership, and capital-intensive methods.²

The focus of Post-Keynesian microeconomic analysis is the empirical behavior of the "megacorp" or large corporate organization which dominates the industrial sector of the economy (Kenyon, 1979; Eichner, 1985). The primary goal of the megacorp is to maximize sales growth. Sales growth is the means by which the firm opens advancement opportunities within the organization for the management hierarchy. Growth is maximized by maintaining a constant market share in industries growing at the same rate

² Here we are discussing only those Post Keynesian theories of Manufacturing prices which are empirically testable. Obviously, Post Keynesian Economics is broader than this summary suggests.

as the economy or better, while investment moves from slower-growing industries to higher-growth sectors.

However, this movement of resources does not necessarily imply a tendency toward an equalized rate of profit. The goal of the megacorp is growth maximization not necessarily profit-rate maximization. The megacorp, rather than conceived as a passive agent to market forces, is an active decision maker, setting the target rate of return, determining the capital budget, and making investment and pricing decisions. The pricing decision of the megacorp is the basis of the Post-Keynesian theory of industrial profit.

Specific Post-Keynesian models of pricing are difficult to specify on the basis of the published writing of this highly heterogeneous school. Alfred Eichner (1985) has provided a testable model of the determination of the mark-up, which determines the profit margin on sales. Eichner's theory of the mark-up is a long-run cross-sectional model. In the long run, the mark-up is determined by the dominant firm's requirements for additional funds for investment to satisfy industry growth, subject to the constraint of the implicit costs of obtaining these funds. These implicit costs to raising the mark-up are the loss of industry sales, entry of new capital, and the possibility of government retaliatory action. In addition, these costs must be less than the cost of borrowing. Eichner (1976) presents data which shows that between 75 and 90 percent of gross fixed capital expenditures in manufacturing is financed by retained earnings (quoted in Kenyon, 1979). This evidence indicates that, to a large extent, large corporations do have an important degree of discretionary power over the mark-up.

Abstracting from the implicit costs of raising the mark-up (which will be discussed later), the Post-Keynesian theory of the mark-up leads to an empirically testable model of industrial profit margins (where the profit margin is an empirical proxy of the average industrial mark-up). The mark-up will be equal to the growth rate of the industry multiplied by the incremental capital-output ratio. The incremental capital-output ratio determines how much new capital is necessary to satisfy any particular level of growth of output. This ratio is assumed to differ between industries. Thus, we have the following:³

$$PR/Q = \beta_0 + \beta_1(\text{growth}) + \beta_2(\text{incr. capital/output}) + u$$

If the Post-Keynesian view does explain industrial mark-ups cross-sectionally, then both the coefficients on industry growth and the incremental capital-output ratios should be positive and significant. Thus, $\beta_1, \beta_2 > 0$.

C. The Classical Analysis of Industrial Profit

The classical analysis of prices and industrial profit has been described by a number of authors (Eatwell, 1982; Dumenil & Levy, 1987; Flaschel & Semmler, 1984; Clifton, 1977). The modern classical microeconomics is based on the notion that quite another economic theory could have developed if the marginalist revolution had not detoured the profession away from the analysis which was being developed by Smith, Ricardo, and Marx. In fact, the effort is seen as an attempt to rescue economics from a fatal error made in the 1850's which allowed classical

³ We substitute an additive model as a proxy for the multiplicative model. We found that both models produce similar results.

economics to become largely discarded. The revival of classical economics, a joint effort by NeoRicardian and Marxian economists, has recently focused attention on the problem of microfoundations of aggregate economic magnitudes (Dumenil & Levy, 1987; Fleschel & Semmler, 1984).

The central idea of the classical analysis of price formation and industrial profit is competition. Competition is not here taken to be a highly idealized state as is in neoclassical economics, but as a realistic process of rivalry which can include firm behavior which might be considered imperfect competition by Neoclassical or Post-Keynesian economics. Product differentiation, advertising and other non-price forms of competition are certainly compatible with classical competition.

Like the Post-Keynesian analysis, the focus of classical microeconomics is a realistic analysis of the firm. However, the classicals view the firm as operating in the interest of the capitalist owner, not in the interest of management. Managers are only agents of the capitalist. The capitalist seeks to maximize the rate of return on his/her invested capital which is, for all intents and purposes, owned by him or her. In current Classical thinking, corporate control by managers or control by stock holders is more ideology than reality.

In addition, the capitalist firm does not have discretionary power over pricing decisions. Like the neoclassicals, but unlike the Post-Keynesians, the classicals put more emphasis on market mechanisms. However, the market mechanism, or "invisible hand," is supposed to work slowly and imprecisely, constantly disrupted by external perturbation and by individual rivalrous actions by firms. The long-run result of the combination of profit-rate maximizing firms and the rough mechanisms of the market will be a tendency

for the rate of profit to be equalized across industries. Constant internal and external perturbations make this a process of "gravitation," such that an equalized rate of profit is never achieved. Rather, actual rates of profit are held within the vicinity of the average rate, and will be equal to it only as long-run averages.

The classicals were rather loose in their description of which actual rate should be equalized. Presumably, the rate of return on total assets is an ex-post proxy for what firms actually attempt to equalize: the expected rate of return on investment. This measure (sometimes called the "economic" rate of return) is the discounted value of the stream of future returns from a particular investment. However, as Eichner (1987) notes, this aggregate is probably unknown to any actual firm. Fisher and McGowan (1984) have argued that, nevertheless, attention can only be focused on this ratio. They further argue that the actual economic rate of return and the average return on total assets will differ because the latter might not accurately relate returns to investment. Our study considers the rate of return on average replacement-cost capital, which is used as a proxy for the "economic" rate of return under the assumption that the shapes of the various time paths of the future profits of firms will average out for large industry aggregates.

The classical economists also have not carefully distinguished between return on **equity** and return on total capital. In Volume II of *Capital*, for example, **Marx** defined total capital as the sum of "productive capital" (fixed capital), "money capital" (financial assets) and "commodity capital" (inventories). The sum of total capital is thus total assets which includes both the firm's net worth or equity and their borrowed capital. However,

this discussion by Marx preceeds his analysis of the division of profit into interest and profit of enterprise. In Volume III of Capital, Marx discusses this division between return on equity and return on total capital. He seems to argue that the average rate of profit which is the result of maximizing efforts by firms is the return on total assets (Marx, 1967, p. 379):

assuming the average profit to be given, the rate of the profit of enterprise is not determined by wages, but by the rate of interest. It is high or low in inverse proportion to it.

In my view, the actual object of equalization for Classical theory should more accurately be return on equity, net of interest costs of total capital.⁴ This view implies that the true capital of the firm is its net worth whether the corporation is public or not, while the value of borrowed assets can not be considered to be owned by the firm. This view also implies that firms can increase their return on equity at the expense of a rising debt-equity ratio. However, rising debt also carries implicit costs to the firm in the form of greater instability (e.g., greater vulnerability to deflation). Our empirical study employs profit on fixed capital and inventories because of data limitations. Thus implicitly assuming constant cross-sectional debt-equity ratios.

