A Theory of Social Interactions

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This essay uses simple tools of economic theory to analyze interactions between the behavior of some persons and different characteristics of other persons. Although these interactions are emphasized in the contemporary sociological and anthropological literature, and were considered the cornerstone of behavior by several prominent nineteenth-century economists, they have been largely ignored in the modern economic literature. The central concept of the analysis is "social income," the sum of a person's own income (his earnings, etc.) and the monetary value to him of the relevant characteristics of others, which I call his social environment. By using the concept of social income, I can analyze the effect on these expenditures of changes in different sources of income and in different prices, including the "price" of the social environment. Interactions among members of the same family receive the greatest attention. The "head" of a family is defined not by sex or age, but as that member, if there is one, who transfers general purchasing power to all other members because he cares about their welfare. A family with a head is a highly interdependent organization that has the following properties: A redistribution of income among members does not affect the consumption or welfare of any member because it simply induces offsetting changes in transfers from the head. Not only the head but other members too act "as if" they "loved" all members, even when they are really selfish, in the sense that they maximize not their own income alone but family income. Transfers from parents to children in the form, say, of schooling, gifts, and bequests tend to be negatively related to what the income of children would be relative to their parents in the absence of these transfers. Therefore, the relative income of children *inclusive* of transfers could be unrelated or even negatively related to these transfers. Consequently, one cannot infer anything about the stability across generations of economic or social positions simply from knowing the relation between parental position and the amount transferred.

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"No Man is an Island." [JOHN DONNE, *Devotions upon Emergent*]

"Man is a social animal." [SENECA, *De beneficiis*]

1. Introduction

Before the theory of consumer demand began to be formalized by Jevons, Walras, Marshall, Menger, and others, economists frequently discussed what they considered to be the basic determinants of wants. For example, Bentham (1789, chap. 5) discusses about 15 basic kinds of pleasures and pains—all other pleasures and pains are presumed to be combinations of the basic set—and Marshall (1962, bk. 3, chap. 2) briefly discusses a few basic determinants of wants before moving on to his well-known presentation of marginal utility theory. What is relevant and important for present purposes is the prominence given to the interactions among individuals.

Bentham mentions "the pleasures . . . of being on good terms with him or them," "the pleasures of a good name," "the pleasures resulting from the view of any pleasures supposed to be possessed by the beings who may be the objects of benevolence," and "the pleasures resulting from the view of any pain supposed to be suffered by the beings who may become the objects of malevolence." Nassau Senior said that "the desire for distinction . . . is a feeling which if we consider its universality, and its constancy, that it affects all men and at all times, that it comes with us from the cradle and never leaves us till we go into the grave, may be pronounced to be the most powerful of all human passions" (quoted by Marshall 1962, p. 87.) Marshall also stresses the desire for distinction and illustrates its influence by discussing food, clothing, housing, and productive activities.[1]

Over the years I have received helpful comments on a succession of drafts from numerous persons, especially my colleagues at the University of Chicago and the National Bureau of Economic Research. I received very useful comments on the draft prepared for publication from Robert Barro, Isaac Ehrlich, Sam Peltzman, and George Stigler, and valuable research assistance from Walter Wessels. My research has been supported by a grant to the NBER from the National Institute of Child Health and Human Development, National Institutes of Health, U.S. Department of HEW; but the paper is not an official NBER publication since it has not been reviewed by the NBER Board of Directors.

[1] He limits his discussion of consumer demand to the largely formal theory of marginal theory because of the importance he attaches to the interaction between activities, consumer behavior and the basic wants: "Such a discussion of demand as is possible at this stage of our work must be confined to an elementary analysis of an almost purely formal kind" (1962, p. 90). He never developed the more complicated and less formal analysis.

As greater rigor permeated the theory of consumer demand, variables like distinction, a good name, or benevolence were pushed further and further out of sight. Each individual or family generally is assumed to have a utility function that depends directly on the goods and services it consumes. This is not to say that interactions between individuals have been completely ignored. Pigou (1903), Fisher (1926, p. 102), and Panteleoni (1898)[2] included attributes of others in utility functions (but did nothing with them). In recent literature, "demonstration" and relative income" effects on savings and consumption,[3] "bandwagon" and "snob" influences on ordinary consumption theory,[4] and the economics of philanthropic contributions[5] have been discussed. But these efforts have not been unified and, more significantly, have not captured the dominance attributed to social interactions by nineteenth-century economists.

Of course, sociologists have for a long time emphasized the central role of interactions and their importance in the basic structure of wants or personality. Veblen's conspicuous consumption and conspicuous leisure (if for this purpose he is classified as a sociologist) have entered ordinary discourse. At one point he said: "But it is only when taken in a sense far removed from its naive meaning that the consumption of goods can be said to afford the incentive from which accumulation invariably proceeds. The motive that lies at the root of ownership is emulation," and "the usual basis of self-respect is the respect accorded by one's neighbors" (Veblen 1934, pp. 25, 30). Interactions were also emphasized by Durkheim, Simmel, Freud, and Weber, as well as in modern discussions of "social exchange" and the "theory of action" (see Blau 1968; Parsons 1968).

My interest in interactions can probably be traced to a study of discrimination and "prejudice" where I analyzed discriminatory behavior by incorporating the race, religion, sex, or other personal characteristics of employees, fellow workers, customers, dealers, neighbors, etc., into utility functions (Becker 1971 [1st ed., 1957]). Subsequently, in order to provide a theoretical framework for a study of philanthropy by the National Bureau of Economic Research, I incorporated the standard of living of "poorer" persons into the utility functions of "richer" ones (Becker 1961). Further reflection gradually convinced me that the emphasis of earlier economists deserved to be taken much more seriously because social interactions had significance far transcending the special cases discussed by myself[6] and others.

[2] I owe this reference to George Stigler.

[3] See, e.g., Brady and Friedman (1947), Duesenbery (1949), or Johnson (1952).

[4] See Leibenstein (1950).

[5] See Vickery (1962), Schwartz (1970), Alchian and Allen (1967, pp. 135–42), and Boulding (1973).

[6] Other drafts that were also circulated include Becker (1968).

This essay incorporates a general treatment of interactions into the modern theory of consumer demand. In Section 2, various characteristics of different persons are assumed to affect the utility functions of some persons, and the behavioral implications are systematically explored. Section 3 develops further implications and applications in the context of analyzing intrafamily relations, charitable behavior, merit goods and multiperson interactions, and envy and hatred. The variety and significance of these applications is persuasive testimony not only to the importance of social interactions but also the feasibility of incorporating them into a rigorous analysis.

