RICARDIAN OR MONOPOLY RENTS?

THE PERSPECTIVE OF POTENTIAL ENTRANTS

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The explanation for the positive relationship between concentration and profitability is one of the most controversial topics in the field of industrial organization. The interest in this topic is due primarily to the conflicting antitrust policy implications originating from two competing hypotheses: the market power (collusion) hypothesis and the efficiency hypothesis. Tests of these hypotheses have focused, to a large extent, on the determinants of incumbents' profitability. The most widely used test has been criticized for being insufficiently discriminating and, therefore, inappropriate for determining the validity of the hypotheses.

The current paper presents an alternative approach. It examines the competing hypotheses by focusing on the behavior of potential entrants. A key premise is that potential entrants respond differently to incumbents' Ricardian rents and to incumbents' monopoly rents. Ricardian rents, resulting from superior efficiency, should have little impact on potential entrants, i.e., usually they do not induce entry; however, monopoly rents, resulting from market power, should attract entry, ceteris paribus.

The current test is thus performed by comparing the entry response to adjusted and unadjusted profitability measures. The adjusted measure is obtained by removing the component of profitability attributable to concentration from the unadjusted measure. The removed component represents Ricardian rents, according to the efficiency hypothesis, and monopoly rents, according to the market power hypothesis. These differing interpretations result in contrasting predictions regarding the explanatory power of the adjusted and unadjusted measures of profitability. The empirical framework is based on a recursive model with a sample of U.S. oligopolistic industries. Previewing the results, the findings are for the most part supportive of the market power hypothesis.

LITERATURE REVIEW

There has been substantial debate on the correct interpretation of the positive correlation characterizing the performance-concentration relationship. Proponents of the market power hypothesis (MPH) argue that the positive relationship reflects higher prices resulting from the exercise of market power.[1] Proponents of the efficiency hy-

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pothesis (EH) claim that the positive relationship can be explained by the superior efficiency of the largest firms in the industry. Enhanced profitability in concentrated industries results from lower costs rather than higher prices [Demsetz,1974] and, therefore, represents economic rents.

A common methodology for testing the hypotheses involves the use of a performance equation, such as price-cost margins with concentration and firm market share included among the explanatory variables.[2] A positive and statistically significant coefficient for market share and an insignificant or negative coefficient for concentration represent evidence supportive of EH.[3] This methodology has been criticized. Clarke, Davis and Waterson [1984] find both theoretical and empirical flaws with this approach. Schmalensee's [1987] tests lead him essentially to conclude that the findings support none of the hypotheses. Salinger [1990] is of the opinion that the methodology is flawed and fails to distinguish between the competing hypotheses. Stevens [1990] points to a misspecification in the methodology resulting from the omission of an interaction term between concentration and market share.[4] Once an interaction term is included, the results suggest that EH and MPH cannot be clearly separated. Finally, it should be noted that in addition to the market power and efficiency hypotheses there are other explanations for the relationship between concentration and profitability [Mancke,1974; Lippman and Rumelt,1982].[5]

MODEL

Ricardian rents result from unique factors owned or controlled by the firm. These factors provide it with lower costs than those of competitive or marginally competitive firms [Lindenberg and Ross, 1981] and can originate from a wide variety of inputs.[6] Demsetz [1973) writes: "Such profits need not be eliminated soon by competition. It may well be that superior competitive performance is unique to the firm, viewed as a team, and unobtainable to others except by purchasing the firm itself. In this case the return to superior performance is in the nature of a gain that is completely captured by the owner of the firm, and not by its inputs. Here although the industry structure may change because the superior firm grows, the resulting increase in profit cannot easily serve to guide competition to similar success. ... It may be very difficult for these firms to understand the reason for this difference in performance or to know which inputs to attribute the performance of the successful firm." Demsetz [1974] adds: "All of this, of course, implies that existing large firms possess superior characteristics that are difficult to imitate. Their method of organizing production, of providing service and of establishing buyer confidence must yield lower cost than can be obtained by newer or smaller firms".

The above statements suggest that market leaders' superior efficiency rents are not likely to attract entrants into the industry. That is not to say that such industries will not experience entry. The entry that does take place, however, will be mostly due to factors other than Ricardian rents. Potential entrants may invest in the development of factors similar to those of the market leaders, assuming they can pinpoint the rent yielding factor, but the uncertainty involved in this imitation process [Lippman and Rumelt, 1982] raises the cost of entry considerably. Such factors are, according to

Demsetz, essentially inimitable, at least for some time. Entry may take place because of a new invention that results in a new product, a cost reducing process, or the possession of some superior input. However such entry could occur in any industry and would have yielded the entrant rents regardless of whether the current market leaders are earning Ricardian rents or not.