As I show below, even the assumption of an implicit interest (following Marx's suggestion) applied to equity does not eliminate the need to assume equal cross-sectional debt-equity ratios:

⁴This should be so regardless of whether the capital is owned or borrowed by the firm. If borrowed, interest is an explicit cost; if owned, the imputed interest represents the opportunity cost to the firm of using its own capital rather than lending it out at the market rate of interest.

$$\frac{PR_{net}}{E} = \frac{PR_{net}}{K} * \frac{K}{E} = \frac{PR_{net}}{K} * (1 + L/E)$$

where PR_{net} is profit net of interest and K is total assets, which is equal to loans plus equity ($L + E$). Only if the debt-equity ratio is constant across industries will net profit on equity be proportional to net profit on assets.

The classical competitive process which equalizes profit rates as defined above involves a double mechanism, or "crossover dynamic". This double mechanism pushes industry profit rates toward equality only in the long run. On the one hand, firms invest in those industries with high rates of profit and expand demand in those industries. Augmented supplies meet demand constraints which force down prices and profits. The same process also works in reverse as capital exits low profit sectors. Thus, prices for the classics are not set by firm decisions, but respond to the disequilibrium of the market.

Empirically, perfect adjustment is not expected to actually occur. Only long-run average profit rates should be equalized if this process is actually working. In addition, only interindustry rates of profit are expected to equalize (as opposed to intraindustry profit rates), since within industries different cost structures can lead to differential firm rates of return, even though the industry averages are equal throughout the economy. Thus, the classicals posit a type of "quasi-equilibrium" (Dumenil & Levy, 1987) which allows for unequal firm rates of return coexisting with industry equality, while the neoclassicals assume a "full" equilibrium, described above.

In this model, the classical equation which explains industrial profit margins should include only the capital-output ratio and the share of imports in domestic sales. Equalized rates of profit imply that profit margins must be adjusted in each industry according to the respective capital-output ratios so that each margin yields an equalized rate of profit.

In addition, classical economists are concerned about international competition which they see as an important aspect of the overall competitive process. Although barriers to entry can exist domestically, these barriers, it is argued, cannot prevent entry from foreign competitors. In the presence of a world market for, say, steel, working with data which includes only domestic firms may well bias the calculated rate of profit. This is so because in an industry characterized by varying rates of profit among firms, the domestic sector of this world market may well represent the high-cost (low-profit-rate) segment. For this reason we include a foreign competition variable proxied by the share of imports in total domestic sales of each industry (for a discussion of this variable, see Turner, 1980).

Thus, our model is specified as follows:

$$PR/Q = \beta_0 + \beta_1(\text{Capital/Output Ratio}) + \beta_2(\text{import share}) + u$$

The expectation is that if classical competition is working, there should be a significant positive coefficient for the capital-output ratio but a significant negative coefficient for the import share. No other variables should be significant.

D. A Summary of Differences

The above specific discussion of the differing empirical expectations of Neoclassical, Post-Keynesian, and Classical economics reveals three distinct philosophical outlooks underlying these expectations. One might call these differing outlooks the "institutional foundations" of each conception which ground the more concrete hypotheses which we are testing empirically. It is interesting to point out how these differences actually color the empirical expectations of each approach.

The neoclassical economist sees capitalism as a system in which rational individuals maximize their utility, with an invisible hand which reconciles differences into a situation of total maximum utility. The firm, in neoclassical economics, is really a black box, through which the owners maximize utility in a situation completely circumscribed by market forces (in competition the firm's sole strategic variable is the level of output). In such a setting, it does not make sense to maximize returns on advanced capital. Instead, what is desired is income over and above the interest which must be paid for the use of money either in the form of borrowed funds or equities. Equity is merely another form of borrowed capital even if borrowed from one's self. Thus, one finds neoclassical economists uncomfortable by the notion of a rate of return on total capital and more at home with a conception of rent-seeking individuals.

The Post-Keynesian conception of capitalism is more realistic. They try to build on the concrete knowledge that we actually have concerning firm behavior. Studies of firms as organizations reveal an active management structure which makes decisions concerning a wide range of target variables. Often the focus of attention of management can change, since the future is

so uncertain that knowing which strategic variable to manipulate can be a difficult decision (see, e.g., Porter, 1976).

Fundamentally, Post-Keynesians hypothesize that firms are organizations which are run in the interest of its managers. There is no capitalist, per se, in the "megacorp", only a management staff which acts in its own interest. The primary goal of management is not actually profit maximization. Management does not own the capital upon which it desires a rate of return. Managers receive salaries, and the best way to raise salaries is to maximize growth, even at the expense of the rate of return. Higher growth leads to greater internal opportunities for advancement which leads to higher managerial income. Thus, the mark-up is a strategic decision variable, and it is set to maintain or expand the rate of growth of the organization. In such a conception, market forces play a minimal role. It is the decisions by firms which are the primary explanatory variables of economic performance.

Rather than focusing on individuals maximizing utility, the Classics (both NeoRicardians and Marxist) view the economy as made up of two distinct types of individuals, those that own productive resources (capitalists) and those that work for capital (workers). For the Classics, the firm is an organization which is owned by a capitalist. "Real ownership" as opposed to "legal" ownership involves control of key decisions about the operations of the enterprise. Thus, the plant and equipment of the firm are considered to be under the control of a capitalist who is interested in obtaining the maximum possible rate of return on the total investment.

The classics recognize the phenomenon emphasized by the Post-Keynesians, that key decisions are made by management teams, yet they

understand this fact differently. For the classicals, the capitalist need not be embodied in a single individual. Instead, capital is a social relationship which can be parcelled out over many individuals. Managers are the embodiment of capital since they collectively perform the functions which were once centralized in a single individual in an earlier stage of development. For the Classicals, this hypothesis implies two differences with Post-Keynesians. First, as capitalists who "own" productive resources, the primary objective of the firm will be to maximize a return on investment or a rate of profit, not economic rent or sales growth. Second, market forces are seen as more powerful than the individual decisions of firms. In this sense Classicals believe in the invisible hand in the original sense of Smith. Competition is a process in which market forces move the economy toward a target, rather than a static arrangement which reconciles optimization plans (an auctioneer).

Thus, behind competing conceptions of industrial profit by Neoclassicals, Post-Keynesians, and Classicals lies a deeper set of institutional differences. Certainly these differences cannot be resolved by one empirical test. But it is our hope that empirical work on concrete aspects of each theory can eventually lead to an ongoing productive dialogue among these alternative schools.

III. Methodology Employed in this Study

Below we will consider the estimation of the three competing equations over two sets of data: A 4-digit set of 350 industries for the year 1977, and a set of panel data consisting of 20 2-digit industries for the years 1960-1980. A smaller 13 industry set of data which included capacity

utilization was also considered; those results are reported in Appendix A.⁵ In both estimations we considered only manufacturing industries. The estimation techniques used were the following:

1. For the four digit industry sample, simple OLS cross-sectional regressions were employed.
2. For the 2-digit panel data set we estimated the relations discussed above by pooling cross-sectional data over the period 1960-1980, and performing ordinary least squares with dummy variables (LSDV) regressions.

Usually, LSDV regressions assume constant coefficients and intercepts which vary over individuals (Maddala, 1977, p. 322). However, in our study we wanted to incorporate into our model the fact that profitability varies over the business cycle for all industries. Thus we used dummies to model time-varying (rather than cross-sectionally varying) intercepts. We included an intercept term for year 1 and 20 dummies for the remaining years respectively. Each dummy variable took the value 1 for their assigned year, and zero otherwise. Thus the intercept for any given year is given by the sum of the intercept term and the coefficient of the appropriate dummy variable.