2. Theoretical Framework

A. Equilibrium for a Single Person

According to the modern (and very old!) theory of household behavior,[7]

$$U_i = U_i(Z_1, \ldots, Z_m) \tag{2.1}$$

is the utility function of the ith person, and $Z_1, \ldots, Z_m$ are the basic wants or commodities. As indicated earlier, Bentham mentions about 15 basic wants, whereas Marshall and Senior stress an even smaller number. Each person also has a set of production functions that determine how much of these commodities can be produced with the market goods, time, and other resources available to him:

$$Z_j = f_j^i(x_j, t_j, E^i, R_j^1, \ldots, R_j^r), \tag{2.2}$$

where x_j are quantities of different market goods and services; t_j are quantities of his own time, E^i stands for his education, experience, and "environmental" variables; and $R_j^1, \ldots, R_j^r$ are characteristics of other persons that affect his output of commodities. For example, if Z_1 measures i's distinction in his occupation, $R_1^1, \ldots, R_1^r$ could be the opinions of i held by other persons in the same occupation. Presumably, characteristics of others affect the production of a significant fraction of commodities.

If the R_j were completely outside i's control—that is, unaffected by what he does with his resources—i would maximize U taking the R_j as given. This is one way to justify the usual neglect of interactions. They are considered beyond the control of the persons being studied and are therefore taken as given when one is analyzing their reactions to changes in resources and prices.

The point of departure of my approach is to assume the contrary, namely, that i can change R_j by his own efforts. For example, he can avoid social opprobrium and perhaps ostracism by not engaging in criminal activities; achieve distinction by working diligently at his occu-

[7] For an exposition of this theory, see Michael and Becker (1973).

pation, giving to charities, or having a beautiful house; or relieve his envy and jealousy by talking meanly about or even physically harming his neighbors. These effects can be formalized in a production function for the $(R_j^1, \ldots, R_j^r)$ that depends partly on the efforts of i and partly on other variables.

To simplify the discussion,[8] I follow Senior and assume only a single commodity (distinction?) that is produced with a single good (the input of time is ignored) and a single characteristic of others. Then maximizing utility is equivalent to maximizing the output of this commodity, and one can write

$$U_i = Z(x, R). \tag{2.3}$$

I assume also (until Section 3C) that the effect of other variables (including the efforts of others) on this characteristic is not dependent on i's own efforts. Therefore, R can be written as the additive function

$$R = D_i + h, \tag{2.4}$$

where h measures the effect of i's efforts, and D_i the level of R when i makes no effort; that is, D_i measures i's "social environment."

His budget constraint for money income can be written as

$$p_x x + p_R h = I_i, \tag{2.5}$$

where I_i is his money income, $p_R h$ is the amount he spends on R, and p_R is the price to him of a unit of R. Substitute $R - D_i$ for h in equation (2.5) to get

$$p_x x + p_R R = I_i + p_R D_i = S_i. \tag{2.6}$$

The right-hand side gives the sum of i's money income and the value to him of his social environment, and will be called his social income. The left-hand side shows how his social income is "spent": partly on his "own" goods (x) and partly on the characteristics of others (R).[9]

If i maximizes the utility-output function given by equation (2.3) subject to the constraint on social income given by equation (2.6), the equilibrium condition is [10]

$$\frac{\partial U_i}{\partial x} \Big/ \frac{\partial U_i}{\partial R} = \frac{p_x}{p_R}. \tag{2.7}$$

[8] I have also developed the analysis assuming many commodities and many characteristics.

[9] Sociologists sometimes assert that variables like social approval and respect "do not have any material value on which a price can be put" (see Blau 1968). But prices measure only scarcity and have nothing intrinsically to do with "material value"; p_R, for example, only measures the resource cost to i of changing social approval, respect, etc.

[10] I assume for simplicity in this formula that p_R measures the marginal as well as average price of R.

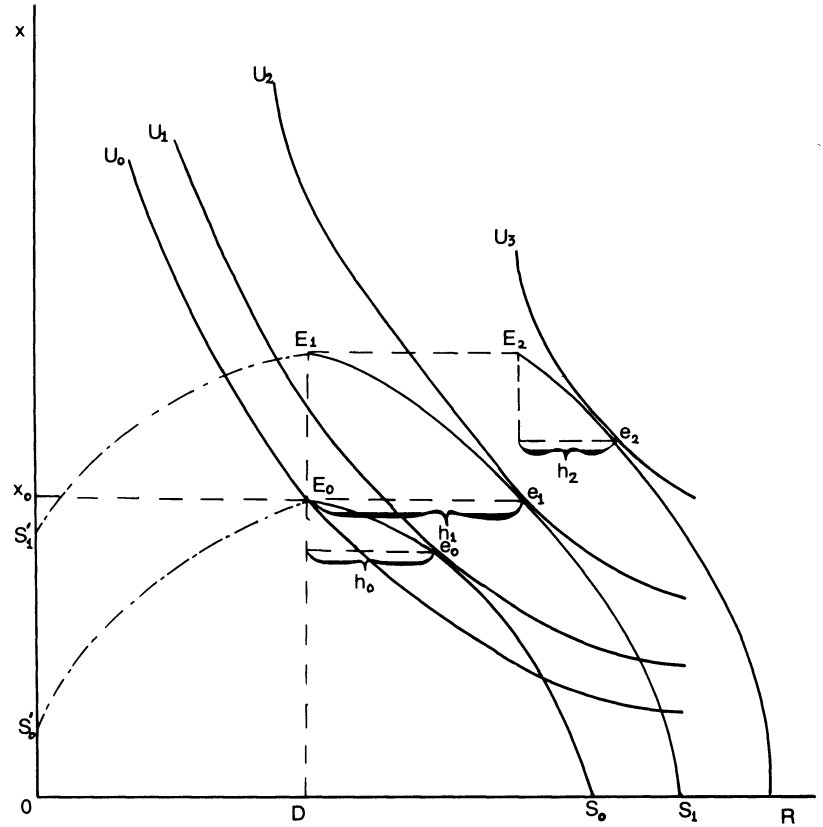

FIG. 1

If I did not want to purchase any R, p_R would be a "shadow" price, measured by the monetary equivalent of the marginal utility (equal to the marginal product) of R to i when $R = D_i$ (or when $h = 0$).

