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Abstract

Structure-Conduct-Performance (SCP) is a central issue in the Industrial-Organization (IO). Analysis of SCP typically uses linear partial and simple approaches: Structure affects Conduct and then Conduct affects Performance. In the real world, Structure, Conduct and Performance have associated relationship with each other interactively and simultaneously. This paper uses analytical approach to scrutinizes the model of interactive SCP of Indonesian manufacturing industry and to apply simultaneous equations econometric models. This paper concludes that the SCP paradigm may be improperly giving to much weight to concentration as an explanatory variable for industry conduct and performance. In the case of Indonesian manufacture, concentration does not occupy the central place of the SCP paradigm.

Keywords: Structure-Conduct-Performance; Industrial Organization; Interactive Model.
JEL:L1,L6

INTRODUCTION

In the last two decades, manufacture sectors have taken important role in East Asia, Japan, Newly Industrializing Countries (NICs i.e. Hongkong, South Korea, Taiwan) and ASEAN countries. The share of manufacture sectors in Gross Domestic Product (GDP) has increased tremendously in those countries. In East Asia, manufacture sectors have driven strongly by their manufacture export (Mohamed and Hall Hill,1988). In the historical perspective, Indonesia has applied some industrialization policies/strategies such as Import Substitution Industrialization (ISI) and then Export Promotion (EP). The ISI policies created a fast growth in industrial sectors but it was unsustainable (Hadjam et al 1989). Manufacture outputs grew in small and restricted domestic market; therefore they were not competitive in the world international market.

To promote the sustainability of manufacture growth, the governments of Malaysia, Philippine, Thailand (in 1970s) and Indonesia (in 1980s) have applied some export promotion policies and continued to apply ISI focusing on more capital intensive and skilled-labor intensive. As a result, the domestic market is integrated with the world international market. The world economic development might be a new threat and problem for national international trade development (Karseno 1995). World Trade Organization ratification, establishing regional economy (such as APEC and AFTA) and arriving some new comers (Cina and Vietnam) might be also new threats for Indonesia.

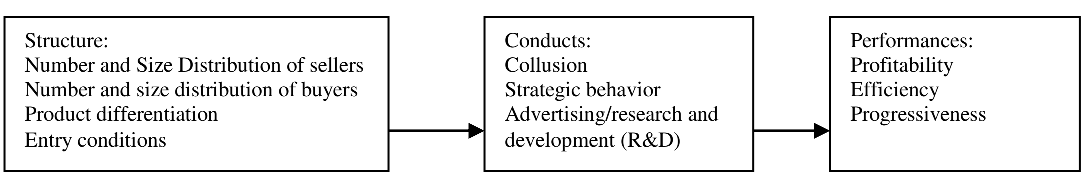
Globalization becomes a new phenomenon that is not avoidable by all countries in the world. The level of production penetration into markets becomes higher and higher. In contrast, space and time dimension -which were main restriction in international trade- can be solved easily as a result of the science and technology developments. Almost of manufacture outputs are tradable goods. International trade plays important role in the success of industrialization process (Poot, 1992). Export performance of a country depends on some factors effecting supply and demand conditions. In short, competitive and comparative advantages will determine the competitiveness of exported products. They are summarized in the industrial organization. Therefore, a study of industrial organization is important in analyzing the interrelationship between factors impacting on performance of a manufacture output in a market. This research is addressed to answer some questions: What factors determine the structure, conduct and performance (SCP)? How do the structure, conduct and performance interrelate?

LITERATURE REVIEW

The most essential contribution of contestability theory, particularly for public policy, is its insinuation that industry structure is determined endogenously and simultaneously with the pricing, output, advertising expenditure and other decisions of the firm comprising industry. The claim contrast with older theories of industrial organization such as the structure-conduct-performance (SCP) paradigm which presented an analytical and empirical framework that dominated industrial economics for many years (Moschandreas 2000). According to this paradigm, industry structure determines the conduct of firms and the performance of the industry. That implies that the fewer firms in an industry the more likely it is that they will have a propensity to collude. Prices will consequently tend to be above the competitive level and entry prevention and other anti-competitive strategies will be more prevalent the higher the degree of industrial concentration. Furthermore, lack of competitive pressures may contribute to managerial slack and inefficiency in production.

The causes and consequences of the structure of industry are two of the concerns of the industrial organization field. A basic framework of this field is the structure-conduct-performance (SCP) framework of industrial analysis (Martin 1988:3). In this basic view, the market structure (its organizational characteristics: particularly degree of concentration and conditions of entry) determines the behaviors (conducts) of the firms in the market regarding prices, sales, employment, advertising, research and development and so on. The conducts of the firms determines performance, particularly profits and efficiency. There is a sense in which the study of industrial economics amounts to fleshing out the relationship outline in Figure 1.