Diagnostic F-tests failed to reject the null hypothesis that an unrestricted model in which slopes and intercepts change over time has no additional explanatory power than a model with constant slope coefficients. Thus the pooling method used is legitimate for this data set. We also

⁵It should be noted that deviation from trend capacity utilization is positively and significantly related over time with profit margins on an industry basis. This relationship over time also holds for actual levels of capacity utilization and industry profit rates. Results are reported in Glick (1985).

estimated our models over two subperiods: 1960-1970 and 1970-1980. Even though a Chow test indicated that there was no overall significant change in the coefficients over these two periods at the 95 % confidence level, the differences were nevertheless deemed to be "practically significant", given prior knowledge of such a structural break (Ehrbar and Glick, 1986).

Although the 4-digit sample better approximated economically meaningful industries, we turned to 2-digit data because it allows a better approximation of long-run trends and of the theoretical variables posited by each theory. For example, trend rates of growth can be calculated, assets can be valued on a replacement cost basis, and taxes and interest can be deducted from profit. In addition, data can be obtained on a pure establishment basis.

IV. Data Sources

A unique aspect of this project is the data set developed for the regression analysis. In the past, pricing models which considered industry relationships have been forced to rely on industry data built from small samples of firms allocated to industries by major product. Our study derives profit data from "GNP in 15 Components" on magnetic tape (Bureau of Economic Analysis) and Capital Stock and Investment data on a replacement cost basis from "Wealth Tape" (Bureau of Economic Analysis) also on a establishment basis. Imports, and Shipments on an establishment basis comes from the Bureau of Labor Statistics⁶, and Concentration Ratios from the "Micro Data Tape" (O.E.C.D.).

Our variables are constructed in the following way:

⁶This data was obtained courtesy of Sara Bernstein of the New York Cooperative Council.

PR = profit = GNP - (wages + salaries + indirect taxes + noncorporate wage equivalent). Depreciation and net interest are removed when specified.

Q = Output = current value of industry shipments

KOR = stock of capital per unit of output at replacement cost

BVKOR = stock of capital at historical book-value

IKOR = incremental capital-Output ratio = change in investment/change in output

GRSH = growth rate of constant-dollar shipments

PI = Price Index = ratio of current- to constant-dollar shipments

CR = 2-digit concentration ratios (weighted averages of 4-digit ratios)

CUDEV = deviations of 2-digit capacity utilization from trend

CRALT = Alternative concentration ratios (percent of output produced by 4-digit industries with concentration ratios above 60% in 1966).

IMSH = Import share = Imports / (Imports + Shipments)

PR/Q = Profit margin or mark-up

I/K = Current-dollar investment / (Current-dollar replacement-cost capital stock)

Following a suggestion by Eichner⁷, we constructed GRSH by estimating the following relation for each industry using ordinary least squares:

$$SH_t = SH_0(1 + g)^t u'$$

where SH is constant-dollar shipments, g is the annually-compounded growth rate, and u' is a multiplicative error term. Then taking the natural logarithm of both sides we obtain:

⁷This was made by verbal communication to the authors.

$$\ln(SH_t) = \ln(SH_0) + [\ln(1 + g)]t + u$$

where $u = \ln(u')$. The OLS estimations for this equation were run for each industry over the respective periods, and the variable GRSH took on this same value for all the time-series observations of each industry.⁸

V. Results and Discussion: Part 1

In this section we consider the results of the three alternative equations. Alternative variables and alternative specifications are considered in Appendix A. The results of the four-digit estimation are presented in Table 1:

⁸For example, if SIC industry 20 had an estimated growth rate of 2.3 % during the period 1960-1980, then GRSH for SIC 20 was set to 2.3 for all twenty annual observations of this industry.

Table 1
Four Digit Regression Results
U.S. Manufacturing, 1977

(t-Scores in parentheses)
 (Dependent Variable = PR/Q)

Equations	(1)	(2)
Constant	.2369 (20.4)	.2308 (19.8)
GRSH (1969-1977)		.2190 (3.00)
IKOR		.00076 (0.22)
KOR	.0213 (2.18)	
CR	.0008 (3.61)	.00067 (3.16)
IMSH	-.0253 (-1.41)	-.0195 (-1.09)
R ²	.065	.0900
Adj. R ²	.0795	.0786
S.E.E.	.0062	.0062
D.W.	1.26	1.27

At the four digit level of aggregation it is impossible to separate net interest from profit. Profit can only be defined as gross value added minus payroll. This means that the neoclassical equation cannot be estimated. Instead we compare the Post-Keynesian expectations with those of the classicals, and include concentration ratios and import share in both equations.

In the classical equation KOR (total fixed assets / output) is positive and significant, while the concentration ratio is strongly related to the

profit-margin differentials. This is a stronger relationship for concentration than usually found in the literature (Bain, 1951; Mann, 1966; Stigler, 1963). The Post-Keynesian equation also displays a strongly significant t-score for concentration, while growth rate is also significantly related to profit margin as predicted. However, the incremental capital-output ratio is not at all significant. Both equations have low R^2 's.

Although the four-digit estimations better approximate an economically meaningful definition of industries, in our opinion the limitations of this approach outweigh this advantage. Industries are not constructed on an establishment basis, only a single year is considered, and the variables cannot be finely constructed. The latter two considerations are especially important. We are testing three long-run theories of industrial profits which require capturing the behavior of economic variables over a period of time. A single year cross-sectional regression mainly captures the effects of disequilibrium (Brozen, 1970; Ehrbar/Glick, 1986). In addition, the inclusion of indirect taxes in the profit numerator, the lack of a replacement cost measure of capital, and the inability to include inventories in the measure of capital further limits the usefulness of the four-digit data. Earlier studies have shown that these differences in variable definitions can have significant impact on econometric results (Glick, 1985).

Table 2 presents our pooled regression results for the three equations based on the 2-digit panel data series described above. Panel data allows for tests of long-run relationships cross-sectionally. In effect, we obtained multiple multivariate observations for a set of individuals (the 2-

digit industries) over time, which allows us to see past the large noise component present in a given year and obtain improved coefficient estimates with lower standard errors. By restricting our industries to a 2-digit SIC basis, we were able to obtain a finer definition of our variables on a consistent establishment basis. The results are displayed below:

Table 2
Two Digit Pooled Regression Results
U.S. Manufacturing, 1960-1980, 1960-1970, 1970-1980

(T-Scores in Parentheses)
(Dependent Variable = PR/Q)

Equations	(1a)	(1b)	(1c)	(2a)	(2b)	(2c)	(3a)	(3b)	(3c)
Const.	0.0948 (45.8)	0.1017 (36.3)	0.0870 (30.6)	*	*	*	*	*	*
KOR				0.0878 (5.08)	0.0976 (4.20)	0.0683 (2.72)			
CR	0.083 (6.27)	0.085 (4.69)	0.085 (4.68)	0.059 (4.44)	0.054 (2.8)	0.067 (3.77)	0.106 (8.63)	0.119 (7.02)	0.1038 (6.09)
IMSH				-0.164 (-3.35)	-0.104 (-1.20)	-0.202 (-3.51)	-0.033 (-.67)	0.088 (1.08)	-0.159 (-2.66)
GRSH							0.188 (1.70)	0.304 (2.29)	-0.317 (-2.25)
IKOR							0.0598 (9.28)	0.0684 (8.14)	0.0466 (5.04)
R ²	0.086	0.092	0.091	0.225	0.189	0.224	0.324	0.345	0.305
Adj.R ²	0.084	0.088	0.087	0.180	0.138	0.175	0.283	0.300	0.258
S.E.E.	0.0424	0.0416	0.0422	0.0402	0.0404	0.0401	0.0376	0.0364	0.038
D.W.	2.17	2.27	2.17	2.20	2.15	2.27	2.25	2.27	2.36

Each of the three equations defined above are estimated in table 2 over three sample periods. Equations 1a, 1b, and 1c, estimate the Neoclassical equation for the subperiods 1960-1980,

1960-1970, and 1970-1980 respectively. Equations 2a, 2b, and 2c present results for the Classical equation over the same three subperiods, and equations 3a, 3b, and 3c are estimation results for the Post-Keynesian equation for the three sample periods.

