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Interdependent Preferences and Status in Consumption: Empirical Evidence

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Veblen analyzed consumption behavior that results in status for the individuals, where preferences are interdependent. When preferences are interdependent, it is assumed that contemporaneous errors of the demand systems of two or more consumers are correlated. Bush (1992, revised 1994) solved the problem of jointly estimating multiple singular systems when their contemporaneous errors correlated. These econometric results are applied to the problem of simultaneously estimating an expenditure system of a representative consumer in the highest social class and an expenditure system of a representative consumer in the next lower social class. The hypothesis of emulation (conspicuous consumption) is tested. The data provides evidence of support for the Veblenian model of consumer behavior. In addition, magnitudes of emulation are determined.

Introduction

Veblen's (1899) analysis of consumption behavior is modeled. Individuals, in different social classes, maximize status subject to their incomes. Expenditure equations are derived for individuals in the highest social class and individuals in the next lower social class.

Quintiles of income for consumer units are used as approximations to social classes. Using quarterly consumer expenditure data from the highest social class ($5th$ quintile) and the next lower social class ($4th$ quintile), the econometric procedure of Bush (1992, revised 1994), which relies on a generalized inverse algorithm of Dhrymes (Forthcoming), is used to jointly estimate the two expenditure systems. Estimation is under the assumption that the contemporaneous errors of the two systems are correlated.

Magnitudes of pecuniary emulation are provided for three goods: housing, transportation, and other. In addition, the consumption decisions of any consumer in the lower social class is found to significantly depend on that consumer's expectations (perceptions) of individuals in the highest social class. Finally, the data provide some evidence of support for the Veblenian model of consumer behavior, where status is maximized and preferences are interdependent.

Literature and Hypothesis

In the analysis of Veblen (1899), wealth and the demonstration of wealth through consumption of goods are the basis of reputability and esteem, i.e., status, in the individual's community. Veblen indicates that " ... the possession of wealth has become the basis of common place reputability and of a blameless social standing. ... Purposeful effort comes to mean, primarily, effort directed in a more credible showing of accumulated wealth. ..."[1]

Veblen continues " the basis on which good repute in any highly organized industrial community ultimately rests is pecuniary strength; and the means of showing pecuniary strength ... are leisure and conspicuous consumption of goods."[2]

The interdependence of preferences of individuals are embedded in Veblen's analysis of emulation. Individuals consume to show standing within the group the individual classes himself/herself. In addition, " each class envies and emulates the class next above it in social scale.... That is to say ... our standard of decency in expenditure, as in other ends of emulation, is set by the usage of those next above us in reputability...." [3]

Economist, such as Basmann et al. (1988) and Hayes et al. (1992), have interpreted Veblen to mean consumers prefer higher priced goods. The author is not aware of any empirical studies that attempt to estimate the effects of pecuniary emulation. Tintner (1960) constructs a neoclassical utility function, for an individual, that is a function of goods consumed by all other individuals in the economy. However, Tintner's framework does not lend itself to the econometric analysis of pecuniary emulation and status.

In Bush (1993), a mathematical interpretation of Veblen is presented, where interdependent preferences (emulation), changing tastes, and status are central and driving ideas of the model. The Stone-Geary-Status ("SGS") functional form is developed for empirical investigation. Using the SGS functional form, we investigate two interpreted hypotheses of Veblen:

1. Suppose that we have individuals from the highest social class and individuals from the social class next below the highest social class. The consumption decisions of any consumer in the lower social class depends on that consumer's expectations (perceptions) of the expenditures of consumers in the highest social class.

2. The consumption decisions of any individual in the highest social class does not depend on that individual's expectations (perceptions) of expenditures of consumers in the lower social class.

In addition, the magnitude of pecuniary emulation, i.e., the size of expectational parameters are estimated.

Model

Suppose there are n goods in the economy. Let l_i, $i = 1, \ldots, n$, be the number of firms competitively producing homogeneous good i, and $l_i > 2$. Following Bertrand (1883), each competitive firm (chooses) selects a price that the firm will charge consumers. Let $\{p_{1i}, p_{2i}, \ldots, p_{l_i i}\}$ be the set of prices charged by l_i firms for good i. In the production of good i, each firm faces the same constant returns to scale production function. There is no joint production of goods, and firms specialize in the production of a single good.