Figure 1. Linear Structure-Conduct-Performance framework

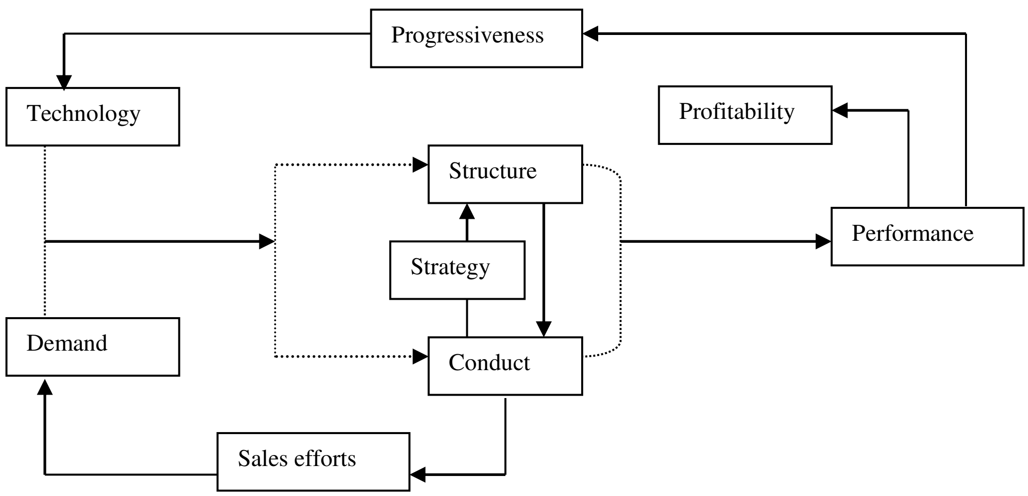


Source: Martin (1988)

Many researches have concentrated on the effect of the concentration ratio, the percentage of output represented by leading four (or three or eight) firms in industry, a measure of structure of an industry, on conduct, such as advertising, and on performance, such as profit (Weis 1971, Comanor and Wilson 1979; Hay and Morris 1979; Scherer 1980; Waterson 1984). The concentration-profit relationship is one of the most thoroughly tested of all hypotheses in economics (Weis, 1974). A voluminous empirical work has attempted to the test the prediction that structure determines performance. But since it not possible to construct an index which encompasses all, or even the main, structural features of an industry many empirical researches attempt to infer the relationship between structure and performance by examining one feature, usually market concentration, on some measures of performance, usually profitability. Moschandreas (2000) notes that research carried over three decates or more by Bain (1956), Stigler (1968), Weiss (1974) and others has consistently indicated a positive although occasionally weak relationship between market concentration and profits. In contrast, there are dissenting voices. Several studies report an insignificant negative (Holtermann 1973; Clarke 1984) or positive (Khalizadeh 1974) relationship between concentration and profits while other (Geroski 1984) have found that the relationship is non-linear.

Various other aspects of industrial conduct and performance have also been related to concentration and other variables. Variables such as prices, wages, advertising, research and development expenditures, and productivity have all been related to concentration and other variables. Each of these studies can be considered a single equation from a larger and simultaneous-equation model of industrial organization relationships, which build on the SCP hypothesis, and can be tested the role played by concentration.

Figure 2. The Interactive Structure-Conduct-Performance framework



Source: Martin 1988

The linear SCP model depicted in Figure 1 presumes very simple causal relationships. In facts, the structure-conduct-performance model that industrial relationships are not so simple but complex and interactive (Phillips 1974). More recently, the group of economists associated with what is known as the 'new industrial organization' theory treats conduct as an equilibrium concept exogenously determined. The no-cooperative Nash Equilibrium is commonly adopted. In their models conduct and the initial demand and supply conditions determine the performance of the market and the number of firms that will exist in the long run (Moschandreas 2000). The transaction cost approach to business organization has also shed doubts on the simple one-way causation implied by the simple SCP paradigm. The linear structure-conduct-performance has been augmented to reflect the interactions among structure conduct and performance that occur in real world market. The structure-conduct-performance interaction suggested by Martin (1988) is presented in Figure 2. This research will analyze the interactive structure-performance-conduct framework in Indonesian manufacture.

METHODOLOGY

Data and Estimation

Data used in this paper is obtained for 30 three-digit (ISIC, International Standard Industrial Classification) manufacturing industries for the 1994-1995 period. A linear version of the model is then estimated using both ordinary least squares (OLS) and two stages least square (2SLS) techniques.

Model

In analyzing the structure-performance-conduct of Indonesian manufacture, this paper will apply simultaneous equation suggested by Intriligator et al (1975) with some extensions. Table 1 shows the six endogenous variables of the model. Market structure is indicated by two variables: concentration, measured by the four-firm concentration ratio based on the value of shipments (CR), and entry, measured by the relative change in the number of firms (ΔN, defined as N_t/N_{t-1}).