His equilibrium position is shown in figures 1 and 2. The first figure assumes that R has a positive marginal product in the production of Z (a positive marginal utility); that R refers, for example, to the respect accorded i rather than to his envy of others. The quantity $0D$ measures his social environment, and $0x_0$ his own income (measured in terms of x), so that the "endowed" point E_o gives his utility when he spends nothing on R. If E_oS_o measures the opportunities available for purchasing additional R,[11] he would maximize his utility by moving along E_oS_o to point e_o, where the slope of this opportunity curve equaled the slope of his

[11] If he can also reduce R by giving up own goods, the curve E_oS_o would continue in the southwest direction (see ES_o' in the figure). However, this section would be irrelevant if R had positive marginal utility.

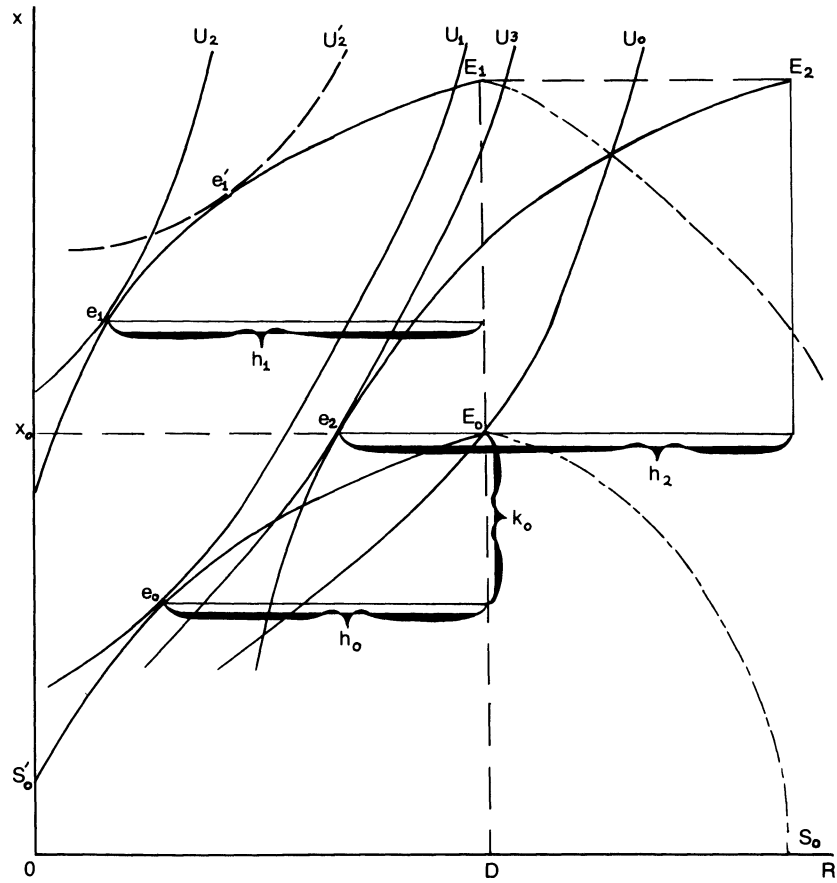

FIG. 2

indifference curve. His equilibrium purchase of R is measured by the line segment h_o.

Figure 2 assumes that R has a negative marginal product (or utility) because, say, it measures the income or prestige of persons that i envies. The section of the opportunity curve to the southeast of point E_o is now irrelevant, and he moves along the southwest section $E_oS'_o$ to point e_o. He is willing to give up resources to reduce R because his utility is raised by a reduction in R; at point e_o, he spends enough resources to reduce R by h_o.

Note that since the marginal (and average) price of R is negative in figure 2, i's social income is *less* than his own income because the value of his social environment is subtracted from his own income. That is, he is made worse off by his social environment if it is dominated by characteristics of others that are distasteful to him. Note too that as long as the marginal utility of R is not zero at the socially endowed position, his social

income would differ from his own income even if he did not want to spend anything on R. He would add to (or subtract from) his own income the product of D and the (monetary equivalent of the) marginal utility of R at the endowed position E_o. In other words, the traditional income concept is incomplete even when no resources are spent trying to influence the attitudes or situation of others.

The analysis developed for social interactions in these figures and in equations (2.3), (2.6), and (2.7) is also applicable whenever there is a physical environment that either can be altered directly or can have its effects augmented or diminished. For example, the human capital of a person is the sum of the amount inherited and that acquired through investments; moreover, the amount invested is partly determined by the inheritance. Or the temperature in a house is determined by the weather and expenditures on fuels, insulation, etc., that reinforce or offset the natural environment.

A more general analysis, therefore, would assume that every term entering the utility function has both an environmental and acquired component. The general analysis could readily be developed, but I have chosen to simplify the discussion by ignoring the nonsocial environment. The results are consistent with those from the general analysis as long as the contribution of the social environment is, on the whole, significantly more important than that of the physical environment. This is assumed to be true. (I am indebted to Gilbert Ghez and especially Robert Barro for stressing the general nature of the analysis.)

B. *Income and Price Effects*

An increase in i's own income alone—without any change in prices or the social environment—would increase both x and R unless one were inferior. The average percentage response in x and R per 1 percent change in his own income is not unity, but is less by the fraction α, where α is the share of the social environment in his social income.[12] Therefore, the effect of a change in his own income on his utility-output is smaller the more important his social environment is.

Put differently, the greater the contribution of his social environment to his social income, the more his welfare is determined by the attitudes and behavior of others rather than by his own income. Traditional models

[12] By differentiating equation (2.6) with respect to I_i alone, $\bar{n} \equiv w_x n_x + w_R n_R = 1 - \alpha$, where

$$w_x = \frac{p_x x}{S_i},\ w_R = \frac{p_R R}{S_i} = 1 - w_x,\ n_x = \frac{dx}{dI_i} \cdot \frac{I_i}{x},\ n_R = \frac{dR}{dI_i} \cdot \frac{I_i}{R},\ \alpha = \frac{p_R D_i}{S_i},$$

and I am assuming that p_R is given (not dependent on h, x, etc.). Of course, the weighted average of income elasticities with respect to a change in S_i must equal unity, as in the usual analysis.

of choice by economists assume that own efforts and access to property income and transfer payments determine welfare. On the other hand, those who stress the social environment, its normative requirements and sanctions for compliance and noncompliance, and the helplessness of the individual in the face of his environment naturally see society dominating individual efforts and, consequently, see little scope for important choices by individuals.