For the Neoclassical estimation net interest was removed from profit, since it represents a cost in Neoclassical theory and not a return.⁹ In addition, two other changes were made. First, no dummy variables were used in the regression equation; second, the independent variable--concentration ratios--was expressed in deviation form. These last two changes were necessary in order to force the intercept term to equal the mean level of profit margins for the entire sample.¹⁰

Casual inspection of the results of table 2 yields a remarkable fact about all of these models: they only account for a small fraction of the observed variation in profit margins, as evidenced by their R^2 's. Even if some of this could be attributed to excluded variables (which the models do not specify, however) the conclusion is inescapable: the disequilibrium effects are a large, perhaps even the larger, part of the story. This is a result which does not lend comfort to any of the economic theories considered here.

⁹This adjustment made no measurable difference to the values of PR/Q, however.

¹⁰It should be noted that the profit term for equations 1a, 1b, and 1c, still contain depreciation. However, this inclusion can only account for a fraction of the observed profit. For manufacturing as a whole depreciation represents approximately 30% of net profit.

Turning to the first set of three equations, we see that substantial profits (defined as profit margins) are clearly the norm for U.S. manufacturing industries, ranging from 8% of sales in the 1970's to about 10% in the 1960's. In addition, the effect of concentration ratio on profit margins is highly significant, although the percentage of total variation explained by this variable is quite small.¹¹ The Neoclassical equation thus does little more than measure the size of the profit margin, so it predictably produces a relatively low R^2 of .086.

The Classical equations 2a, 2b, and 2c explain profit margins by the industry capital-output ratios and the import share. If resources in a capitalist economy are distributed so that an equalized rate of profit between industries emerges, then each industry's profit margin should be adjusted according to the size of the capital-output ratio to yield this equalized return on capital. In addition, classicals stress the importance of international competition. The import share of sectoral domestic sales is used to capture this phenomenon.

All three classical equations (2a, 2b, and 2c) find a highly significant positive relationship between the capital-output ratio and the profit margin, lending support to the classical contention. This relationship is strongest for the entire period, and deteriorates a bit for the subperiod of the

¹¹Our strong results concerning the impact of concentration ratios on profit margins compared to previous literature is most probably the result of the larger number of observations in our sample due to pooling.

seventies. Likewise, the import share produces the appropriate negative coefficient and is also highly significant. As the Classicalists would expect, the relationship of the profit margin and import share is stronger in the 1970's than in the 1960's. For the latter subperiod, the import share is not statistically significant. Concentration, as in the Neoclassical equations, maintains its significant impact on profit margins, with a slightly weaker relationship for the 1960's.

The higher adjusted- R^2 for the classical equations--along with the significant t-statistic for the capital-output ratio--seems to indicate that the classical theory does a better job empirically in explaining how firms actually allocate resources, as well as how the market forms prices. The classical equations appear to show that firms are maximizing the rate of profit on total capital, rather than simply seeking out economic rents as posited by neoclassicals.

The Post-Keynesian theory is represented by equations 3a, 3b, and 3c. For the 20-year sample, the Post-Keynesian theory obtains mixed results. The t-statistic for the long-run growth trend is positive, but not significant at the .05 level. The incremental capital-output ratio, however, is highly significant. Overall, the adjusted R^2 is superior to that produced by the Neoclassical or the Classical equations.

The subsample regressions reveal the reason for the weak relationship between the growth trend and the mark-up or profit margin. In the 1960s, there is a significant positive relation-

ship between the growth trend and the mark-up. Coupled with the significant relationship with the incremental capital-output ratio, this seems to garner support for the Post-Keynesian scenario for the 1960's. The results of equation 3b can be interpreted to mean that profit margins were determined in such a way as to obtain the necessary funds to satisfy the long-run rate of growth. The positive relationship between concentration and the markup is also expected since the manufacturing sector is considered to be dominated by oligopoly.

The interesting result for the Post-Keynesian examination comes in the subperiod 1970-1980. During this period, the expected sign for the growth rate is not obtained. Instead, we find a negative and significant relationship between the rate of growth and the profit margin. Industries with higher profit margins displayed slower rates of growth for this period, the opposite of what Post-Keynesian theory posits. In addition, the import share is again highly negative and significant for this period. This result is an anomaly for the Post-Keynesian microeconomic theory and might indicate that its empirical relevance is restricted to certain periods rather than others.

There are a number of minor puzzles in the varying levels of significance of the coefficients in the three alternative models. In some cases, these can be better understood by referring to the calculated correlation coefficients between the various independent variables. Inspection of the t-statistics of the concentration-ratio coefficients reveals that this variable is

more significant for the Neoclassical and Post-Keynesian models than for the Classical. This can be understood as the effect of excluding the variable KOR (capital-output ratio) from these models, since the correlation between KOR and CR for the twenty-year period is 0.290. Thus the variable CR gains some explanatory power when KOR is so excluded.

Likewise, the remarkable level of significance for IKOR in the Post-Keynesian model is in part due to its twenty-year negative correlation with IMSH: -0.280. This also helps explain why IMSH became insignificant in the Post-Keynesian model during this period even though it was highly significant in the Classical model.

The results of table 2 begin to reveal important information about the actual process of competition thereby giving us direction in comparing competing analytic traditions in microeconomics. However, as discussed earlier, each of three theoretical tendencies being tested are part of a larger integrated theory capable of accomodating a large range of empirical observations.

The Neoclassical theory would have no trouble in arguing that the significance of the capital-output ratio results because it is a measure of a barrier to entry for firms seeking economic rents. The growth rate can be seen as a measure of disequilibrium in the market (although a long-run disequilibrium is inimical to the spirit of Neoclassical economics), and the import

share can have a strong impact on market structure (see, e.g., Shepherd, 1982).

The Classical theory can justifiably argue that the rate of growth is only significant because it captures long-run disequilibrium in the process which equalizes the rate of profit across sectors. The superior performance of the incremental capital-output ratio might be difficult to account for, although an argument might be made that it better represents the capital-intensity of industries than does the average capital-output ratio. During the 1960s, industries with high profit rates also had high rates of growth. During the 1970s, high-rate-of-profit industries were particularly hurt by imports and their growth rate declined, even though they absolutely still had higher rates of profit. This explains why in the 1970s growth is negatively related to profit margin while the incremental capital-output ratio remained positively related.¹²

Finally, the Post-Keynesians can certainly deal with the troublesome results for the 1970's in the following way. The rising import share in the 1970's indicated that the implicit costs of raising the mark-up to obtain the necessary funds for investment had increased since the 1960's. As a result, firms no longer could rely on retained earnings for investment as in the past. Instead firms in industries with higher growth rates had

¹²A similar process was described for the 1920's by Epstein (1934).

to rely on capital markets and rising debt-equity ratios in order to maintain market shares in these industries.