Conduct, involving the decision of the firm, is represented by two variables: capital intensity, measured by the capital/labor ratio (K/L), and advertising, measured by advertising-sales ratio (A/S). Performance, involving the social performance of the industry, is represented by two variables: price change, measured by relative change in price (Δp, defined as p_t/p_{t-1}) and profit, measured by net profit on the net worth (Π).

Table 1. Variables of the Simultaneous-Equations Model of Industrial Organization

No.	Variables
1.	**Endogenous Variables**
	Structure Module
	1) CR = concentration ratio (CR4)
	2) ΔN = relative change in number of firms
	Conduct Module
	1) K/L = capital-labor ratio
	2) A/S = advertising-sales ratio
	Performance Module
	1) Δp = relative change in price
	2) Π = profit rate on net worth
2.	**Exogenous Variables**
	Underlying-considerations module
	1) ε_p = price elasticity of demand (negative)
	2) ε_I = income elasticity of demand
	3) MES = minimum efficient size (weighted average of the total asset size class)
	Factor external to a particular industry
	1) w = real wage
	2) g = growth in the value of shipment
	3) Δc = relative change in direct cost

The exogenous variables fall into two categories. *First*, those are factors that may be treated as 'underlying considerations', especially, price and income elasticity of demand (ε_p and ε_I) and the minimum efficient size (MES). *Second*, those are factors that are endogenous to the overall economy but treated as exogenous for any particular industry, namely the real wage (w), the growth in the value of shipments (g) and the relative change in direct cost (Δc). The real wage is assumed to be set by aggregate labor markets, which cut across all industries. As the growth in shipment and the change in direct costs, they reflect considerations that are, from an input-output stand point, respectively, 'downstream' and 'upstream' from any particular industry. An expanded model would treat some of the exogenous variables as endogenous.

Tabel 2. Simultaneous-Equation Model of Industrial Organization

Structure	Conduct
1) $CR = f_1(K/L\ ,\ A/S\ ,\ \Pi\ ,\ \varepsilon_p\ ,\ g)$ + + + - -	3) $K/L = f_3(CR\ ,\ w)$ + +
2) $\Delta N = f_2(CR\ ,\ A/S,\ \Pi\ ,\ MES)$ - - + -	4) $A/S = f_4(CR\ ,\ \Pi\ ,\ \varepsilon_p)$ + + -
Performance	
5) $\Delta p = f_5(CR\ ,\ K/L\ ,\ \Delta c)$ + - +	
6) $\Pi = f_6(CR, A/S,\ MES\ ,\ g\ ,\ \varepsilon_I)$ + + + + +	

The econometric simultaneous model is presented as follows:

$$CR = \alpha_0 + \alpha_1\left(\frac{K}{L}\right) + \alpha_2\left(\frac{A}{S}\right) + \alpha_3\Pi + \alpha_4\varepsilon_p + \alpha_5 g + u_i \quad \text{.......(1)}$$

$$\Delta N = \beta_0 + \beta_1 CR + \beta_2\left(\frac{A}{S}\right) + \beta_3\Pi + \beta_4 MES + u_i \quad \text{.......(2)}$$

$$\left(\frac{K}{L}\right) = \phi_0 + \phi_1 CR + \phi_2 w + u_i \quad \text{.......(3)}$$

$$\left(\frac{A}{S}\right) = \gamma_0 + \gamma_1 CR + \gamma_2\Pi + \gamma_3\varepsilon_p + u_i \quad \text{.......(4)}$$

$$\Delta p = \varphi_0 + \varphi_1 CR + \varphi_2\left(\frac{K}{L}\right) + \varphi_3\Delta c + u_i \quad \text{.......(5)}$$

$$\Pi = \xi_0 + \xi_1 CR + \xi_2\left(\frac{A}{S}\right) + \xi_3 MES + \xi_4 g + \xi_5\varepsilon_p + u_i \quad \text{.......(6)}$$

The six equations of the model and the expected sign of coefficients of all variables of the model are specified in Table 2. It is by no means claimed that the model is either definitive or exhaustive. Rather it is an attempt to represent the SCP paradigm. The variables incorporated and relationships indicated were chosen on the basis of three considerations-their roles in the SCP paradigm, their use in previous studies, and that availability of the pertinent and utilizable data.

RESULT

The result of both estimation techniques i.e. ordinary least square (OLS) and two-stage least square (2SLS) is presented in Table 3. Several finding appear from estimation of this model, particularly the 2SLS coefficient and (asymptotic) standard errors. One set of findings concerns the several two-way relationships of the model, in which one variable both influences and is influenced by another.