The relative importance of the social environment, as well as other implications of the theory of social interactions, can be empirically estimated from information on expenditures motivated by these interactions. If i's social environment did not change when his own income changed, the induced absolute change in the characteristics of others would equal the change in his contribution to these characteristics. However, the relative change in his contribution would differ from the relative change in these characteristics because the level of the latter is partly determined by the social environment.

Consider again figures 1 and 2, where an increase in i's own income with no change in the environment is shown by a vertical increase in the endowed position from E_o to E_1. Since his equilibrium position changes from e_o to e_1, the change in R is exactly equal to $h_1 - h_o$, the change in i's contribution to R. The percentage change in R in figure 1 is clearly less than that in h, since R is the sum of h and (a fixed) D. Since the percentage change in R in figure 2 is negative, it is also less than the percentage change in h, which is positive (since h is negative). However, if R had been increased by the increase in i's own income—if, say, the new equilibrium position was at point e_1'—the percentage change in R would be positive and would clearly exceed in algebraic value the negative percentage change in h.

The own-income elasticity of demand for contributions is related to the elasticity of demand for characteristics by the following formula:[13]

$$n_h \equiv \frac{dh}{dI_i} \cdot \frac{I_i}{h} = \frac{n_R}{\bar{n}(=1-\alpha)}\left[1 + \alpha\left(\frac{1}{\beta} - 1\right)\right], \tag{2.8}$$

where $0 \leq \beta \leq 1$ is the fraction of own income that is spent on contributions to R. If $\alpha > 0$, if the social environment adds to i's social income,

[13] Since $dh/dI_i = dR/dI_i$,

$$n_h = \frac{dh}{dI_i} \cdot \frac{I_i}{h} = \frac{dR}{dI_i} \cdot \frac{I_i}{R} \cdot \frac{R}{h} = n_R \cdot \frac{R}{h}. \tag{2.8'}$$

But

$$\frac{R}{h} = \frac{p_R R}{p_R h} = 1 + \frac{p_R D_i}{p_R h} = 1 + \frac{S_i - I_i}{\beta I_i} = 1 + \frac{1/(1-\alpha) - 1}{\beta} = \frac{(1-\alpha) + \alpha/\beta}{1-\alpha}.$$

Since $1 - \alpha = \bar{n}$ (see n. 12 above), $n_h = (n_R/\bar{n})(\alpha/\beta + 1 - \alpha)$.

then clearly $n_h > n_R$.[14] Moreover, if $n_R \geq \bar{n} = 1 - \alpha < 1$, necessarily $n_h > 1$ even when $n_R < 1$; that is, contributions to the characteristics of others could have a "high" income elasticity even when the characteristics themselves had a "low" elasticity. Of course, if $n_h > 1$, the own-income elasticity of demand for own consumption (n_x) would be less than unity. That is, social interaction implies a relatively *low* income elasticity for own consumption even without introducing transitory changes in income, errors in variables, and the like.

Equation (2.8) further implies that an increase in α, an increase in the social environment, with no change in the own-income elasticity of demand for characteristics relative to the average elasticity ($n_R/\bar{n}$),[15] would increase the own-income elasticity of demand for contributions.[16] In other words, the more that i's social income was determined by his social environment, the greater would be the percentage change in his contributions to the characteristics of others as his own income changed.

If, on the other hand, $\alpha < 0$—the social environment subtracted from i's social income—then equation (2.8) implies that $n_h < n_R$ when $n_R > 0$, and $n_h > n_R$ when $n_R < 0$ (these different cases are shown in fig. 2). His demand for characteristics would probably be reduced by an increase in his own income (i.e., $n_R < 0$) if these characteristics have a negative marginal utility to him. Again, an increase in α, with $n_R/\bar{n}$ held constant, would raise n_h (the argument in n. 16 fully applies).

Since the social environment to any person cannot be readily observed, an indirect method of estimating at least its sign would be useful. If $n_R/\bar{n}$ were known, that is, if the relative income elasticity of demand for characteristics were known, the sign of α could be estimated simply from information on the own-income elasticity of demand for contributions to the environment, and its magnitude from additional information on the fraction of own income spent on these contributions. Equation (2.8) implies that

$$\alpha = \frac{n_h(\bar{n}/n_R) - 1}{1/\beta - 1}. \tag{2.9}$$

Therefore, $\alpha \gtreqless 0$ as $n_h(\bar{n}/n_R) \gtreqless 1$, and information on n_h, $\bar{n}/n_R$, and β would be sufficient to estimate α.

An increase in a social environment that adds to i's social income would increase his demand for own goods if they had positive income elasticities.

[14] For $[1 + \alpha(1/\beta - 1)]/(1 - \alpha) > 1$, since $1/\beta > 1$, and $1 - \alpha < 1$.

[15] An increase in α lowers $\bar{n}$ because the relative contribution of own income to social income is reduced.

[16] $$\frac{dn_h}{d\alpha}\left(\frac{n_R}{\bar{n}} = \text{constant}\right) = \frac{n_R}{\bar{n}}\left(\frac{1}{\beta} - 1\right) - \frac{n_R}{\bar{n}}\,\alpha\,\beta^{-2}\,\frac{d\beta}{d\alpha}.$$

Both terms are greater than zero because $\beta < 1$, and $d\beta/d\alpha < 0$ (this is shown shortly); therefore, $dn_h/d\alpha > 0$.

If his own income were unchanged, his increased expenditure on own goods would have to be "financed" by reduced contributions to the characteristics of others. Similarly, an increase in a social environment that subtracts from his social income would increase his expenditures on others and reduce his expenditures on own goods. Consequently, the effect of a change in the environment is always (i.e., as long as own goods are not inferior) partly offset by induced changes in i's contributions in the opposite direction, regardless of whether the environment adds to or subtracts from i's social income.

Geometrically, a change in the social envirnment is shown by a horizontal movement of the endowed position. An increase in the environment shifts the endowment in figure 1 from point E_1 to E_2; the equilibrium position is changed from point e_1 to a point on a higher indifference curve (e_2), and i's contribution declines from h_1 to h_2. In figure 2, the equilibrium is changed from point e_1 to a point on a lower indifference curve (e_2), and i's contribution increases from h_1 to h_2.[17]

If both the own and environment incomes of i changed, the effect would be a combination of those when each alone changed. For example, if both incomes increased, the effect on his contributions of the increase in the environment would at least partly offset the effect of the increase in his own income. In particular, if both incomes increased by the same percentage, the percentage change in contributions would be greater than, equal to, or smaller than that percentage as his demand for characteristics exceeded, equaled, or was less than unity.