The three plausible alternative scenarios for our results illustrate the fact that the "correspondence test" described earlier cannot be a single decisive event, but must actually be a process which penetrates to successively deeper levels of theory. Like an onion, theoretical systems are multi-layered, with the most fundamental propositions deep within them (Quine 1961). We have only brought empirical evidence to bear on the outside layers. Below we attempt to move in one layer deeper.

VI. Results and Discussion: Part 2

In this section we examine the expectations of each of the three theories concerning resource allocation through the investment function in order to help us interpret the results presented above. Behind each of the above scenarios concerning the determination of industrial profits is a conception of the way in which a capitalist economy allocates resources among industries.

The comparison of the competitive process of dynamic resource allocation is problematic for Neoclassical theory. In general, competition is described as a state rather than a process, and the actual dynamics of microeconomic adjustment have always been emphasized less than the analysis of the equilibrium state itself. In the case of Walrasian general equilibrium this is carried to extremes. In the Walrasian model disequilibrium is

ruled out by definition: adjustment takes place through the agency of an auctioneer. In the Marshallian models which are generally used by industrial economists, however, there is no such *deus ex machina*. Firms are theorized to direct investment to industries which offer the highest economic rent. Thus, for Neoclassical theory, we model investment as a function of net profit (normalized by output).

Classical microeconomics, as described above, emphasizes the fact that firms seek to maximize the rate of return on capital. Investment will be directed to those sectors with rates of profit higher than average and away from those with below-average profit rates. Thus, the Classical investment function makes flows of investment a function of the rate of profit.¹³

Finally, the Post-Keynesian theory views investment as a function of growth. The mark-up which was studied above, for Post-Keynesian theory, is conceived as a method to obtain the necessary funds for investment. For the Post-Keynesians, we therefore model investment as a function of the long-run industry growth trend, approximated by the variable GRSH.

Table 3 presents the empirical results for the three alternative investment functions:

¹³ The classical investment function actually makes investment a function of capacity utilization and the rate of profit. For a more detailed account, see Dumenil & Levy (1987).

Table 3
Investment Functions
(Dependent variable = I/K)

Equations	(1a)	(1b)	(1c)	(2a)	(2b)	(2c)	(3a)	(3b)	(3c)	(4a)	(4b)	(4c)
Const.	*	*	*	*	*	*	*	*	*	*	*	*
I/YK	0.343 (9.6)	0.36 (7.85)	0.319 (6.07)							0.343 (9.73)	0.357 (7.79)	0.332 (6.39)
I _{net} /Q				0.413 (4.37)	0.393 (3.09)	0.410 (3.07)						
GRH							0.0052 (2.10)	0.004 (1.34)	0.006 (1.85)	0.0052 (2.34)	0.0029 (1.09)	0.0078 (2.63)
R ²	0.212	0.261	0.159	0.071	0.084	0.053	0.037	0.050	0.026	0.223	0.265	0.186
Adj.R ²	-	-	-	-	-	-	-	-	-	0.179	0.223	0.139
SEE	0.077	0.073	0.081	0.083	0.081	0.086	0.085	0.082	0.087	0.076	0.073	0.079
D.W.	1.72	1.71	1.73	1.93	1.74	1.90	1.87	1.87	1.85	1.77	1.75	1.75

Table 3 estimates the investment functions for the same three subperiods as in table 2. Equations 1a, 1b, and 1c estimate the Classical investment function for the periods 1960-1980, 1960-1970 and 1970-1980. Equations 2a, 2b, and 2c, estimate the Neoclassical investment function, and equations 3a, 3b, and 3c, display the results for the Post Keynesian investment functions for the same subperiods respectively. Equation 4a, 4b, and 4c combine the Post Keynesian and Classical equations.¹⁴

Since the first three equations each predict investment on the basis of one independent variable, the unadjusted R²'s are a valid measure of their comparative explanatory power. The rate

¹⁴ Net Profit could not be added to this equation because of high multicollinearity with the profit rate variable.

of profit displays the strongest explanatory power concerning investment, lending support to the Classical scenario of our earlier results. The coefficient for the rate of profit is both positive and highly significant in each subperiod. The profit margin is also significantly related to investment but not to the degree that the rate of profit is.

Finally, the growth trend makes a poor showing. It is weakly significant for the entire period and insignificant for both subperiods. This is an intriguing result. The most likely reason for this is that over a 20-year period, sales and capital stock must be rising at approximately the same rate, since the capital-output ratio changes slowly, if at all. On the other hand, over shorter periods, the fluctuations in sales due to business cycles will tend to disrupt this link with the growth of capital.¹⁵

VII. Summary and Conclusions

This study has been motivated by the conviction that competing theoretical traditions in economics should be taken seriously by the profession. Once the logical coherence of these theories has been established, conflicting theoretical

¹⁵ This result is in stark contrast to studies which show that year-by-year changes in the rate of growth of sales are related to investment (Stigler, 1963). The growth rate that has been suggested by Eichner and which is used here assumes that the expected future growth rate is adequately estimated by a contemporaneous longrun trend. Another possibility for future research might be to try backward moving averages or an exponentially smoothed forecast of sales as perhaps better proxies for expected future growth of sales.

differences must be settled by empirical test. We have considered the case of the Neoclassical, Classical, and Post-Keynesian microeconomic theories. A careful reading of each theory reveals a coherent, self-contained discourse. Therefore, we have attempted to submit the competing tenets of each view to empirical test. At a first level, we attempted to test the three competing explanations of industrial profits. We found that the Classical and Post-Keynesian theories both fared well. The Post-Keynesian theory, however, was faced with the anomaly that its approach seemed to accurately describe the 1960's, but did not fit with the facts of the 1970's. Nevertheless, we argued that empirical comparisons are not a simple matter. Advocates of each approach appeared to be capable of explaining the full set of theoretical results within their own paradigm.

The fact that regression results such as ours do not clearly differentiate complex theoretical traditions shows that a naive empiricism is not warranted. On the other hand, this need not imply a relativistic Kuhnian conclusion about incommensurable paradigms. Instead, we have argued that the "correspondence test" must be carried out for successively deeper levels of theory. We have tried to move one level deeper, by empirically investigating the predictions of the three theories concerning their dynamic predictions for resource allocation. We did this by estimating three competing investment functions. Our results appeared to imply a clear superiority of the Classical approach. This result contrasts with earlier work on investment which

considered short-run rates of growth of sales rather than long-run growth trends. This might indicate that a better Post-Keynesian specification of its theory is necessary.

Unfortunately, we cannot offer comfort to any clear theoretical victor, nor solace to those whose efforts have been less successful. Instead, a dialogue between competing approaches in economics. But as an important part of this dialogue we would ask that the ground rules emphasize a commitment to generating testable propositions and a willingness to subject them to comparative empirical examination.