Table 3. Industrial Organization Simultaneous Model, Estimated for 30 Three-Digit Manufacturing Industries

EQ1.	2SLS	CR	=	768.0672	-	153.3588K/L	+	63.99336A/S	-	3835.781Π	-	437.0436g	+	5.969512 ε_p	
			se	3857.233		959.7001		117.1505		1540.705		2515.75		27.0382	
	OLS	CR	=	136.6732	-	0.024385K/L	+	22.55822A/S	-	410.6111 Π	-	82.44661g	+	0.270246 ε_p	R^2=0.27
			se	60.92362		5.282122		24.269		213.149		54.47823		0.285018	F =1.73
EQ2.	2SLS	ΔN	=	0.549304	+	0.009831CR	+	0.635769A/S	+	6.740051 Π	-	0.043451MES			
			se	0.119127		0.002935		0.530038		3.256738		0.059757			
	OLS	ΔN	=	1.02901	+	0.001554CR	+	0.384021A/S	-	0.461869 Π	+	0.046518MES			R^2=0.37
			se	0.065273		0.00126		0.145799		1.199721		0.042684			F =3.72
EQ3.	2SLS	K/L	=	0.459381	+	0.022953CR	+	0.007335w							
			se	0.604521		0.014358		0.024459							
	OLS	K/L	=	1.379586	+	0.000242CR	+	0.00669w							R^2=0.003
			se	0.366916		0.008		0.025587							F =0.035
EQ4.	2SLS	A/S	=	-1.14897	+	0.008823CR	+	42.51085 Π	-	0.017794 ε_p					
			se	1.460185		0.012631		47.55374		0.021535					
	OLS	A/S	=	0.045942	+	0.001041CR	-	1.022915 Π	+	0.001351 ε_p					R^2=0.06
			se	0.090881		0.001575		1.796953		0.002118					F =0.53
EQ5.	2SLS	ΔP	=	1.189834	-	0.000297CR	-	0.059469RKL	+	0.000374ΔC					
			se	0.031784		0.000767		0.017473		0.003649					
	OLS	ΔP	=	1.135778	-	0.000275CR	-	0.021797RKL	+	0.00081ΔC					R^2=0.162
			se	0.024399		0.000428		0.010176		0.004131					F =1.68
EQ6.	2SLS	Π	=	0.137108	-	0.000341CR	+	0.356161A/S	+	0.012217MES	-	0.119961g	-	0.001421 ε_I	
			se	0.273726		0.001972		0.253508		0.036172		0.211279		0.000971	
	OLS	Π	=	0.050212	-	0.000338CR	-	0.006512A/S	+	0.000921MES	-	0.011414g	+	0.0000739 ε_I	R^2=0.13
			se	0.063763		0.000217		0.025682		0.007322		0.055858		0.000569	F =0.71

Source: BPS. Industrial Statistics. *Calculated.*

The first is that between advertising-sales ratio and the concentration ratio: A/S exerts a statistically insignificant positive influence on CR, and CR exerts a statistically insignificant positive effect on A/S. The relationship between CR and the profit rate Π has been a major implication of the SCP paradigm. The estimated model, however, indicates that Π exerts a statistically significant negative influence on CR, and CR exerts a statistically insignificant negative effect on Π. It indicates that higher profitability lower CR, vice versa. The third and the last of two-way relationship is that between A/S and Π. According to the estimate in Table 3, A/S exerts statistically significant positive influence on Π, while Π exerts a insignificant positive influence on A/S. The second set of findings concerns the one-way relationship of the estimated model, specifically the lack of statistically significant influence of CR on ΔN.

The third set of findings relates to the role of concentration. This construct has played a central role in the SCP literature, but the result suggest that while concentration does have some place in industrial-organization relationship, it perhaps does not occupy the central place it has assumed as a result of an inadequately tested acceptance of the SCP paradigm. While concentration does have a statistically significant effect on capital intensity, it has no significant influence on entry. Nor does it have a significant influence on the two conduct of decision of the firm with regard to capital intensity and advertising or on the two performance variables of the change in price and the profit rate. Even the central doctrine of the SCP paradigm that concentration leads to higher productivity is not supported by the evidence. Furthermore, concentration can not itself be explained on the basis of consideration such as advertising. These finding concerning the influence and role of the concentration ratio in the system pose serious questions about its central role in the literature on industrial organization.

The fourth set of findings relates to the role of advertising. The evidence points to answer the question of whether advertising is a barrier to entry or not are presented. Advertising does appear to reduce entry, but at the same time, it appears to have no statistically significant effect on concentration. Thus advertising may create a barrier to the entry of new firm with out changing the degree of concentration in the industry.