Suppose there are Z consumers in the economy. Let $f_i^z(I^{+z})$ be individual $z's$, $z = 1, \ldots, Z$ expectation or perception of the expenditures on good i of an individual in the next higher social class. The minimum income or average income of individuals in the next higher social class is I^{+z}. Now, $f_i^z(I^{+z}) = \alpha_i^{(z)} I^{+z} + \alpha_o^{(z)} + \varphi_i^{(z)}$, $i = 1, \ldots, n$, where $\varphi_i^{(z)}$ is a random variable measuring errors in a consumer's expectations. In addition, $E\varphi_i^{(z)} = 0$, and $VAR(\varphi_i^{(z)}) < \infty$. A consumer's expectation of the marginal budget share on good i of a consumer in the next higher social class is $\alpha_i^{(z)}$, $i = 1, 2, \ldots, n$ and $\alpha_o^{(z)}$ is a constant.

The consumer maximizes status-utility function $SU^{(z)}$:

$$SU^{(z)} = \prod_i^n (v_i^{(z)} - \gamma_i^{(z)}[min\{p_{1i}, \ldots, p_{l_i i}\}] - \alpha_i^{(z)} I^{+z} - \alpha_o^{(z)} - \varphi_i^{(z)})^{\beta_i^{(z)}} \quad (0.1)$$

subject to $v_1^{(z)} + v_2^{(z)} + \ldots + v_n^{(z)} = m$

The status-utility function $SU^{(z)}$ is quasi-concave in $v_1^{(z)}, v_2^{(z)}, \ldots, v_n^{(z)}$ The expenditure of consumer z, $z = 1, \ldots, Z$ on good i is $v_i^{(z)}$ and $m^{(z)}$ is the income of the zth individual. The $\{\gamma_1^{(z)}, \ldots, \gamma_n^{(z)}\}$ are parameters. Parameter restrictions are $\sum_{i=1}^{n} \beta_i^{(z)} = 1$, and $\sum_{i=1}^{n} \alpha_i^{(z)} = 1$

Given a price decrease, the quantity demanded can move in two directions for individuals of different social classes. In Bush (1993), it was shown that, given an individuals social class and his seeking of status, the quantity demanded can decrease with a price decrease or that the quantity demanded can increase with a price decrease. Given an individual's social class, the quantity demanded can increase with a price increase or the quantity demanded can decrease with a price increase.

Assume that all agents have perfect information on prices. In addition, assume that firms are aware that consumers purchase from any firm with the least price for homogeneous good i.

A firm l, $l = 1, 2, \ldots, l_i$, which produces good i, has two decisions: 1) determine the price it will charge for good i, and 2) determine the amount of homogeneous good i it will produce. Since there is constant returns to scale in the production of good i, c_i is the unit cost of firm l, $l = 1, \ldots, l_i$, in the production of good i. (We assume that firms negotiated a rental rate for capital and a wage rate for labor in competitive factor markets.) [4] Since firms are aware that consumers will purchase from the firm with the least price for homogeneous good i, Bertrand price competition forces any firm that produces good i to set the price of good i at marginal cost c_i. If any firm establishes a price above marginal cost c_i, the firm will sell nothing. If any firm sells below marginal cost c_i, the firm will incur losses and not survive.

Survival is the ability of the firm to continue business operations through the recovery of all costs. The level of production is critical to the firms survival. The level of production is selected so that the expected value of squared losses are minimized. Firm l selects its actual production level, q_{apl}, in order to minimizes:

$$E(c_i q_{apl} - p_{li} q_{li})^2$$

which implies

$$min_{\ q_{apl}} \quad E(q_{apl} - q_{li})^2,$$

where q_{li} is a random variable of sales of good i by firm l. This random variable has finite mean and variance. Thus, firm l will produce what it expects to sell, i.e., $q_{apl} = Eq_{li}$. However, actual realized sales need not equal expected sales which is the firm's level of production.