Through the assumption that p_R is constant, I have been assuming, in effect, that expenditures and the social environment are perfect substitutes in producing characteristics of others. However, the qualitative implications of this assumption can also be derived if they are simply better substitutes for each other than for own consumption—if p_R rises as h rises, but not "too" rapidly. For example, a rise in the environment would reduce contributions, and a rise in own income would increase contributions by a relatively large percentage if the environment and expenditures on these characteristics are simply relatively close direct substitutes.

A rise in the cost of changing the characteristics of others (p_R) would induce the usual substitution (and perhaps income) effects away from these characteristics. If the environment were given, the absolute change in contributions would equal the absolute change in these characteristics,

[17] The endowment-income elasticity of demand for contributions can easily be shown to equal

$$N_h = \frac{dh}{dD} \cdot \frac{D}{h} = (N_R - 1)\left\{\frac{1}{1-\alpha}\left[1 + \alpha\left(\frac{1}{\beta} - 1\right)\right]\right\} + 1.$$

Clearly, when $\alpha > 0$, $N_h < 0$ if $N_R \leq \alpha = \overline{N}$, the average endowment-income elasticity of demand; and when $\alpha < 0$, $N_h > 0$ if $N_R \geq \alpha$.

while the percentage changes would differ according to equation (2.8) in the following way:

$$E_h = -\frac{dh}{dp_R}\frac{p_R}{h} = E_R\left[\frac{1 + \alpha(1/\beta - 1)}{1 - \alpha}\right] \tag{2.10}$$

(same proof as in n. 13 above). Therefore, when $\alpha > 0$, E_h would exceed E_R by an amount that would be greater, the greater α and the smaller β. Similarly, when $\alpha < 0$, E_h would be less than E_R[18] by an amount that would be greater, the greater the absolute value of α and the smaller β.

3. Applications

Three specific applications of the general analysis of social interaction are now considered: interactions among members of the same family, charity, and envy and hatred. These applications not only provide empirical support for the income and price implications just derived, but also bring out a number of other implications of social interaction.

A. The Family

Assume that i cares about his spouse j in the sense that i's utility function depends on j's welfare.[19] I assume until much later in this section that j does not care positively or negatively about i. For simplicity, define the variable measuring this dependence, R_i, as follows:

$$R_i = \frac{I_j + h_{ij}}{p_x} = \frac{S_i}{p_x} = x_j\,, \tag{3.1}$$

where I_j is j's own income, h_{ij} are the contributions from i to j, S_j is j's social income ,and x_j are the goods consumed by j. The social income of i can be derived by substituting equation (3.1) into equation (2.6):

$$p_x x_i + p_R R_i = S_i = I_i + \frac{p_R I_j}{p_x}\,, \tag{3.2}$$

where p_R is the price to i of transferring resources to j. If i can transfer resources to j without any "transactions" costs—presumably, these costs are reduced by sharing a common household—and if i cares sufficiently about j to have $h_{ij} > 0$, then $p_R = p_x$, and

$$S_i = p_x x_i + p_x x_j = I_i + I_j = I_{ij}\,. \tag{3.3}$$

[18] I assume that an increase in the absolute value of p_R reduces the demand for R, so that $E_h > 0$.

[19] Caring is not simply a *deus ex machina* introduced to derive the following implications, since I have shown elsewhere (Becker 1974) that the marriage market is more likely to pair a person with someone he cares about than with an otherwise similar person that he does not care about.

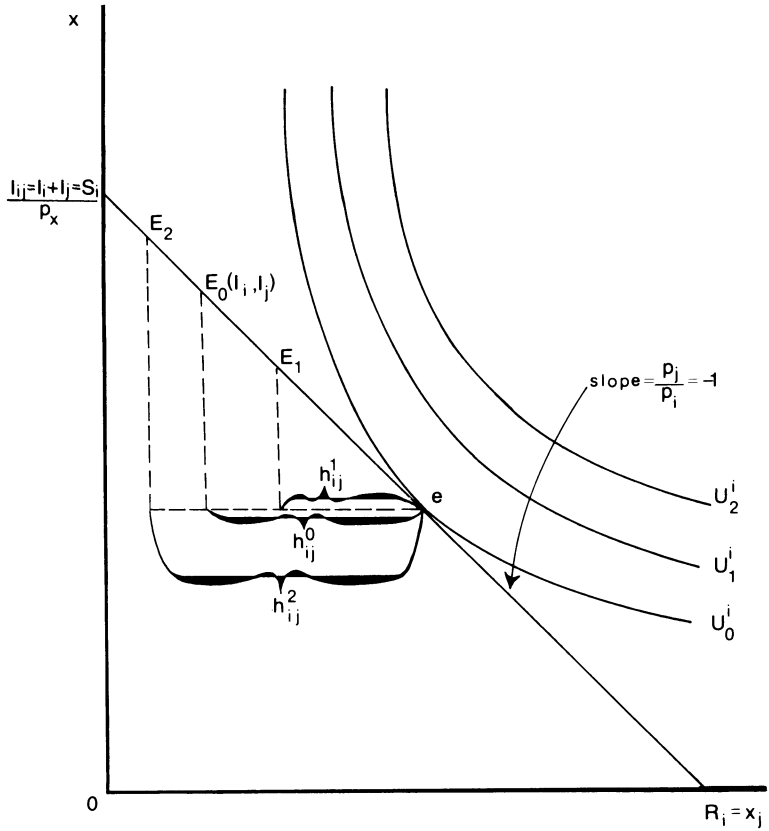

FIG. 3

The social income of i equals the combined own incomes of i and j, or the "family's" own income. Moreover, the equilibrium condition given by equation (2.7) implies that

$$\frac{\partial U_i}{\partial x_i} \Big/ \frac{\partial U_i}{\partial (R_i = x_j)} = \frac{p_x}{p_R} = 1 , \tag{3.4}$$

or i would receive equal marginal utility from j's and his own consumption.

Conditions (3.3) and (3.4) are shown in figure 3. Resources can be transferred from i to j by moving along i's budget line in a southeast direction from the endowed position at point E_o. The equilibrium position is at point e, where the slope of i's indifference curves equals the slope of his budget line (= to -1). The vertical (or horizontal) intercept gives the family's own income—i's social income—deflated by the price of x.