Appendix A Alternative Variables

This appendix presents empirical results concerning the determination of industrial profits using a number of alternative variables. The variables are defined in the data section. Table 4 presents these results:

Table 4
Alternative Model Specifications

Exps.	(1a)	(1b)	(1c)	(2a)	(2b)	(2c)	(3a)	(3b)	(3c)	(4a)	(4b)	(4c)
Const.	*	*	*	*	*	*	*	*	*	*	*	*
KCR												
CR	0.079 (5.90)	0.086 (4.43)	0.077 (4.29)				0.11657 (9.49)	0.1250 (7.529)	0.1190 (6.85)	0.05685 (3.894)	0.0951 (3.88)	0.0786 (3.66)
IMH	-0.197 (-3.95)	-0.104 (-1.15)	-0.247 (-4.32)	-0.123 (-2.33)	-0.055 (-.607)	-0.208 (-3.22)	-0.023 (-.486)	0.108 (1.35)	-0.151 (-2.58)	-0.362 (-4.33)	-0.442 (-2.33)	-0.494 (-4.64)
GRH				0.1296 (1.08)	0.002 (1.38)	-0.0026 (-1.54)	0.0011 (.961)	0.0017 (1.27)	-0.0036 (-2.47)	0.009 (7.08)	0.0000+ (.002)	-0.0003 (-.233)
IKR				0.4588 (6.74)	0.0535 (5.90)	0.0331 (3.38)	0.0611 (9.67)	0.0704 (8.54)	0.0475 (5.25)	0.1364 (12.9)	0.152 (8.89)	0.0879 (6.23)
CRALT				0.002 (.316)	0.007 (.757)	0.005 (.491)						
BAKR	0.025 (.736)	0.5053 (1.09)	-0.2724 (-.58)									
CIIRD										0.00036 (.849)	-0.00002 (-.032)	0.0106 (.974)
PI							0.00099 (4.23)	0.00109 (3.22)	0.00099 (3.18)			
R ²	0.175	0.125	0.197	0.196	0.189	0.181	0.353	0.376	0.338	0.558	0.452	0.405
Adj. R ²	0.127	0.069	0.147	0.148	0.134	0.125	0.312	0.331	0.29	0.513	0.398	0.336
S.E.E.	0.0443	0.042	0.0874	0.0443	0.0404	0.0413	0.0136	0.0356	0.0372	0.0285	0.0338	0.0277
D.W.	2.36	2.29	2.43	2.58	2.59	2.59	2.34	2.3	2.48	1.8	2.26	2.29

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The equations use the same subperiods as previously. The first three equations substitute the historical book value of capital in the capital-output ratio for the replacement-cost measure used above. In all three subperiods the ratio of book value of capital to output is insignificantly related to industrial profits.

Equations 2a, 2b, and 2c, use an alternative measure of the concentration ratio, defined as the percent of value added produced by four-digit industries with four-firm concentration ratios of at least 60 percent for the year 1966 (Shepherd, 1982). We find that this variable also performs poorly compared to the traditional concentration ratio. This may be the result of using the 1966 ratios for the full span of years.

Equations 3a, 3b, and 3c add the price index to the Post-Keynesian equation. The price index is positive and significantly related to industrial profits in every subperiod. This is probably an indication of that inflation is not entirely cost push. Industries with higher rates of inflation also obtain higher mark-ups as a result.

Finally, equations 4a, 4b, and 4c, test the impact of the deviations from OLS-estimated trend values of capacity utilization for a smaller 13-industry sample. We find that this variable is also insignificantly related to industrial profits.

Appendix B
The Empirical Comparison of Competing Paradigms for Europe and Japan

The same basic analysis presented above also underlies the analysis presented in this appendix, i.e., that competing microeconomic conceptions can be compared empirically. Although one simple test may not be adequate, this appendix furthers our goal of developing an ongoing dialogue among alternative schools which is empirically based. The specific value of this appendix is that it undertakes the identical empirical test which appears in Table 2, but for four European Countries and Japan. Since a separate data base was employed with a distinct manufacturing industry breakdown, the three equations were also estimated for the United States as a control mechanism. The results appear in Tables 5A - 5G. Table 5G aggregates the six countries for an estimate whose unit of analysis is most of the developed world.

Methodology

The methodology employed in this appendix is identical to that described in the methodology section of the paper. A pooled cross sectional regression was estimated which included dummies to model time varying intercepts. Diagnostic F-tests failed to reject the null hypothesis that an unrestricted model in which slopes and intercepts change over time has no additional explanatory power beyond a model with constant slope coefficients.

The analysis considered the following thirteen manufacturing industries which are akin to, but not identical with, the 2-

digit SIC industry definitions usually employed in the United States.

Industry Definitions

1. Non ferrous ores and metal, non radioactive
2. Non metallic minerals.
3. Chemical products.
4. Metal products, except machinery and transportation
5. Agriculture and industry machinery
6. Office and data processing machines, precision, and optical
7. Electrical goods.
8. Transportation equipment
9. Food, beverages, and tobacco
10. Textiles, clothing, leathers, and footwear
11. Paper
12. Rubber and plastics.
13. Miscellaneous

The Countries studied were the following:

Countries Studied

1. Germany
2. France
3. Italy
4. United Kingdom
5. United States
6. Japan
7. Total

The total was derived by aggregating the six nations. This was possible since the data are on a consistent industry basis and expressed in a common currency.

Data Sources

Data was derived from the EUROSTAT data base. EUROSTAT was the result of a project which utilized O.E.C.D. sources to develop a consistent industry and currency basis for a number of European countries, the United States and Japan. The O.E.C.D. derived its data from the national accounts of the respective countries. In some cases, the O.E.C.D. sponsored projects in

these countries to supply missing information. I then selected only those countries for which capital stock data was available, since not all countries have developed estimates for fixed tangible wealth.

The data are cruder than that used in the paper. Output was proxied by value added rather than shipments, since constant dollar shipments contained numerous missing values. Capital stock excludes inventories, and profit was derived by subtracting total wages from value added. The profit variable thus contains net interest, indirect taxes, and depreciation components which, although small, may vary across industries. In addition, no non-corporate wage equivalent was subtracted. Concentration ratios are not available for these countries, and utilization rates are only available at the aggregate level (from other sources).

As described in our earlier discussion concerning the competing merits of using 4-digit and 2-digit data for the United States, the analysis of European data also presents a trade off between greater coverage (in this case to additional countries) and finer variable definitions.

The variables were constructed in the same manner as described earlier in the paper:

Variables

1. PR = Profit = Value added - Wages
2. Q = Output = Value added
3. KOR = Stock of Capital per unit of output at replacement cost.
4. IKOR = Incremental capital output ratio = The average change in capital divided by the average change in output.
5. GRSH = Growth rate of constant dollar value added (see paper for equation).
6. IMSH = Imports/(Imports + Shipments)

Date are only available for the years 1972-1981.