Sales of firms are random because consumers face uncertainty. Given perfect information on prices and given no transportation costs, we have modeled consumer decisions on consumption expenditure. However, consumers must also decide where to spend. Consumers' choices of firms to patronize are made in accordance with consumer convenience in daily routine and with the degree of uncertainty in daily events. Thus, competitive firms are exposed to risk of failure due to the uncertainty of sales.

Empirical specification

Dropping superscripts, the maximization of (0.1) results in the following expenditure equations:

$$v_i = \alpha_i^o + \sum_{j=1}^{n} a_{ij}p_j + \alpha_i^* I^+ + \xi_i,\ i, = 1, \ldots, n$$

where $\alpha_i^* = \alpha_i - \beta_i$, and $a_{ii} = (1 - \beta_i)\gamma_i$. Equilibrium prices are $p_1, p_2, \ldots, p_n$ [5]. The coefficient $a_{ij} = -\beta_i\gamma_j$. The error term ξ_i is a function of random variables $\varphi_1, \ldots, \varphi_n$. The intercept term is the constant coefficient α_i^o

Veblen recognized consumption which "does not in any appreciable degree become known to outsiders, e.g., articles of underclothing, some articles of food, ..." [6] Thus, focus is placed on consumption (expenditure) categories that obviously signal pecuniary strength. Expenditures on housing, transportation, and all other commodities are modeled.

In specifying the expenditure equations of consumers, the theoretical derivation requires that all prices enter into all expenditure equations. However, the marketing literature provides evidence that consumers may not consider all prices of commodities when purchasing a particular good. In a field study of grocery shoppers, Dickson (1990) found that only 50 percent of shoppers knew the exact price of items they had selected within 30 seconds of making the purchase. Given additional marketing evidence, we permit different prices to appear in each expenditure equation.

Veblen's framework does not allow for the highest social class to have expectations or perceptions of the expenditures of the next lower social class. In the case of housing, one can reasonably a priori exclude the highest social class from having expectations of expenditures of the lower social class. However, given transportation and the very broad category of other, their is no additional difficulty in determining whether the poorer have any influence on the consumption decisions of the richer. In specifying the expenditure system, we test whether individuals in the higher social class have expectations of expenditures, on specific categories of goods, of those in the next lower social class.

Quintiles of income for consumer units are taken as an approximation for social classes. Two social classes are considered: the highest social class corresponds to the highest quintile, and the social class next below the highest social class is the forth quintile of income. Consumer 5 is a representative consumer in the highest social class, and consumer 4 is a representative consumer in the next lower social class. The expenditure of consumer j, $j = 4, 5$, on good i is denoted $v_i^{(j)}$, where $i = 1 = house$; $i = 2 = transport$; and $i = 3 = other$. A superscript of (4) or (5) on a parameter or variable indicates that the parameter or variable is associated with consumer 4 or consumer 5. At time t, the income (total expenditure) of consumer 4 is denoted m_t, and the income (total expenditure of consumer 5 is denoted I_t^+. At time t, the price of housing is PRH_t; the price of transport is $PRTR_t$; and the price of other is PRO_t.

Specification Set 1

Consumer 4

$$\begin{aligned}
v^{(4)}_{t,HOUSE} &= \alpha^{o(4)}_1 + a^{(4)}_{11} PRH_t + a^{(4)}_{12} PRTR_t + a^{(4)}_{13} PRO_t + \beta^{(4)}_1 m_t + \alpha^{*(4)}_1 I^+_t + u^{(4)}_{t1} \\
v^{(4)}_{t,TRANSPORT} &= \alpha^{o(4)}_2 + a^{(4)}_{22} PRTR_t + \beta^{(4)}_2 m_t + \alpha^{*(4)}_2 I^+_t + u^{(4)}_{t2} \\
v^{(4)}_{t,OTHER} &= \alpha^{o(4)}_3 + a^{(4)}_{31} PRH_t + a^{(4)}_{33} PRO_t + \beta^{(4)}_3 m_t + \alpha^{*(4)}_3 I^+_t + u^{(4)}_{t3}
\end{aligned}$$