An important implication of this analysis is that a change in the distribution of family income between i and j has no effect at all on the consumption or welfare of either, as long as i continues to transfer resources to j. A change in the distribution would be on the same budget line as E_o if total family income is unchanged: the change from E_o to E_1 is nominally more favorable to j, whereas the change to E_2 is nominally more favorable to i. Since there is only one point of tangency between i's budget line and an indifference curve, the equilibrium position must be unchanged at e. A shift in favor of j's income to E_1 simply induces an equal reduction in i's contributions to j (from h_{ij}^o to h_{ij}^1 in the figure), whereas a shift against j's income to E_2 induces an equal increase in his contributions (from h_{ij}^o to h_{ij}^2).[20]

This discussion has assumed a two-person family but is equally applicable to larger families that include grandparents, parents, children, uncles, aunts, or other kin. If one member, call him the "head," cares sufficiently about all other members to transfer general resources to them,[21] redistribution of income among members would not affect the consumption of any member, as long as the head continues to contribute to all.

The head's concern about the welfare of other members provides each, including the head, with some insurance against disasters. If a disaster reduced the income of one member alone, k, by say 50 percent, the head would increase his contributions to k, and thereby offset to some extent the decline in k's income. The head would "finance" his increased contribution to k by reducing his own consumption and his contributions to other members; in effect each member shares k's disaster by consuming less. If k's share of family income were negligible, he would essentially be fully insured against his own disasters because even a 50 percent decline in his income would have a negligible effect on family income, and thus on the consumption of each member. Since the share contributed by any member would tend to be inversely related to family size, large families, including the extended kinship family found in certain societies, can provide self-insurance especially when old-age, health, and other kinds of market insurance are not available or are very costly.[22] Note that insurance is automatically provided when resources are voluntarily transferred,

[20] If the utility of i also partly depended directly on the amounts he transferred to j, perhaps because i's "prestige" or "approval" partly depended on these transfers, then redistribution of family income *would* have a net effect on the consumption of both i and j.

[21] A somewhat weaker assumption is that the family is "fully connected" through a series of transfers between members; for example, a transfers resources to b because a cares about b, b transfers to c because b cares about c, and so on until m transfers to the last member, n, and n transfers to no one (this assumption is made in an intergenerational context by Barro 1974). Indirectly, a (or any other member but n) would be transferring to all members because an increase in his contributions to b would induce an increase in the contributions to all other members.

[22] The interaction between self and market insurance is analyzed in Ehrlich and Becker (1972).

without the need for any member to have dictatorial control over the family's allocation of resources.

The result on the unimportance of the distribution of income among persons linked by transfers can also be used to understand the interaction among generations.[23] Suppose that the resources of the present generation are changed at the expense of or to the benefit of the resources accruing to future generations. For example, increased government debt or social security payments are financed by increased taxes on future generations, or increased public investment, perhaps in schools, with benefits accruing to future generations is financed by taxes on the present generation. If present and future generations are fully connected by a series of intergenerational transfers, called "bequests," then each of these apparent changes in the relative resources of present and future generations would tend to be offset by equal but opposite changes in bequests. In particular, increased public debt would not raise the real wealth or consumption of the present generation or reduce that of future generations because increased taxes on future generations would be matched by increased bequests to them. Similarly, increased public investment in education would be matched by reduced private investment in education.[24]

The budget constraint of the head is determined by total family income, not his own income alone—equation (3.3) for a two-person family can be readily generalized to many persons. Since the head maximizes his utility subject to his budget constraint, anything that increased family income would increase his utility. Therefore, the head would consider the effect on total family income of his different actions, and would forfeit own income if the incomes of other family members were increased even more. For example, he would not move to another city if his spouse's or children's income would be decreased by more than his own income would be increased. Or, although children usually eventually set up their own households and fully control their own incomes, the head would guide and help finance their investments in education and other human capital to maximize the present value of the real income yielded by these investments.[25]

Put differently, the head automatically internalizes the "external" effects of his actions on other family members.[26] Indeed, because the

[23] This application is taken from the detailed discussion in Barro (1974).

[24] The empirical evidence does strongly suggest that most of the investment in higher education by state governments has been offset by reduced private investment (see Peltzman 1973; McPherson, in preparation).

[25] The incentive that parents have to invest in their children is discussed in several places (see, e.g., De Tray 1973; Parsons 1974).

[26] The Coase Theorem proves that when "bargaining costs" are negligible, each family member could always be induced to maximize family opportunities through bargaining with and side payments from other members. I have proved that the head (and, as shown later, other members too) has this incentive and, in effect, makes or receives "side payments" without bargaining with other members. The word "automatically" is used to distinguish this theorem from the Coase Theorem.

head maximizes family income, he *fully* internalizes these externalities not only when the income of different members but also when their consumption, the other side of the budget constraint, is directly affected. He would take an action directly affecting consumption only when either the value of any increase in his consumption exceeded the value (to him) of any decrease in other members' consumption, or when any decrease in his own was less valuable than the increase in theirs.[27]

For example, he would read in bed at night only if the value of reading exceeded the value (to him) of the loss in sleep suffered by his wife, or he would eat with his fingers only if its value exceeded the value (to him) of the disgust experienced by his family. The development of manners and other personal behavior "rules" between family members well illustrates how apparent "external" effects can be internalized by social interaction between members.

Note too that not only is the head better off when his utility is raised, but so too are other members of his family, even if his actions directly reduce their consumption or increase their discomfort and disgust. For if his utility is raised and if their welfare has a positive income elasticity to him, he would increase his contributions to them by more than enough to offset their initial losses. For example, if he benefits from reading at night, his wife does too because he more than compensates her for her loss of sleep.[28]

The head maximizes a utility function that depends on the consumption of all family members subject to a budget constraint determined by family

[27] Although this is a rather immediate implication of his interest in maximizing family opportunities, a direct proof may be instructive. Suppose that a particular action changed the utility of the head by

$$dU_h = mu^h dx_h + \sum_{j=1,\neq h}^{n} mu^j dx_j, \tag{1'}$$

where $mu^j = \partial U_h/\partial x_j$, and dx_j measures the change in consumption of the jth family member. If the head can transfer resources to other members dollar for dollar, in equilibrium,

$$mu^j = \lambda_h p_j \qquad \text{all } j, \tag{2'}$$

where λ_h is the marginal utility of income to the head, and p_j is the cost of x_j. Substitution of eq. (2') into (1') gives

$$dU^h = \lambda_h(p_h dx_h + \sum_{j=1,\neq h}^{n} p_j dx_j) = \lambda_h \sum_{\text{all } j} p_j dx_j. \tag{3'}$$

Since the head takes an action if and only if $dU_h > 0$, eq. (3') implies (since $\lambda_h > 0$) that he takes an action if, and only if,

$$\sum_{\text{all } j} p_j dx_j > 0, \tag{4'}$$

which was to be proved.