Potential entrants are guided by incumbent firms' profitability when calculating their own expected profitability. It would be reasonable to assume that when performing such calculations, potential entrants tend to delete or disregard the Ricardian rent component of incumbents' profitability. Potential entrants usually cannot earn such rents due to the inimitable nature of the factors involved. It would be misleading for them to assume that incumbents' returns inclusive of Ricardian rents are representative of their own expected post entry returns.

The current approach is based on the idea of subtracting from the performance measure – price cost margins (PCM) — the component attributable to concentration. That component could reflect either monopoly profits due to market power (MPH) or else profits due to superior efficiency of market leaders (EH). If it is the former, then the explanatory power of the adjusted PCM in the entry equation should be weaker than that of the unadjusted PCM. If the removed component consists primarily of profits due to superior efficiency then their removal should either have little impact or else the adjusted PCM in the entry equation should provide improved explanatory power.

The current methodology, then, consists of a comparison of the effects of adjusted and unadjusted PCM on entry. It should be noted that a positive coefficient for unadjusted PCM in an entry equation is not, by itself, sufficient evidence for MPH unless concentration is the sole source of above normal margins.[7,8] Instead, the test has to focus on the component of PCM attributable to concentration and its impact on entry.[9]

The model follows Masson and Shaanan [1982] except that the threshold concept is used rather than entry forestalling profits. This empirical model was originally utilized to test dynamic-stochastic limit pricing; however, as explained below, it is in conformity with the rational entry deterrence models. It should be noted that despite the association with entry deterrence and limit pricing, the empirical model does not necessarily require firms to engage in limit pricing or in any other type of entry deterrence behavior.[10] In the deterrence models it is shown that in the presence of information asymmetries, rational limit pricing may result from equilibrium behavior. Entrants may be imperfectly informed about some aspects of incumbents' operations such as marginal costs, coordination ability, or the existence of inimitable inputs. This in turn leads to uncertainty about prices, expected profits and post-entry conditions [Masson and Shaanan, 1987]. Under these conditions the adoption of rational limit pricing may enable incumbents to reduce the likelihood of entry. The deterrence models also demonstrate that with noise, the probability of entry can be an increasing function of incumbents' pricing. Given this feature and the fact that incumbents are uncertain about some aspects of the potential entrants' operations and about entry in general, their behavior is quite consistent with the description of incumbents presented in the stochastic-dynamic limit pricing models of Kamien and Schwartz

[1971] and Baron [1973]. Therefore tests for stochastic-dynamic limit pricing can be used to test rational limit pricing models [Masson and Shaanan, 1987; Gilbert 1989].

An additional issue that merits attention is the criticism aimed at cross-section studies on this topic. The argument is that the estimates obtained are not consistent. The criticism applies even when instrumental variables are introduced because the instruments necessary for consistent estimation are rarely available [Schmalensee, 1989]. However, consistent estimation is possible in a recursive system [Schmalensee, 1989] and the present study employs a recursive model described below.

Entry in period t+1 is modeled as a function of incumbents' actual price-cost margin (PCM^a) minus a threshold price-cost margin (PCM^T) below which entry will not take place.

$$E_{t+1} = f(PCM_t^a - PCM_t^T) \tag{1}$$

PCM^T is unobservable but it can be determined as a function of barriers to entry and growth (G). Barriers to entry include the advertising-sales ratio (A) as a proxy for product differentiation, minimum efficient scale (S) and capital requirements (K).

$$PCM_t^T = h(A_t, S_t, K_t, G_t) \tag{2}$$

By inserting equation (2) into equation (1) the following function is obtained:

$$E_{t+1} = i[(PCM_t^a - (A_t, S_t, K_t, G_t)] \tag{3}$$

Price-cost margins and growth should induce entry whereas barriers to entry are expected to have a negative impact. While equation (3) is fairly standard in the context of entry deterrence models, alternative specifications are examined. An entry equation containing the adjusted price-cost margin, $NPCM^a$, is also tested.

$$E_{t+1} = j[(NPCM_t^a - (A_t, S_t, K_t, G_t)] \tag{3a}$$

Coefficient signs are expected to be the same as for equation (3).