Consumer 5

$$\begin{aligned}
v^{(5)}_{t,HOUSE} &= \alpha^{o(5)}_1 + a^{(5)}_{11} PRH_t + a^{(5)}_{13} PRO_t + \beta^{(5)}_1 I^+_t + u^{(5)}_{t1} \\
v^{(5)}_{t,TRANSPORT} &= \alpha^{o(5)}_2 + a^{(5)}_{22} PRTR_t + \eta_1 m_t + \beta^{(5)}_2 I^+_t + u^{(5)}_{t2} \\
v^{(5)}_{t,OTHER} &= \alpha^{o(5)}_3 + a^{(5)}_{31} PRH_t + a^{(5)}_{32} PRTR_t + a^{(5)}_{33} PRO_t + \eta_2 m_t + +\beta^{(5)}_3 I^+_t + u^{(5)}_{t3}
\end{aligned}$$

The matrix $v^{(j)}_{t.} = [v^{(j)}_{t1} v^{(j)}_{t2} v^{(j)}_{t3}]$, and $u^{(j)}_{t.} = [u^{(j)}_{t1} u^{(j)}_{t2} u^{(j)}_{t3}]$, $j = 4,\ 5$. The joint system can be written as

$$y_{t.} = x_{t.} B + u_{t.},$$

where

$$\begin{aligned}
y_{t.} &= [v^{(4)}_{t.}\ v^{(5)}_{t.}] \\
x_{t.} &= [1\ PRH_t\ PRTR_t\ PRO_t\ m_t\ I^+_t] \\
u_{t.} &= [u^{(4)}_{t.}\ u^{(5)}_{t.}]
\end{aligned}$$

The matrix $y_{t.}$ is 1×6; $x_{t.}$ is 1×6; and the matrix $u_{t.}$ is 1×6. The matrix B is a 6×6 matrix containing the parameters of specification set 1 not a priori known to be zero.

Adding-up restrictions apply to the parameters of each system. In addition, adding-up restrictions imply $Cov(u_{t.}^{(4)'})$ is singular, and $Cov(u_{t.}^{(5)'})$ is singular. Due to the interdependence of preferences, it is reasonable to assume that the contemporaneous errors of the respective systems are correlated which implies $Cov(u_{t.}^{'}) = \Omega$. Bush (1992, revised 1994) has shown that $Eu_{t.}^{'} = 0$, and $Cov(u_{t.}^{'})$ is singular. In addition, $\{u_{t.}^{'},\ t = 1, 2, \ldots\}$ is a sequence of i.i.d. random vectors.

Assuming autoregressive errors, $u_{t.} = u_{t-1.}H + \varsigma_{t.}$, where H is a matrix of parameters. The sequence $\{\varsigma_{t.}^{'},\ t = 1, 2, \ldots\}$ is a sequence of i.i.d. random vectors, where $E\varsigma_{t.}^{'} = 0$, and where $Cov(\varsigma_{t.}^{'}) = \Sigma$. The matrix Σ is singular. In addition, adding up restrictions imply restrictions on H.

Specification Set 2

Given $y_{t.}$, $x_{t.}$, and $u_{t.}$, the second set of specifications for the expenditures of consumer 4 and consumer 5 can be jointly written as

$$y_{t.} = x_{t.}\Theta + u_{t.},$$

where

$$\Theta = \begin{bmatrix} \theta_{11} & \theta_{12} & \theta_{13} & \theta_{14} & \theta_{15} & \theta_{16} \\ \theta_{21} & 0 & \theta_{23} & \theta_{24} & 0 & \theta_{26} \\ 0 & \theta_{32} & \theta_{33} & 0 & \theta_{35} & \theta_{36} \\ 0 & \theta_{42} & \theta_{43} & \theta_{44} & 0 & \theta_{46} \\ \theta_{51} & \theta_{52} & \theta_{53} & 0 & \theta_{55} & \theta_{56} \\ \theta_{61} & \theta_{62} & \theta_{63} & \theta_{64} & \theta_{65} & \theta_{66} \end{bmatrix}$$

Adding-up restrictions apply to each subsystem, and the stochastic structure is the same as in specification set 1.