[28] Recall that I have been assuming that only a single good is consumed by each person, although this analysis presupposes many goods. The transition to many goods is straightforward if the head's utility depends on a function of the various goods consumed by another member that is monotonically related to the utility function of that member (see the discussion later in this section).

income and family consumption. Therefore, the effect of a change in relative prices of goods, or in aggregate family income (as well as in its distribution) on a family's consumption of different goods, could be predicted solely from the head's utility function and a budget constraint on family variables. The usual substitution and income effects of demand theory would be fully applicable.

In this sense, then, a family with a head can be said to maximize "its" consistent and transitive utility function of the consumption of different members subject to a budget constraint defined on family variables. The "family's" utility function is identical with that of one member, the head, because his concern for the welfare of other members, so to speak, integrates all the members' utility functions into one consistent "family" function.

That is, a "family's" utility function is the same as that of one of its members not because this member has dictatorial power over other members, but because he (or she!) cares sufficiently about all other members to transfer resources voluntarily to them. Each member can have complete freedom of action; indeed, the person making the transfers would not change the consumption of any member even with dictatorial power! For example, if i had dictatorial power, he could move the equilibrium position e in figure 3 to the vertical axis (or anywhere else), but would not choose to move it because his utility partly depends on j's consumption.[29]

Nothing much has yet been said about the preferences of members who

[29] It is difficult to contrast my derivation of a "family" utility function with a traditional derivation, since explicit derivations are rare. The most explicit appears to be in a well-known article on social indifference curves by Samuelson (1956). He considers the problem of relating individual and family utility functions, but his discussion is brief and the arguments sometimes are not spelled out. Without sufficient elaboration, he refers to a consistent "family welfare function" being grafted onto the separate utility functions of different family members (p. 10). In addition, he says that a family member's "preferences among his own goods have the special property of being independent of the other members' consumption. But since blood is thicker than water, the preferences of the different members are interrelated by what might be called a 'consensus' or 'social welfare function' which takes into account the deservingness or ethical worths of the consumption levels of each of the members." How are these preferences interrelated by a "consensus," and should not the "deservingness" of the consumption levels of different members simply be incorporated into different members' preferences (as in my approach)? Incidentally, at one point (p. 9), Samuelson appears to believe that if the family utility function is the same as the head's, he must have sovereign power, which I have shown is not necessary. He later (p. 20) says that "if within the family there can be assumed to take place an optimal reallocation of income so as to keep each member's dollar expenditure of equal ethical worth, then there can be derived for the whole family a set of well-behaved indifference contours relating the totals of what it consumes: the family can be said to *act as if* it maximizes such a group preference function" (italics in original). In my analyses, the "optimal reallocation" results from interdependent preferences and voluntary contributions, and the "group preference function" is identical with that of the "head."

are not heads. The major, and somewhat unexpected, conclusion is that if a head exists, *other members also are motivated to maximize family income and consumption, even if their welfare depends on their own consumption alone.* This is the "rotten kid" theorem (I owe this name to the Barro family). For consider a selfish member j who can take an action that would reduce his income by b, but increase that of another member k by c. Initially, j would be worse off by b, since the gain to k is of no direct concern to him. However, if $c = b$, the head would transfer enough additional resources to j from k to leave him (and k) equally well off, since intrafamily reallocations of income do not affect the consumption of any member. Moreover, if $c > b$—if family income were raised by j's action—and if j's welfare were a superior "good" to the head, then he would transfer enough additional resources to j to make j better off. Consequently, even a selfish j would only undertake actions that raised family income or consumption, regardless of the initial impact on him.

In other words, when one member cares sufficiently about other members to be the head, all members have the same motivation as the head to maximize family opportunities and to internalize fully all within-family "externalities," regardless of how selfish (or, indeed, how envious) these members are. Even a selfish child receiving transfers from his parents would *automatically* consider the effects of his actions on other siblings as well as on his parents. Put still differently, sufficient "love" by one member guarantees that all members act as if they loved other members as much as themselves. As it were, the amount of "love" required in a family is economized: sufficient "love" by one member leads all other members by "an invisible hand" to act as if they too loved everyone.

Armed with this theorem, I do not need to dwell on the preferences of nonheads. Of course, just as there may be no head if all members are sufficiently selfish, so there may be none if they are all sufficiently altruistic. Each would want to transfer resources to other members, but no one would want to accept transfers. Aside from that, mutual interaction or mutual interdependence of welfare raises no particular problems.[30]

[30] It frequently has been alleged to me that mutual interaction of the form

$$U_i = U_i[x_i, g_i(U_j)]$$
$$U_j = U_j[x_j, g_j(U_i)],$$

where x_i and x_j are the own consumption of i and j, and g_i and g_j are monotonic functions of the utility indexes U_i and U_j, results in instability and unbounded utility levels. For it is argued, an increase in x_i by one unit directly raises i's utility, which raises j's utility through g_j, which in turn further raises i's utility, and so on, until U_i and U_j approach infinity. Mathematically, there is an infinite regress, since, by substitution,

$$U_i = U_i[x_i, g_i\{x_j, g_j\{x_i, g_i\{x_j, g_j\{\dots\}\}\}\}].$$

However, with appropriate restrictions on the magnitude of the interactions, the infinite regress has a finite effect, and the "reduced forms" of U_i and U_j on x_i and x_j

By assuming in figure 3 and in the formal development given by equations (3.1)–(3.4) that only a single good is consumed by each person, I eliminated any distinction between transferring general purchasing power and transferring particular goods to another member. If each member consumes many goods, the conclusions in this section about family utility functions, internalization of within-family externalities, and so on fully hold only if the head is content to transfer general purchasing power. He would transfer in this form if his utility function depended on the utility of other members—that is, if his utility function could be written in the form

$$U_h = U_h[x_{h1}, \ldots, x_{hm}, g_1(x_{21}, \ldots, x_{2m}), \ldots, g_n(x_{n1}, \ldots, x_{nm})], \quad (3.5)$$

where x_{ij} is the quantity of the jth good consumed by the ith person, and

$$dg_i = 0 \left(= \sum_{j-1}^{m} \frac{\partial g_i}{\partial x_{ij}} dx_{ij} \right)$$

implies that the utility of the ith person is unchanged. If he is concerned not about the utility of other members but about their consumption of particular "merit" goods, the conclusions can be quite different. The systematic discussion of merit goods is postponed to Section 3*C*.