The fifth set of finding relates to the two techniques of estimation, OLS and 2SLS. Comparing the estimates obtained using OLS with those obtained using 2SLS indicates the effect of the estimation technique. Seven important shifts take place in moving from OLS to 2SLS estimates:

- The influence of Π negative and insignificant on ΔN using OLS but positive and significant using 2SLS
- The influence of MES positive and insignificant on ΔN using OLS but negative and insignificant using 2SLS
- The influence of Π negative and insignificant on A/S using OLS but positive and significant using 2SLS
- The influence of ε_p positive and insignificant on A/S using OLS but negative and insignificant using 2SLS
- The influence of A/S negative and insignificant on Π using OLS but positive and insignificant using 2SLS
- The influence of ε_p positive and insignificant on Π using OLS but negative and significant using 2SLS

CONCLUSION

Several conclusions come forward from this study. First, the SCP paradigm may be improperly giving to much weight to concentration as an explanatory variable for industry conduct and performance. In the case of Indonesian manufacture, the estimated model indicates that profit exerts a statistically significant negative influence on concentration, and concentration exerts a statistically insignificant negative effect on profit. Variable advertising-sale ration exerts statistically significant positive influence on profit, while profit exerts a insignificant positive influence on the advertising-sale ratio. In the case of Indonesian manufacture, concentration does not occupy the central place of the SCP paradigm. Concentration does have a statistically significant effect on capital intensity; it has no significant influence on entry. Concentration cannot itself be explained on the basis of consideration such as advertising. The influence and role of the concentration ratio in the system pose serious questions about its central role in the literature on industrial organization. Advertising does appear to reduce entry, but at the same time, it appears to have no statistically significant effect on concentration. *Second*, it is possible to specify and estimate a simultaneous-equation model of industrial organization. *Third*, the OLS and 2SLS techniques provide different estimates, casting some doubt upon previous single-equation studies.

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Appendix

A. 1. Estimation of Equation 1 (OLS)
Dependent Variable: CR

Method: Least Squares

Date: 11/24/02 Time: 07:22

Sample: 1 30

Included observations: 30

Variable	Coefficient	Std. Error	t-Statistic	Prob.
C	136.6732	60.92362	2.243353	0.0344
RKL	-0.024385	5.282122	-0.004617	0.9964
RAS	22.55822	24.269	0.929508	0.3619
PHI	-410.6111	213.149	-1.926404	0.066
PE	0.270246	0.285018	0.948169	0.3525
G	-82.44661	54.47823	-1.513386	0.1432
R-squared	0.265007	Mean dependent var		40.504
Adjusted R-squared	0.111884	S.D. dependent var		21.80224
S.E. of regression	20.54641	Akaike info criterion		9.060106
Sum squared resid	10131.72	Schwarz criterion		9.340345
Log likelihood	-129.9016	F-statistic		1.730678
Durbin-Watson stat	1.702376	Prob(F-statistic)		0.16592

A.2. Estimation of Equation 2 (OLS)
Dependent Variable: DN

Method: Least Squares

Date: 11/24/02 Time: 07:18

Sample: 1 30

Included observations: 30

Variable	Coefficient	Std. Error	t-Statistic	Prob.
C	1.02901	0.065273	15.76474	0
CR	0.001554	0.00126	1.233928	0.2287
RAS	0.384021	0.145799	2.633901	0.0143
PHI	-0.461869	1.199721	-0.384981	0.7035
MES	0.046518	0.042684	1.089821	0.2862
R-squared	0.372919	Mean dependent var		1.134463
Adjusted R-squared	0.272586	S.D. dependent var		0.142594
S.E. of regression	0.121616	Akaike info criterion		-1.22488
Sum squared resid	0.369763	Schwarz criterion		-0.99135
Log likelihood	23.3732	F-statistic		3.71681
Durbin-Watson stat	2.388939	Prob(F-statistic)		0.016576

A.3. Estimation of Equation 3 (OLS)
Dependent Variable: RKL

Method: Least Squares

Date: 11/24/02 Time: 07:25

Sample: 1 30

Included observations: 30

Variable	Coefficient	Std. Error	t-Statistic	Prob.
C	1.379586	0.366916	3.759951	0.0008
CR	0.000242	0.008	0.030237	0.9761
W	0.00669	0.025587	0.261444	0.7957
R-squared	0.002554	Mean dependent var		1.392647
Adjusted R-squared	-0.071331	S.D. dependent var		0.907418
S.E. of regression	0.939224	Akaike info criterion		2.807114
Sum squared resid	23.81782	Schwarz criterion		2.947233
Log likelihood	-39.1067	F-statistic		0.034566
Durbin-Watson stat	0.998187	Prob(F-statistic)		0.966067

A.4. Estimation of Equation 4 (OLS)