Data

Quarterly consumer expenditures on housing, transportation, and other are taken from the *Consumer Expenditure Interview Survey: Quarterly Data, 1984 - 1990.* Transportation includes, but is not limited to, vehicle purchases, vehicle insurance, gasoline, and motor oil. Housing consists of owned dwellings, rented dwellings, other lodgings, utilities, fuels, public services, housefurnishings and operations. The category of other consists of food, apparel (services), health care, entertainment, and all other expenditures.

Since expenditure data are unadjusted, price data are unadjusted consumer price indices for all urban consumers. The data are taken from the *CPI Detailed Report.* For a given quarter and each category, the consumer price index was constructed by creating a weighted sum of the consumer price indices of all commodities (services) in that category. For a particular commodity in the category, the weight was the ratio of expenditures on the commodity to the total expenditures for the category. Expenditures, that were used in price weighting came from the Consumer Expenditure Survey, since the survey provides expenditures that are representative of all consumer units.

The Consumer Expenditure Survey provides data by quintiles of income before taxes. In the fourth quarter of 1984, the representative unit of the highest 20% of consumer units had an income 94.6 % higher than the representative consumer unit in the fourth quintile. In the second quarter of 1990, the representative unit of the highest 20% of consumer units had an income 97.2 % higher than the representative consumer unit in the fourth quintile. Thus, we take quintiles from the Consumer Expenditure Survey as an approximation for social class.

Estimation

Bush (1992, revised 1994) solved the problem of jointly estimating two or more singular systems of equations, where the contemporaneous errors of the various systems are correlated and where each respective singular system of equations has a unique specification. In the joint estimation problem, exclusion restrictions and adding-up restrictions are imposed within and across systems. When autoregressive errors are present, the estimation procedure is provided, where lags may appear across systems. For example the lagged error from consumer 5's transportation equation can appear in the transportation equation of consumer 4. It is shown that the estimation procedure of Dhrymes (Forthcoming) for estimating a singular system of equations can be used to derive estimates of a larger system, where the larger system is composed of two or more singular systems of equations. However, a covariance matrix that reflects the correlation of the contemporaneous errors of the various systems is employed, and the generalized inverse of the matrix is applied. The results of Bush (1992, revised 1994) are applied to the consumer expenditure data and the specifications of the previous sections. The estimation procedure was coded in APL by the author.

Lag Structures

Specification sets 1 and 2 are each estimated under the following lag structures.

Lag Structure 1

$$H = \begin{bmatrix} h_{11} & 0 & 0 & 0 & 0 & 0 \\ 0 & h_{22} & 0 & 0 & 0 & 0 \\ 0 & 0 & h_{33} & 0 & 0 & 0 \\ 0 & 0 & h_{43} & h_{44} & 0 & 0 \\ 0 & h_{52} & h_{53} & 0 & h_{55} & 0 \\ 0 & 0 & h_{63} & 0 & 0 & h_{66} \end{bmatrix}$$

Lag Structure 2

$$H = \begin{bmatrix} h_{11} & 0 & 0 & 0 & 0 & 0 \\ 0 & h_{22} & 0 & 0 & 0 & 0 \\ 0 & 0 & h_{33} & 0 & 0 & 0 \\ 0 & 0 & h_{43} & h_{44} & 0 & h_{46} \\ 0 & h_{52} & h_{53} & 0 & h_{55} & 0 \\ 0 & 0 & h_{63} & 0 & 0 & h_{66} \end{bmatrix}$$

Lag Structure 3

$$H = 0$$

Results

The hypothesis that individuals, in some lower social class, do not have expectations (perceptions) of the expenditures of other individuals in the next higher social class and that these expectations do not influence consumption expenditure decisions of individuals in the lower social class, is rejected. Under specification set 1 and under lag structure 1, the null hypothesis that $H_o : \alpha_1^* = 0$ ($H_1 : \alpha_1^* \neq 0$) is rejected at the 5% level of significance. The null hypothesis that $H_o : \alpha_2^* = 0$ ($H_1 : \alpha_2^* \neq 0$) is rejected at the 5% level of significance; and the null hypothesis that $H_o : \alpha_3^* = 0$ ($H_1 : \alpha_3^* \neq 0$) is rejected at the 5% level of significance. However, each individual autoregressive parameter is not significant at the 5% level.