The other part of the empirical model requires estimation of a performance equation. Debates over the correct measure of profitability are almost as numerous as those on the competing hypotheses [See Scherer and Ross, 1990; and Martin, 1993]. As indicated above, the price-cost margin measure is presently adopted. This measure has a theoretical rationale and has been used extensively in tests of the hypotheses. Several specifications of PCM^a are examined. The independent variables include concentration (C), barriers to entry, growth, and the capital-output ratio (KO), to account for different levels of capital intensity. The equation tested is the following:

(4) $$PCM_t^a = q(C_t, A_t, S_t, K_t, G_t, KO_t).$$

To account for the possible endogeneity of advertising and concentration, simultaneous equations are also tested. From equation (4) we obtain the partial derivative of concentration $PCM_C^{a\prime}$ necessary to calculate $NPCM^a$, where

$$NPCM^a = PCM^a - PCM_C^{a\prime} * C.$$

ESTIMATION AND DATA

Recalling the discussion from Model Section, the tests for *MPH* and *EH* focus on the coefficients of PCM^a and $NPCM^a$ in the entry equations.

To find in favor of *MPH* the following results are expected:

a) From equation (3), the partial derivative, $E'_{PCM^a} > 0$.

b) From a *J* test (explained below), *MPH* should be accepted and *EH* either accepted or rejected.

To find in favor of *EH* the following results are expected:

c) From equation (3a), the partial derivative, $E'_{NPCM^a} > 0$.

d) From a *J* test, *EH* should be accepted and *MPH* either accepted or rejected.

A price-cost margin equation, based on equation (4), is estimated to obtain the coefficient of concentration necessary to calculate $NPCM^a$. Two entry equations, based on equations (3) and (3a) are estimated to test whether PCM^a and/or $NPCM^a$ are positively correlated with entry. In order to accept one hypothesis and rule out the alternative, additional testing is required. A comparison of coefficients is insufficient for this purpose.[11] Davidson and MacKinnon's J test for nonnested equations is applied to the entry equations. In the context of the J test, equation (5) below represents *MPH* and equation (6) represents *EH*.

(5) $$\text{(MPH) H}_0\text{:} \quad E_{t+1} = \alpha_0 + \alpha_1 PCM_t^a + \alpha_2 A_t + \alpha_3 S_t + \alpha_4 K_t + \alpha_5 G_t$$

(6) $$\text{(EH)} \quad \text{H}_1\text{:} \quad E_{t+1} = \beta_0 + \beta_1 NPCM_t^a + \beta_2 A_t + \beta_3 S_t + \beta_4 K_t + \beta_5 G_t$$

The entry equations do not contain a concentration variable, therefore the two hypotheses can be regarded as nonnested and the J test is applied. To test H_0 against H_1, equation (6) is estimated and the predicted value of its dependent variable ($EHAT_1$) is added as an explanatory variable to equation (5). After the new equation is estimated we examine whether $EHAT_1$ adds explanatory power to H_0. If H_0 is the "correct" model, then $EHAT_1$ should not be able to explain anything beyond that explained by the H_0 model [Kennedy, 1998]. If H_0 is rejected, that still does not enable one to conclude that H_1 should be accepted. To determine the adequacy of the other model, the roles of the two hypotheses must be reversed and the test performed again. In this testing procedure there is a good deal of flexibility. The tests yield four possible outcomes: a) Both MPH and EH are acceptable. b) Neither is acceptable. c) MPH is acceptable but not EH. d) EH is acceptable but not MPH [See Maddala, 1988; Davidson and Mackinnon, 1993].

An alternative approach, the errors in variables method, can also be used to test the two hypotheses.

The possibility of simultaneity between entry and PCM^a is dealt with by recognizing that the model is recursive. Entry takes place with a lag, i.e., E_{t+1} is determined by the explanatory variables in period t. Therefore, the entry equation is recursively identified given a condition on the error term and can be estimated by OLS.[12] The sample includes 39 U.S. manufacturing industries and is based on Harris' [1973] study which contains information on entry by market share in many major oligopolies.[13] Such industries are well suited for testing the issue at hand. Following is a description of the data employed:

Entry (E): The entry data consists of the market share of what Harris describes as "substantial domestic entry" which occurred mainly during the 1958-1963 period. Most of the entrants in the Harris sample were top 1000 Fortune firms as listed in Fortune's Plant and Product Directory. Other important entrants were obtained mainly from Standard and Poors' industry surveys and industry case studies. Harris examined entry into 48 4-digit industries, all of which had previously appeared in industrial organization studies.[14] Entry by these Fortune 1000 firms consisted primarily of diversification through the building of new capacity.[15] It is interesting to note that roughly half of the large capacity entrants in Harris' sample were already producing in the same 2-digit industry and hence it is not unreasonable to assume that they may have had some knowledge about the target industry. There are several advantages in using this entry data. If entry deterrence were to take place it would most likely occur in oligopolistic industries. Additionally, if incumbents contemplate the adoption of an entry deterrence strategy it would, in most cases, be aimed at large entrant firms such as those included in the present sample. A gross entry measure based on market share is preferable, in the context of entry deterrence models, to both net entry measures and entry measures based on the number of firms. The current measure also excludes the numerous tiny entrant firms that have little impact on incumbents.

Price-Cost Margin (PCM^a): The data is for 1958 and is obtained from Harris who used Collins and Preston's [1968] measures while supplementing his own estimates for industries missing from their sample.

Concentration (C): The four firm concentration ratio is based on Shepherd's [1970] adjusted measure. Shepherd's data which is for 1966 was further adjusted to 1958.

Advertising/Sales (A): Harris used the IRS Corporation Source Book of Statistics and Income as well as Advertising Age for 1954-1957.

Minimum Efficient Scale (S): The data is taken from Harris who defines the minimum efficient scale as the average large plant size as a percentage of sales. Average large plant size is the average size of the least number of plants accounting for two thirds of industry output.

Capital Requirements (K): The data is taken from Harris and is defined as S times industry book value for 1958.

Growth (G): Data for the pre-entry growth rate of sales is taken from Harris.

Capital/Output (KO): The data is obtained from Collins and Preston [1968]. The ratio consists of gross book value divided by value of shipments.

TABLE 1
Summary Statistics

Variable	Mean	Std Dev	Minimum	Maximum
E	1.97	3.68	0	15.0
PCM^a	25.24	12.19	4.31	53.97
C	68.67	19.65	31.0	100.0
S	4.78	3.72	0.19	15.15
K	28.01	62.88	0.35	375.0
A	3.95	4.52	0.20	18.7
G	4.16	2.69	0.01	11.0
KO	47.03	34.15	9.02	152.6

Equation T.2.1, the first equation in Table 2, is an entry equation. Various diagnostics tests were applied to this equation. A Thursby and Schmidt [1977] specification test does not indicate omitted variable bias and a White [1980] test shows no evidence of heteroskedasticity. A Belsey, Kuh and Welsch [1980] test does not reveal any substantial outliers, none of the observations exceeds a critical level.[16] The coefficient of PCM^a has the expected positive sign and is statistically significant. A one percentage point increase in PCM^a, results in a 0.177 percentage point increase in the market share of large domestic entrants. This positive relation is consistent with the findings of many entry studies, from different nations, where a gross entry measure was used [See Siegfried and Evans, 1994). The proxy for product differentiation, A, appears to have a strong deterrent effect, a one percentage point increase in A results in a 0.4 percentage point decline in the market share of entrants. The signs of other coefficients are in accordance with expectations although K and G are statistically insignificant. These results are similar to Masson and Shaanan's [1982] findings.

Diagnostics tests were also applied to the PCM^a equation, equation T.2.2, with similar results. As expected, the coefficient of concentration has a positive and statistically significant effect on price-cost margins. The interpretation of this result is that a six percentage point increase in the four firm concentration ratio leads to approximately a one percentage point increase in PCM^a. $NPCM^a$ is obtained by subtracting $0.171C$ from PCM^a for each industry in the sample. The advertising sales ratio has a strong positive and statistically significant impact on PCM^a, a one percentage point increase in A results in a 0.87 percentage point increase in PCM^a. The minimum efficient scale variable has the expected sign and capital requirement has the wrong sign, however, both variables are statistically insignificant. Growth results in slightly more than a one percentage point increase in price-cost margins for a percentage point increase in growth. The control variable *KO*, has the expected positive sign.