Table 5A
Two Digit Pooled Regression Results
Germany, Manufacturing, 1972-1981

(T - Scores in Parentheses)
 (Dependent Variables = PR/Q)

Equations	1	2	3
Const.	.374 (16.019)	*	*
KOR		-.012 (-.871)	
IMSH	-.427 (-2.832)	-.34 (-2.11)	-.34 (-2.35)
GRSH			.027 (.063)
IKOR			.008 (5.26)
R ²		.09	
Adj R ²		.006	

Table 5B

Two Digit Pooled Regression Results
France, Manufacturing, 1972-1982

(T - Scores in Parentheses)
(Dependent Variables = PR/Q)

Equation	1	2	3
Const.	.315 (18.291)	*	*
KOR		.021 (2.83)	
IMSH	-.130 (-1.483)	-.188 (-2.09)	-.169 (-1.80)
GRSH			.668 (2.17)
IKOR			-.003 (-.522)
R ²		.173	.154
Adj R ²		.096	.067

Table 5C

Two Digit Pooled Regression Results
Italy, Manufacturing, 1972-1981

(T - Scores in Parentheses)
(Dependent Variable = PR/Q)

Equation	1	2	3
Conts.	.408 (22.841)	*	*
KOR		-.014 (-2.016)	
IMSH	-.486 (-4.91)	-.448 (-4.26)	-.726 (-6.09)
GRSH			1.70 (3.02)
IKOR			-.005 (-1.37)
R ²		.260	.312
Adj R ²		.191	.241

Table 5D

Two Digit Pooled Regression Results
U.K., Manufacturing, 1972-1982

(T - Scores in Parentheses)
(Dependent Variable = PR/Q)

Equation	1	2	3
Const.	.310 (11.618)	*	*
KOR		-.015 (-2.28)	
IMSH	-.245 (-2.027)	-.235 (-1.93)	-.274 (-2.48)
GRSH			2.66 (4.09)
IKOR			.002 (1.54)
R ²		.114	.298
Adj R ²		.031	.226

Table 5E

**Two Digit Pooled Regression Results
U.S., Manufacturing, 1972-1981**

(T - Scores in Parentheses)
(Dependent Variable = PR/Q)

Equation	1	2	3
Const.	.295 (27.254)	*	*
KOR		.081 (6.48)	
IMSH	-.229 (-2.533)	-.373 (-4.43)	-.290 (-2.97)
GRSH			-1.21 (-2.30)
IKOR			-.00009 (-.221)
R ²		.320	.118
Adj R ²		.256	.028

Table 5F
Two Digit Pooled Regression Results
Japan, Manufacturing, 1972-1981

(T - Scores in Parenthesis)
(Dependent Variables = PR/Q)

Equation	1	2	3
Const.	.432 (24.090)	*	*
KOR		.020 (1.28)	
IMSH	1.103 (3.517)	.935 (2.76)	1.11 (3.62)
GRSH			3.34 (1.21)
IKOR			-.007 (-.308)
R ²		.167	.232
Adj R ²		.089	.154

Table 5G

Two Digit Pooled Regression Results
 Total All Countires, Manufacturing, 1972-1981

(T - Scores in Parentheses)
 (Dependent Variable = PR/Q)

Equation	1	2	3
Const.	.364 (20.321)	*	*
KOR		.036 (3.71)	
IMSH	-.480 (-3.967)	-.611 (-4.49)	-.544 (-3.91)
GRSH			.550 (.930)
IKOR			.025 (2.99)
R ²		.210	.185
Adj R ²		.136	.107

Results

Table 5E reveals that the results for the United States are very similar to those reported in Table 2. In the classical equation, for example, there is a highly significant and positive relationship between the dependent variable profit margin and capital. This is the same relationship which was found in our original data set displayed in Table 2. Similarly, there is a strong negative relationship with the import share as was found earlier. In the Post Keynesian equation, as in Table 2, there is a negative relationship between the long run growth rate and the mark up (profit margin) for this period. The only difference with our earlier result is the relationship between the incremental capital output ratio and the dependent variable. In the earlier estimation a strong positive and significant relationship was evident. In the EUROSTAT data no significant relationship was found. This might be due to the lack of consistent investment data in the EUROSTAT data base.

Given the similarity of results between the two data sets for the United States, It is interesting that relationships found for the European Countries are quite different. I suspect that a large measure of this difference is due to the stronger influence of the international economy on these countries as compared with the United States.

In the classical equations, there is a strong negative and significant relationship between capital and profit in both the U.K. and in Italy. This result is difficult to understand

because it means that there is little or no tendency toward an equalization of the rate of profit over the ten years studied in these two countries. Similarly, in Germany, the relationship between these two variables is negative, although not significant. Only France displays a significant positive relationship between capital and profit similar to that found in the United States. The Japanese relationship is positive, but only weakly significant.

The situation is quite the contrary regarding the impact of the import share on the industrial profit margin. In every European country, as well as the United States, there is a significant negative relationship between these two variables. Only Japan displays a positive significant relationship between the share of imports in each industry and its profit margin. This might be the result of Japan's superior position internationally during this period. Nevertheless, since the results represent a cross sectionally relationship they are difficult to understand.

The positive relationship hypothesized by the Post-Keynesians between the markup and the long industrial rate of growth has mixed results in this data base. We found earlier that in the United States, this relationship was negative for the period of the 1970's. However, this is not the case for a number of other countries, France, Italy, and the U.K. display positive significant relationships between the markup and the industrial

growth rate, while in Germany and Japan the relationship has the right sign but is insignificant.

In no country did I obtain a significant positive relationship between the incremental capital output ratio and the profit margin as was found earlier. Only in Japan is the relationship significant although the sign is wrong. As mentioned earlier, this variable was built in a questionable fashion because of data limitation. A more accurate variable construction might reveal a result closer to that obtained for the United States.

In all cases, the R-Squared and Adjusted R-Squared terms are comparable or superior to those obtained earlier.

Conclusion

Although a comparative empirical study of countries other than the U.S. on an industry basis present a very difficult situation as regards data availability, the similarity of results for those obtained for the United States offers some basis for confidence. It is clear that if these results can be taken seriously, they reveal great differences between the situation in the United States and Europe and Japan. Unlike the United States, government intervention and international influences are much stronger in these countries. This makes a test of the basic paradigmatic story of the three competing theories which assume a pure market economy even more problematic than was the case for the United States. Nevertheless, the growing availability of industry level data for Europe and Japan must not be ignored and should be exploited in further inquiries. As stated in our paper's conclusion, we view this work as only a first step in an ongoing dialogue. Future empirical tests will hopefully begin to introduce further empirical controls and investigate deeper levels of the competing approaches.

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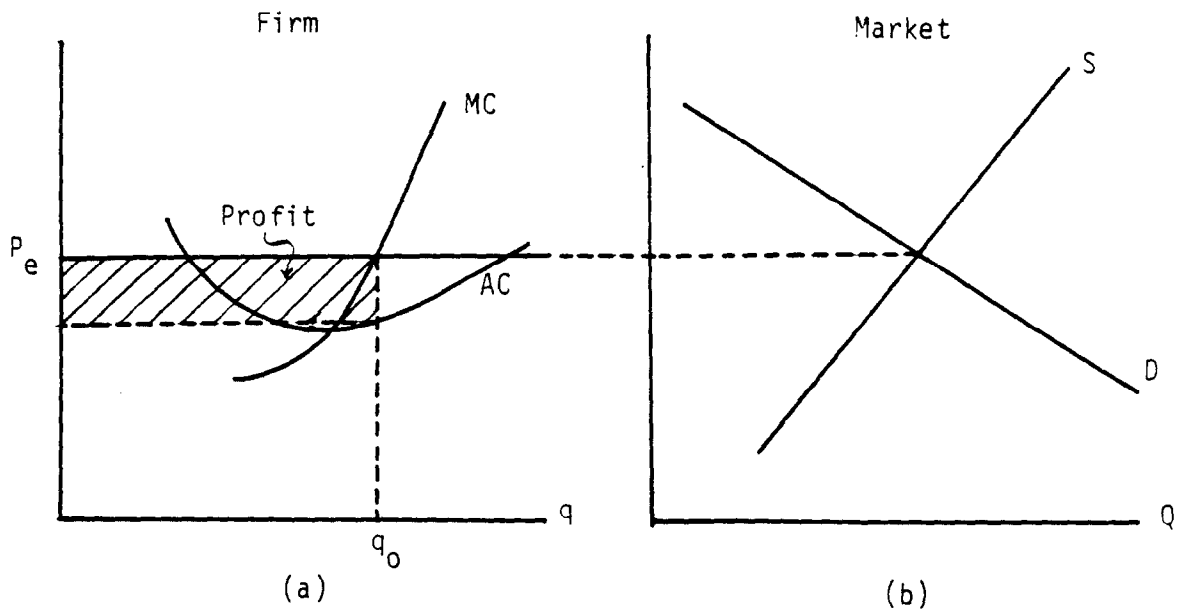