Dependent Variable: RAS

Method: Least Squares

Date: 11/24/02 Time: 07:26

Sample: 1 30

Included observations: 30

Variable	Coefficient	Std. Error	t-Statistic	Prob.
C	0.045942	0.090881	0.505524	0.6174
CR	0.001041	0.001575	0.661103	0.5144
PHI	-1.022915	1.796953	-0.56925	0.5741
PE	0.001351	0.002118	0.637806	0.5292
R-squared	0.057641	Mean dependent var		0.075325
Adjusted R-squared	-0.051093	S.D. dependent var		0.163674
S.E. of regression	0.167803	Akaike info criterion		-0.60849
Sum squared resid	0.732104	Schwarz criterion		-0.42166
Log likelihood	13.12729	F-statistic		0.530109
Durbin-Watson stat	2.174144	Prob(F-statistic)		0.665606

A.5. Estimation of Equation 5 (OLS)

Dependent Variable: DP

Method: Least Squares

Date: 11/24/02 Time: 07:34

Sample: 1 30

Included observations: 30

Variable	Coefficient	Std. Error	t-Statistic	Prob.
C	1.135778	0.024399	46.55022	0
CR	-0.000275	0.000428	-0.643259	0.5257
RKL	-0.021797	0.010176	-2.142052	0.0417
DC	0.00081	0.004131	0.196033	0.8461
R-squared	0.162429	Mean dependent var		1.09561
Adjusted R-squared	0.065786	S.D. dependent var		0.051439

S.E. of regression	0.049718	Akaike info criterion	-3.04133
Sum squared resid	0.064269	Schwarz criterion	-2.85451
Log likelihood	49.61999	F-statistic	1.680711
Durbin-Watson stat	2.389503	Prob(F-statistic)	0.195592

A.6. Estimation of Equation 6 (OLS)
Dependent Variable: PHI

Method: Least Squares

Date: 11/24/02 Time: 08:11

Sample: 1 30

Included observations: 30

Variable	Coefficient	Std. Error	t-Statistic	Prob.
C	0.050212	0.063763	0.787487	0.4387
CR	-0.000338	0.000217	-1.557242	0.1325
RAS	-0.006512	0.025682	-0.253544	0.802
MES	0.000921	0.007322	0.125792	0.9009
G	-0.011414	0.055858	-0.204343	0.8398
IE	7.39E-05	0.000569	0.129851	0.8978
R-squared	0.128867	Mean dependent var		0.024057
Adjusted R-squared	-0.052619	S.D. dependent var		0.020145
S.E. of regression	0.020668	Akaike info criterion		-4.74358
Sum squared resid	0.010252	Schwarz criterion		-4.46334
Log likelihood	77.15362	F-statistic		0.710067
Durbin-Watson stat	1.594369	Prob(F-statistic)		0.621741

B. 1. Estimation of Reduced Equation 1 to Get CRhat

Dependent Variable: CR

Method: Least Squares

Date: 11/24/02 Time: 09:54

Sample: 1 30

Included observations: 30

Variable	Coefficient	Std. Error	t-Statistic	Prob.
C	110.8249	56.7793	1.951853	0.0627
PE	0.099255	0.236686	0.419353	0.6787
IE	0.486854	0.546956	0.890116	0.3822
MES	15.81716	6.466392	2.446057	0.0222
W	0.297558	0.577089	0.515619	0.6108
G	-73.133	51.28393	-1.426041	0.1667
R-squared	0.283668	Mean dependent var		40.504
Adjusted R-squared	0.134432	S.D. dependent var		21.80224
S.E. of regression	20.28392	Akaike info criterion		9.03439

Sum squared resid	9874.494	Schwarz criterion		9.314629
Log likelihood	-129.5158	F-statistic		1.900799
Durbin-Watson stat	2.019069	Prob(F-statistic)		0.131609

B. 2. Estimation of Reduced Equation 2 to Get DNhat

Dependent Variable: DN
Method: Least Squares
Date: 11/24/02 Time: 10:04
Sample: 1 30
Included observations: 30

Variable	Coefficient	Std. Error	t-Statistic	Prob.
C	1.530017	0.301092	5.081568	0
PE	0.004796	0.001245	3.852901	0.0007
IE	0.007396	0.002894	2.555594	0.0171
MES	0.053685	0.033163	1.61882	0.118
G	-0.430829	0.271917	-1.584415	0.1257
R-squared	0.509475	Mean dependent var		1.134463
Adjusted R-squared	0.430991	S.D. dependent var		0.142594
S.E. of regression	0.107562	Akaike info criterion		-1.47048
Sum squared resid	0.289242	Schwarz criterion		-1.23695
Log likelihood	27.0572	F-statistic		6.491457
Durbin-Watson stat	2.482036	Prob(F-statistic)		0.001001

B. 3. Estimation of Reduced Equation 3 to Get RKLhat

Dependent Variable: RKL
Method: Least Squares
Date: 11/24/02 Time: 10:06
Sample: 1 30
Included observations: 30