When the specification is set 1 and the lag structure is structure 1, the own price of transportation in consumer 4's transportation equation is negative and significant at the 5% level of significance. However, the own price of housing and the own price of other are both positive. This suggests that consumer 4's status is enhanced through the purchase of higher priced housing and other items. In all expenditure equations of consumer 4, income is significant and positive. The results from specification set 1 and lag structure 1 are contained in Table 1.

Table 2 contains the estimates from using specification set 1 and lag structure 2. In this regression analogous results to lag structure 1 are obtained. Representative consumer 4 has statistically significant expectations of the expenditures of representative consumer 5, and these expectations of consumer 4 affect consumer 4's expenditure decisions.

In Table 3, the results from estimating specification set 1, without autoregressive errors, are presented. The chi-square statistic for testing the hypothesis $H_o : \beta = 0$ $(H_1 : \beta \neq 0)$ is 50, where β is a column vector of the elements of B not a priori known to be zero, i.e., the vectorization of the nonzero elements of B. The regression cannot be rejected at the 5% level of significance. Again, the data lends statistically significant support to this specification of interdependent preferences and status. The signs of own price variables in the expenditure systems of both consumer 4 and consumer 5 are the same as the signs that appear under either lag structure 1 or lag structure 2. The R^2 values are reasonable for all regressions, although the R^2 values in the transportation equations are consistently lower.

The hypothesis that, when making consumption decisions, individuals in the highest social class do not have expectations of the expenditures of individuals in the next lower social class, is not rejected. The estimates of η_1 and η_2 are not significant at the five percent level.

Bush (1993) has shown that, if there are no expectations of the expenditures of the next higher social class, the consumption resulting from status maximization and from utility maximization coincide for a particular class of status functions. Thus, the anticipated sign of consumer 5's own price variables should be negative, and, in fact, the estimated signs of consumer 5's own price variables are negative.

Tables 4 and 5 contain parameter estimates from the specification set 2, lag structure 2 and lag structure 3. The results in Tables 4 and 5 provide additional evidence of the statistical significance of interdependent preferences and status maximizing behavior.

Comments

In the estimation of the specification sets, several price variables are not statistically significant. When autoregressive errors are absent, the precision of the estimates could be improved. These problems are in part due to multicollinearity. Due to computer memory restrictions, estimation was limited to three categories of commodities, to data from 1984:1 to 1990:2, and to two classes of consumers. Obviously, alternative specifications can be investigated. In addition, the selection of quintiles as an approximation for social classes is subject to criticism. Given theses limitations, improved data are required for stronger support of the model of interdependent preferences and status maximization.

Conclusion

This paper contains additional evidence on conspicuous consumption and emulation which were discussed by Veblen (1899). Using the econometric procedure of Bush (1992, revised 1994), which relies on the estimation algorithm of Dhrymes (forthcoming), joint estimation of the expenditure system of a representative consumer in the highest social class and of the expenditure system of a consumer in the next lower social class, was undertaken. The consumption decisions of a representative consumer in the lower social class significantly depend on that consumer's expectations of the expenditures of consumers in the highest social class. Finally, the results of the estimation indicate that the data provided support for a model of status maximization, where preferences are interdependent.

Table 1

Estimates of Parameters
Specification Set 1
Lag Structure 1

	CONSUMER 4			CONSUMER 5		
	EQUATION			EQUATION		
VAR	HOUSE	TRANSPORT	OTHER	HOUSE	TRANSPORT	OTHER
con	-528.4700 (-2.0088)	548.0374 (1.8437)	-19.5674 (-0.0797)	-368.8005 (-1.3910)	1775.9547 (4.7159)	-1407.1541 (-3.7295)
PRH	0.5666 (0.4246)		-0.5666 (-0.4246)	-1.4670 (-0.8518)		1.4670 (0.8518)
PRTR	2.0859 (2.1506)	-2.0859 (-2.1506)			-7.1932 (-4.4828)	7.1932 (4.4828)
PRO	-1.1971 (-1.3786)		1.1971 (1.3786)	0.8335 (0.8107)		-0.8335 (-0.8107)
m	0.1989 (5.0833)	0.4809 (6.2042)	0.3201 (5.0691)		0.0766 (1.0343)	-0.0766 (-1.0343)
I+	0.0582 (2.0770)	-0.1525 (-2.8210)	0.0943 (2.2662)	0.3464 (11.5083)	0.2001 (3.5814)	0.4535 (10.9237)
R-sqr	0.9469	0.7792	0.9713	0.9632	0.6497	0.9825