Figure 1
Short-run Equilibrium

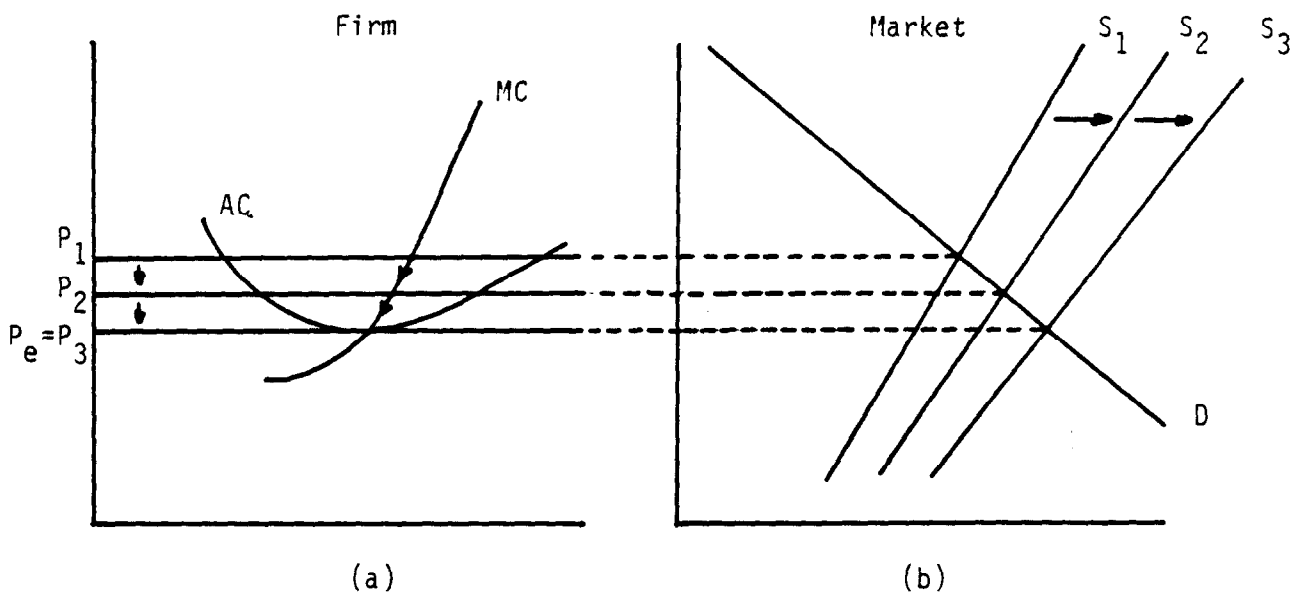


Figure 2
Adjustment to Long-run Equilibrium

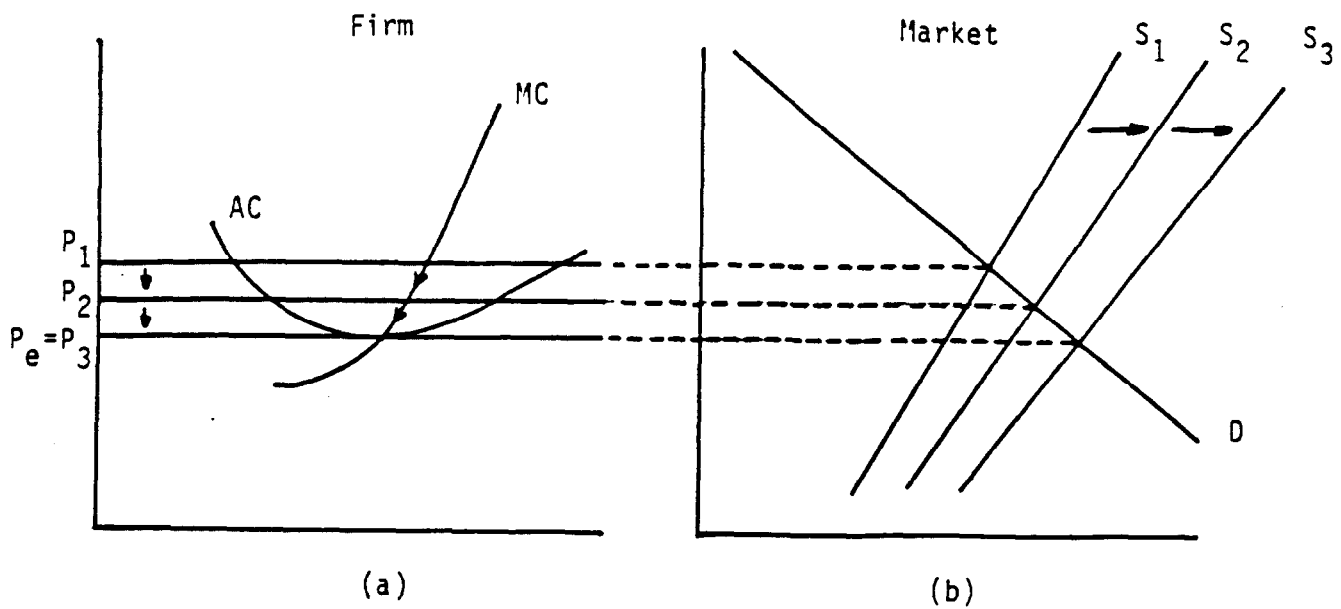


Figure 3
Adjustment to Long-run Equilibrium

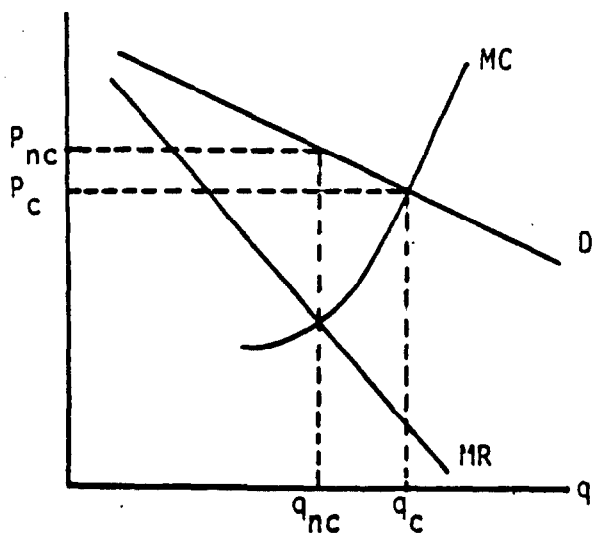


Figure 4
Noncompetitive Firm