Variable	Coefficient	Std. Error	t-Statistic	Prob.
C	4.012131	2.214856	1.811464	0.0816
PE	0.028105	0.009292	3.024626	0.0055
W	0.000595	0.021941	0.027103	0.9786
G	-2.615941	2.013019	-1.299511	0.2052
R-squared	0.303178	Mean dependent var		1.392647
Adjusted R-squared	0.222775	S.D. dependent var		0.907418
S.E. of regression	0.799983	Akaike info criterion		2.515113
Sum squared resid	16.63928	Schwarz criterion		2.701939
Log likelihood	-33.72669	F-statistic		3.770747
Durbin-Watson stat	1.274951	Prob(F-statistic)		0.022658

B. 4. Estimation of Reduced Equation 4 to Get RAShat

Dependent Variable: RAS
Method: Least Squares
Date: 11/24/02 Time: 10:08
Sample: 1 30
Included observations: 30

Variable	Coefficient	Std. Error	t-Statistic	Prob.
C	-0.260474	0.471541	-0.55239	0.5856
PE	0.001298	0.00195	0.665608	0.5118
IE	0.004302	0.004533	0.949086	0.3517
MES	-0.032265	0.051936	-0.621235	0.5401
G	0.308614	0.42585	0.724701	0.4754
R-squared	0.086841	Mean dependent var		0.075325
Adjusted R-squared	-0.059264	S.D. dependent var		0.163674
S.E. of regression	0.168454	Akaike info criterion		-0.5733
Sum squared resid	0.709419	Schwarz criterion		-0.33976
Log likelihood	13.59944	F-statistic		0.594373
Durbin-Watson stat	2.139176	Prob(F-statistic)		0.66995

B. 5. Estimation of Reduced Equation 5 to Get DPhat

Dependent Variable: DP
Method: Least Squares
Date: 11/24/02 Time: 10:10
Sample: 1 30
Included observations: 30

Variable	Coefficient	Std. Error	t-Statistic	Prob.
C	0.706423	0.11378	6.208664	0
PE	-0.001345	0.000471	-2.855084	0.0085
W	0.000773	0.001563	0.494638	0.6252
G	0.361797	0.10248	3.530413	0.0016
DC	0.002556	0.004716	0.542106	0.5925
R-squared	0.463742	Mean dependent var		1.09561
Adjusted R-squared	0.37794	S.D. dependent var		0.051439
S.E. of regression	0.04057	Akaike info criterion		-3.42056
Sum squared resid	0.041148	Schwarz criterion		-3.18702
Log likelihood	56.30835	F-statistic		5.404831
Durbin-Watson stat	2.144092	Prob(F-statistic)		0.002815

B. 6. Estimation of Reduced Equation 6 to Get Phihat

Dependent Variable: PHI
Method: Least Squares
Date: 11/24/02 Time: 10:13
Sample: 1 30
Included observations: 30

Variable	Coefficient	Std. Error	t-Statistic	Prob.
C	0.00659	0.057734	0.114146	0.9101
PE	0.000428	0.000241	1.779986	0.0877
IE	-5.52E-05	0.000556	-0.099172	0.9218
MES	-0.004662	0.006575	-0.709016	0.4851
W	-0.000101	0.000587	-0.172718	0.8643
G	0.014864	0.052146	0.28505	0.7781
R-squared	0.132515	Mean dependent var		0.024057
Adjusted R-squared	-0.048211	S.D. dependent var		0.020145
S.E. of regression	0.020625	Akaike info criterion		-4.74777
Sum squared resid	0.010209	Schwarz criterion		-4.46753
Log likelihood	77.21656	F-statistic		0.733236
Durbin-Watson stat	1.943644	Prob(F-statistic)		0.605674

C. 1. Estimation of Equation 1 (TSLS)

Dependent Variable: CR
Method: Least Squares
Date: 11/24/02 Time: 10:17
Sample: 1 30
Included observations: 30

Variable	Coefficient	Std. Error	t-Statistic	Prob.
C	768.0672	3857.233	0.199124	0.8438
RKLHAT	-153.3588	959.7001	-0.159799	0.8744
RASHAT	63.99336	117.1505	0.546249	0.5899
PHIHAT	-3835.781	1540.705	-2.489627	0.0201
PE	5.969512	27.0382	0.220781	0.8271
G	-437.0436	2515.75	-0.173723	0.8635
R-squared	0.283668	Mean dependent var		40.504
Adjusted R-squared	0.134432	S.D. dependent var		21.80224
S.E. of regression	20.28392	Akaike info criterion		9.03439
Sum squared resid	9874.494	Schwarz criterion		9.314629
Log likelihood	-129.5158	F-statistic		1.900799