Matrix H

0.0082 (0.0615)	0	0	0	0	0
0	0.0082 (0.0615)	0	0	0	0
0	0	0.0082 (0.0615)	0	0	0
0	0	0.2303 (1.4446)	-0.2221 (-1.7078)	0	0
0	-0.0373 (-0.3244)	0.2703 (1.1283)	0	-0.2248 (-1.7597)	0
0	0	0.2380 (1.5023)	0	0	-0.2298 (-1.7974)

** T-statistic in parentheses

***r-sqr is the square of the correlation between predicted and actual values.

TABLE 2

Estimates of Parameters
Specification Set 1

VAR	CONSUMER 4 EQUATION HOUSE	TRANSPORT	OTHER	CONSUMER 5 EQUATION HOUSE	TRANSPORT	OTHER
con	-534.2807	533.7431	0.5376	-446.7459	1747.7468	-1301.0009
	(-2.0459)	(1.8091)	(0.0022)	(-1.4569)	(4.7293)	(-3.1220)
PRH	0.6660	0.0000	-0.6660	-1.0648	0.0000	1.0648
	(0.4929)		(-0.4929)	(-0.5638)		(0.5638)
PRTR	2.0198	-2.0198	0.0000	0.0000	-7.0475	7.0475
	(2.0914)	(-2.0914)			(-4.5312)	(4.5312)
PRO	-1.2953	0.0000	1.2953	0.3605	0.0000	-0.3605
	(-1.4532)	0	(1.4532)	(0.2607)		(-0.2607)
m	0.1977	0.4818	0.3204	0.0000	0.0763	-0.0763
	(5.0918)	(6.2780)	(5.1064)		(1.0666)	(-1.0666)
I+	0.0611	-0.1538	0.0927	0.3541	0.1985	0.4474
	(2.1337)	(-2.8761)	(2.2408)	(10.3209)	(3.7022)	(10.5697)
R-SQR	0.9466	0.7781	0.9712	0.9633	0.6472	0.9826

Estimates of H

0.0067	0.0000	0.0000	0.0000	0.0000	0.0000
(0.0500)					
0.0000	0.0067	0.0000	0.0000	0.0000	0.0000
	(0.0500)				
0.0000	0.0000	0.0067	0.0000	0.0000	0.0000
		(0.0500)			
0.0000	0.0000	0.2707	-0.1725	0.0000	-0.0915
		(1.4934)	(-1.0630)		(-0.4976)
0.0000	-0.0583	0.3309	0.0000	-0.2660	0.0000
	(-0.4736)	(1.2137)		(-1.7752)	
0.0000	0.0000	0.2765	0.0000	0.0000	-0.2698
		(1.5337)			(-1.8028)

* T-Statistics in parentheses

Table 3

Esitmated Parameters of B*
Specification Set 1
Lag Structure 3

	CONSUMER 4 EQUATION			CONSUMER 5 EQUATION		
	HOUSE	TRANSPORT	OTHER	HOUSE	TRANSPORT	OTHER
con	-398.4475	448.2939	-49.8463	-370.0774	1566.8467	-1196.7693
PRH	0.2929	0.0000	-0.2929	-1.5302	0.0000	1.5302
PRTR	1.8392	-1.8392	0.0000	0.0000	-6.1153	6.1153
PRO	-0.7843	0.0000	0.7843	0.5429	0.0000	-0.5429
m	0.1951	0.4805	0.3244	0.0000	0.0991	-0.0991
I+	0.0529	-0.1506	0.0977	0.3575	0.1733	0.4692
R- sqr	0.9478	0.7813	0.9710	0.9622	0.6471	0.9817

MINUS TWICE THE ln OF THE LIKELIHOOD RATIO IS CHI SQUARE
CHI SQUARE = 50

* The estimates were less than twice their standard error.