TABLE 2

Regression Results[a]

2.1. $E = -0.648 + 0.177*PCM^a - 0.413*A - 0.265*S - 0.006*K + 0.296*G$

(0.44) (2.65) (2.42) (1.85) (0.74) (1.35)

$R^2 = 0.32$

Adjusted $R^2 = 0.22$

2.2. $PCM^a = -2.948 + 0.171*C + 1.87*A + 0.159*S - 0.013*K + 1.146*G + 0.083*KO$

(0.63) (2.88) (6.76) (0.53) (0.73) (2.65) (2.32)

$R^2 = 0.73$

Adjusted $R^2 = 0.68$

2.3. $E = 1.411 + 0.15*NPCM^a - 0.355*A - 0.261*S - 0.005*K + 0.322*G$

(1.12) (1.85) (1.89) (1.74) (0.60) (1.37)

$R^2 = 0.25$

Adjusted $R^2 = 0.14$

2.4. $E = -0.46 + 0.339*PCM^a - 1.38*EHAT_1 - 0.84*A - 0.621*S - 0.015*K + 0.796*G$

(0.31) (2.13) (1.12) (2.02) (1.78) (1.30) (1.60)

$R^2 = 0.35$

Adjusted $R^2 = 0.22$

2.5. $E = -1.165 - 0.207*NPCM^a + 1.917*EHAT_0 + 0.442*A + 0.247*S + 0.003*K - 0.216*G$

(0.68) (1.12) (2.13) (1.08) (0.89) (0.35) (0.64)

$R^2 = 0.35$

Adjusted $R^2 = 0.22$

[a] The numbers in parentheses are t values. All regressions are based on 39 observations.

To test for recursive identification, the correlation between the error terms of the entry and price-cost margin equations is examined. The results indicate that the error terms are uncorrelated thus suggesting that the entry equation is recursively identified. The possibility of correlation between the explanatory variables and the error term in each of the two equations is tested by applying the Hausman test. The results do not permit a rejection of the null hypothesis that the error term and the explanatory variables are uncorrelated.[17]

Results for the entry equation containing $NPCM^a$ are presented in equation T.2.3. The coefficient of $NPCM^a$ is statistically significant at the 10 percent level but is smaller than the coefficient of PCM^a in equation T.2.1. J test results are presented in equations T.2.4 and T.2.5. $EHAT_1$ in equation T.2.4 is the fitted value of the entry equation containing $NPCM^a$. Most importantly for our current purpose the hypothesis that the coefficient of $EHAT_1$ is equal to zero cannot be rejected. Consequently H_0 cannot be rejected and the market power hypothesis is accepted. By reversing the above procedure H_1 is tested against H_0 and equation T.2.5 presents the outcome of the test. $EHAT_0$, the fitted value of equation T.2.1, has a statistically significant coefficient and adds explanatory power to the equation. Since the coefficient of $EHAT_0$ does not equal zero, H_1 and the efficiency hypothesis are rejected. In terms of the four options presented above, the finding is that MPH is acceptable but not EH.

ALTERNATIVE SPECIFICATIONS

To assess the robustness of the results alternative specifications were examined. It has been suggested that the use of pre-entry profitability, as an indicator of potential entrants' post entry profitability, assumes naive expectations on the part of potential entrants, or at the very least, the use of an incomplete information set [Highfield and Smiley, 1987; Geroski, 1991]. Therefore, an alternative specification based on a "rational expectations" measure of margins, PCM^e_{t+1}, is tested.

(1a) $$E_{t+1} = u(PCM^e_{t+1} - PCM^T_t)$$

where

(7) $$PCM^e_{t+1} = \text{EXP}(PCM^a_t \,|\, I_t).$$

The left hand side of (7) represents subjective expectation while the right hand side term is the objective expectation, conditional on the available data (I_t) at the time the expectations (EXP) occurred [Maddala, 1988]. A proxy for PCM^e_{t+1} can be obtained from the predicted value of PCM^a_{t+1} and proxies for each industry are obtained from the following regression:

(8) $$PCM^a_{t+1} = \underset{(1.98)}{2.43} + \underset{(4.15)}{0.614}PCM^a_t + \underset{(2.56)}{0.411}PCM^a_{t-1} - \underset{(-0.06)}{0.012}G_t.$$

$$\text{adjusted } R^2 = 0.95$$

An entry equation was then estimated with the predicted value of PCM^a_{t+1}. A PCM^a_{t+1} equation, equivalent to equation (4), was also estimated to obtain the coefficient of concentration necessary for calculating $NPCM^a$. Non-nested (J) tests were performed, however, the results obtained with proxies for expected margins are very similar to those reported in Table 2 with PCM^a_t.