Durbin-Watson stat	2.019069	Prob(F-statistic)		0.131609

C. 2. Estimation of Equation 2 (TSLS)

Dependent Variable: DN
Method: Least Squares
Date: 11/24/02 Time: 10:19
Sample: 1 30
Included observations: 30

Variable	Coefficient	Std. Error	t-Statistic	Prob.
C	0.549304	0.119127	4.611087	0.0001
CRHAT	0.009831	0.002935	3.349616	0.0026
RASHAT	0.635769	0.530038	1.199479	0.2416
PHIHAT	6.740051	3.256738	2.069571	0.049
MES	-0.043451	0.059757	-0.72713	0.4739
R-squared	0.515134	Mean dependent var		1.134463
Adjusted R-squared	0.437556	S.D. dependent var		0.142594
S.E. of regression	0.10694	Akaike info criterion		-1.48208
Sum squared resid	0.285905	Schwarz criterion		-1.24855
Log likelihood	27.23125	F-statistic		6.640161
Durbin-Watson stat	2.412498	Prob(F-statistic)		0.000875

C.3. Estimation of Equation 3 (TSLS)

Dependent Variable: RKL
Method: Least Squares
Date: 11/24/02 Time: 10:21
Sample: 1 30
Included observations: 30

Variable	Coefficient	Std. Error	t-Statistic	Prob.
C	0.459381	0.604521	0.759909	0.4539
CRHAT	0.022953	0.014358	1.598619	0.1215
W	0.007335	0.024459	0.299909	0.7665
R-squared	0.088769	Mean dependent var		1.392647
Adjusted R-squared	0.021271	S.D. dependent var		0.907418
S.E. of regression	0.897715	Akaike info criterion		2.716712
Sum squared resid	21.7591	Schwarz criterion		2.856831
Log likelihood	-37.75068	F-statistic		1.315128
Durbin-Watson stat	1.204763	Prob(F-statistic)		0.285091

C.4. Estimation of Equation 4 (TSLS)

Dependent Variable: RAS
Method: Least Squares
Date: 11/24/02 Time: 10:24
Sample: 1 30
Included observations: 30

Variable	Coefficient	Std. Error	t-Statistic	Prob.
C	-1.14897	1.460185	-0.786866	0.4385
CRHAT	0.008823	0.012631	0.698527	0.491
PHIHAT	42.51085	47.55374	0.893954	0.3795
PE	-0.017794	0.021535	-0.826291	0.4162
R-squared	0.063387	Mean dependent var		0.075325
Adjusted R-squared	-0.044683	S.D. dependent var		0.163674
S.E. of regression	0.167291	Akaike info criterion		-0.6146
Sum squared resid	0.72764	Schwarz criterion		-0.42778
Log likelihood	13.21904	F-statistic		0.586536
Durbin-Watson stat	2.187876	Prob(F-statistic)		0.629253

C.5. Estimation of Equation 5 (TSLS)

Dependent Variable: DP
Method: Least Squares
Date: 11/24/02 Time: 10:25
Sample: 1 30
Included observations: 30

Variable	Coefficient	Std. Error	t-Statistic	Prob.
C	1.189834	0.031784	37.43558	0
CRHAT	-0.000297	0.000767	-0.387311	0.7017
RKLHAT	-0.059469	0.017473	-3.403546	0.0022
DC	0.000374	0.003649	0.102603	0.9191
R-squared	0.36797	Mean dependent var		1.09561
Adjusted R-squared	0.295044	S.D. dependent var		0.051439
S.E. of regression	0.043189	Akaike info criterion		-3.3229
Sum squared resid	0.048497	Schwarz criterion		-3.13608
Log likelihood	53.84354	F-statistic		5.04577
Durbin-Watson stat	1.832699	Prob(F-statistic)		0.006898

C.6. Estimation of Equation 6 (TSLS)

Dependent Variable: PHI
Method: Least Squares
Date: 11/24/02   Time: 10:28
Sample: 1 30
Included observations: 30

Variable	Coefficient	Std. Error	t-Statistic	Prob.
C	0.137108	0.273726	0.500896	0.621
CRHAT	-0.000341	0.001972	-0.172718	0.8643
RASHAT	0.356161	0.253508	1.404931	0.1729
MES	0.012217	0.036172	0.337748	0.7385
G	-0.119961	0.211279	-0.567786	0.5755
IE	-0.001421	0.000971	-1.463424	0.1563
R-squared	0.132515	Mean dependent var		0.024057
Adjusted R-squared	-0.048211	S.D. dependent var		0.020145
S.E. of regression	0.020625	Akaike info criterion		-4.74777
Sum squared resid	0.010209	Schwarz criterion		-4.46753
Log likelihood	77.21656	F-statistic		0.733236
Durbin-Watson stat	1.943644	Prob(F-statistic)		0.605674