Table 4

Estimates of Parameters
Specification Set 2

	CONSUMER 4			CONSUMER 5		
	EQUATION			EQUATION		
VAR	HOUSE	TRANSPORT	OTHER	HOUSE	TRANSPORT	OTHER
con	-146.3401	876.0896	-729.7495	-376.0648	1872.9807	-1496.9159
	(-0.8204)	(1.8592)	(-1.7619)	(-1.2672)	(4.5982)	(-3.7176)
PRH	0.2881		-0.2881	-1.7015		1.7015
	(0.3391)		(-0.3391)	(-0.9993)		(0.9993)
PRTR		-3.5347	3.5347		-7.7875	7.7875
		(-1.8009)	(1.8009)		(-4.4922)	(4.4922)
PRO		0.5008	-0.5008	0.8464		-0.8464
		(0.3586)	(-0.3586)	(0.7036)		(-0.7036)
m	0.1883	0.5177	0.2941		0.0941	-0.0941
	(4.7435)	(6.0356)	(4.1731)		(1.2543)	(-1.2543)
I+	0.0642	-0.1778	0.1136	0.3546	0.1979	0.4475
	(2.1868)	(-2.6541)	(2.1544)	(10.2803)	(3.5488)	(9.9957)
R-SQR	0.9451	0.7682	0.9731	0.9628	0.6445	0.9824

Estimates of H

0.1296	0.0000	0.0000	0.0000	0.0000	0.0000
(0.9762)					
0.0000	0.1296	0.0000	0.0000	0.0000	0.0000
	(0.9762)				
0.0000	0.0000	0.1296	0.0000	0.0000	0.0000
		(0.9762)			
0.0000	0.0000	0.2719	-0.0652	0.0000	-0.0772
		(1.6896)	(-0.4199)		(-0.4451)
0.0000	0.0070	0.2674	0.0000	-0.1448	0.0000
	(0.0524)	(1.1667)		(-1.0302)	
0.0000	0.0000	0.2783	0.0000	0.0000	-0.1488
		(1.7409)			(-1.0589)

T-statistics in parentheses

Table 5

Estimates of Parameters
Specification Set 2

	CONSUMER 4			CONSUMER 5		
		EQUATION			EQUATION	
VAR	HOUSE	TRANSPORT	OTHER	HOUSE	TRANSPORT	OTHER
con	-99.7878	514.6116	-414.8238	-354.7579	1695.4494	-1340.6915
PRH	0.5511		-0.5511	-1.5921		1.5921
PRTR		-2.5842	2.5842		-6.9825	6.9825
PRO		-0.6458	0.6458	0.7181		-0.7181
m	0.1986	0.5205	0.2809		0.1106	-0.1106
I+	0.0446	-0.1397	0.0951	0.3529	0.1799	0.4672
R-SQR	0.9489	0.7807	0.9725	0.9621	0.6429	0.9817

MINUS TWICE THE ln OF THE LIKELIHOOD RATIO IS CHI SQUARE
CHI SQUARE = 50

* Estimates were less than twice their estimated standard Errors

FOOTNOTES

1. Thorstein Veblen, *Theory of the Leisure Class* (New York: MacMillan Company, 1899), 29-34.

2. Ibid., 84.

3. Ibid., 104.

4. The capital market and labor market are competitive. Owners of capital and/or labor establish prices. Firms employ *least priced* capital and *least priced* labor. For firm l, which produces good i, costs are: $cost = min\{r_1, \ldots, r_g\}k_{li} + min\{w_1, \ldots, w_g\}L_{li}$, where k_{li} is the quantity of capital of firm l which produces good i. The quantity of labor of firm l, which produces good i, is L_{li}. The price r_j is rental rate that agent j proposes to provide the services of her capital, $j = 1, \ldots, g$, and $g \geq \sum_i^n l_i$. Agent j proposes to provide her labor services for wage rate w_j. With perfect information, competition drives the rental rate down to $r^* > 0$. Competition in the labor market drives the price down to $w^* > 0$.

5. The prices $(p_1, \ldots, p_n)$ are equilibrium prices in the sense that consumers maximize status and firms have selected Nash equilibrium prices.

6. Ibid., 115.

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