The concentration variable was replaced with the unadjusted Census concentration measure. This substitution results in a weaker concentration coefficient in the PCM^a equation — but the J test results remain basically unchanged — MPH is accepted while EH is rejected. Substituting profits on equity for PCM^a yields the same conclusion.

Switching from changes in variables to changes in estimation method, two other estimation techniques were examined. A J test for a tobit estimation of entry provides the same result as before, MPH is accepted and EH is rejected. There is support in the literature for simultaneous estimation of PCM^a, concentration and advertising. Therefore, two-stage least squares estimation was applied but the results remain unchanged — MPH is accepted and EH is rejected.

A different specification, which represents a departure from the traditional barriers to entry framework, was also tested. This model follows from the credible commitment literature and both entry and PCM^a are characterized as being functions of tangible and intangible sunk costs.[18] The entry equation also includes margins and growth while the PCM^a equation also includes concentration, growth and the capital-output ratio. Once again J test results suggest an acceptance of MPH and a rejection of EH.

An alternative testing method, the errors in variables approach, can also be used. If we assume that from the perspective of potential entrants' PCM^a is mismeasured because it includes Ricardian rents, then the coefficient of PCM^a is biased downward and the coefficient of $NPCM^a$, the "correct" measure should be larger. However, a comparison of the coefficients in equations T.2.1 and T.2.3 shows the opposite.

Finally, an exception to the above outcomes is obtained from a test based on a non-linear concentration variable in the form of C and C^2. In this case the J test findings are that both MPH and EH are unacceptable.

To summarize, an examination of potential entrants' behavior suggests that potential entrants do not view the component of margins attributable to concentration as Ricardian rents. Specifically, the explanatory power of the adjusted measure is weaker than that of PCM^a. J test results point to a rejection of the efficiency hypothesis and, with one exception, an acceptance of the market power hypothesis. These results are interesting in that they are obtained through the use of a different approach and are opposite to the results of many previous studies which found evidence supportive of EH or for both EH and MPH.

If increased concentration, indeed, leads to higher prices, then proposals for relaxing or weakening antitrust laws may be inappropriate, especially, in the case of horizontal mergers. However, the current results would have to be replicated before any policy conclusions are applied.

NOTES

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1. This outcome is consistent with the Cournot model.
2. A more direct methodology, based on the use of a relative efficiency measure, is employed by Martin [1988]. Martin's findings support both hypotheses.
3. Salinger [1990] surveys this literature.
4. See also Shepherd [1986].
5. Lippman and Rumelt question positive associations between profitability and market share unless uncertain imitability has been controlled or ruled out.
6. Montgomery and Wernerfelt [1988] describe the sources of Ricardian rents.
7. Masson and Shaanan [1982] note that if high actual profits reflect strictly superior efficiency, then such profits should not attract entry.
8. The neo-classical idea that higher profits lead to entry is not unanimously accepted. In Lippman and Rumelt's [1982] model, interfirm heterogeneity in efficiency originates from stochastic, Gibrat type, processes resulting from the uncertainty involved in the creation of new costs functions. Such uncertainty, combined with either causal ambiguity or property rights in unique resources

which impede imitation and factor mobility, results in uncertain imitability. Their model suggests that high levels of profits can signal difficult to replicate levels of efficiency and deter rather than induce entry.

9. Because entry does not usually respond to short-term profitability, the current test for EH would also be a test for the disequilibrium profitability hypothesis.
10. Rational limit pricing models were presented by Milgrom and Roberts [1982], Saloner [1982], Matthews and Mirman [1983], and Harrington [1984]. These models added rationality to potential entrants' behavior whereas previously it had been restricted to incumbents' behavior.
11. The errors in variables approach is discussed below.
12. Tobit estimation is also examined.
13. Masson and Shaanan [1982] used a slightly smaller sample with 37 industries and a measure of profits over equity.
14. Presently, only 39 industries are used either because the remaining industries are not manufacturing industries or else because of missing information for other variables employed.
15. In some cases entry also took place through branching out into a new product area in an existing plant.
16. The critical level is based on Vellman and Welsch [1981].
17. Consequently, an instrumental variables approach is not required for estimating the entry and price-cost margin equations.
18. Tangible sunk costs data are obtained from Waddell, Ritz, Norton and Wood [1966]. Advertising costs are used to proxy intangible sunk costs.

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