If parents are transferring resources to their children in the form, say, of gifts and expenditures on education and other human capital or after they die in the form of bequests, then an increase in the income of parents by a given percentage would tend to increase contributions to children by a still larger percentage, certainly by one exceeding the increased welfare of their children (see the discussion in Section 2). In other words, contributions to children can be very responsive to a change in parental income without the welfare of children being so responsive.

Empirical evidence on bequests, gifts, and many other transfers to children is seriously deficient. The general impression is, however, that

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are well defined. Consider, for example, the Cobb Douglas functions

$$U_i = x_i^{a_i} U_j^{b_i}$$
$$U_j = x_j^{a_j} U_i^{b_j},$$

where a_i and a_j presumably are greater than zero, and b_i and b_j can either be greater than or less than zero. By substitution,

$$U_i = x_i^{a_i/(1-b_ib_j)} x_j^{a_jb_i/(1-b_ib_j)} = x_i^{\alpha_i} x_j^{\beta_i}$$
$$U_j = x_i^{a_ib_j/(1-b_ib_j)} x_j^{a_j/(1-b_ib_j)} = x_i^{\alpha_j} x_j^{\beta_j},$$

where b_ib_j is independent of monotonic transformations on U_i and U_j. A finite sum to the regress requires that $|b_ib_j| < 1$; essentially, that the marginal utilities or disutilities due to interdependence are less than unity. Note that although it is possible for $a_i = b_i$ and $a_j = b_j$, for own consumption and the welfare of the other person to be equally "important," the condition $|b_ib_j| < 1$ implies that either $|\alpha_i| > |\beta_i|$, or $|\beta_j| > |\alpha_j|$, or both; that is, for at least one of the persons, own consumption has to be more important than the other person's consumption in the "reduced forms."

bequests have a very high income elasticity. Moreover, the elasticity of expenditures on children's education with respect to parental income does appear to be above unity (Schultz 1967, p. 9), which is consistent with the implications of the theory.

The responsiveness of expenditures on children's education and other training and skills to parental income has often been noted, and lamented as evidence of immobility and rigid "class" structure. Yet my analysis implies that the welfare of children—a measure of their "class"—rises by a smaller percentage than parent expenditures on them, and possibly even by a smaller percentage than parental income. Put differently, considerable regression toward the mean across generations—that is, the expected income or other measure of the position of children would be much closer to the average position than is that of their parents—can be observed at the same time that contributions to children are very responsive to parental income.[31]

The crucial point is that considerable regression toward the mean across generations would occur partly because of genetic factors and luck if all parents spent an equal amount on their children. As a result of this, and given interdependent preferences, higher-income parents tend to spend considerably more on their children than lower-income ones. However, these expenditures would only tend to dampen but not eliminate the

[31] In one study, the elasticity of children's years of schooling with respect to parental income is a sizeable +1.2, at the same time that the elasticity of children's *income* with respect to parental income is only +0.3, or a 70 percent regression toward the mean (unpublished calculations by Jacob Mincer from the Eckland Sample). Note in this regard, however, that parents cannot easily prevent considerable regression toward the mean by investing in their children. For let the relation between the human capital invested in children and parental income be

$$S_c = a + b \log I_p + u,$$

where b is the elasticity of parental response, and u represents other determinants of S_c. According to the theory of investment in human capital (Mincer 1974; Becker 1975 [in press]),

$$\log I_c = \alpha + rS_c + v,$$

where r is the rate of return on human capital, and v represents other determinants of $\log I_c$. Then by substitution,

$$\log I_c = (\alpha + ra) + rb \log I_p + (ru + v).$$

Even if r were as large as 0.2, and b as large as 2.0, rb would only be 0.4: the regression toward the mean would be 60 percent. If $v = c \log I_p + v'$, where $1 - c$ measures the degree of "intrinsic" regression to the mean, then by substitution,

$$\log I_c = (\alpha + ra) + (rb + c) \log I_p + (ru + tv').$$

Since the analysis in the text implies that b would be positively related to $1 - c$ as parents try to offset the "intrinsic" regression, the "observed" regression to the mean,

$$1 - \gamma = 1 - (c + rb) = (1 - c) - rb,$$

may be only weakly related to and also is less than the "intrinsic" regression $1 - c$. I am indebted to discussions with Jacob Mincer on the issues sketchily covered in this footnote.

regression toward the mean. Therefore, the elastic response of contributions to children can give a very biased picture of the degree of immobility or inheritance of "class" position. Indeed, contributions would be more responsive to parental income the stronger are the basic forces producing mobility because parents attempt to offset these forces. In other words, an elastic response of contributions to parental income may be evidence of sizeable *mobility*![32]

B. *Charity*

If someone makes contributions of time or goods to unrelated persons or to organizations, he is said to be "charitable" or "philanthropic." The discussion of contributions within a family indicates that charitable behavior can be motivated by a desire to improve the general well-being of recipients.[33] Apparent "charitable" behavior can also be motivated by a desire to avoid the scorn of others or to receive social acclaim. Not much generality is sacrificed, however, by only considering charity motivated by a desire to improve well-being.[34]

The numerous implications about family behavior developed in the previous section fully apply to the synthetic "family" consisting of a charitable person i and all recipients of his charity. For example, no member's well-being would be affected by a redistribution of income among them, as

[32] It is generally believed that the United States has a more mobile "open" society than European countries do; yet (admittedly crude) comparisons of occupational mobility between fathers and sons do not reveal large differences between the United States and several Western European countries (Lipset and Bendix 1959). Since the analysis in this paper suggests that parents' contributions to their children's education and other training is more responsive to parental position in "open" societies, more responsive parental contributions are probably offsetting the greater "openness" of American society.

[33] *The Random House Dictionary of the English Language* (unabridged, 1967) defines charity as "the benevolent feeling, especially toward those in need or in disfavor."

[34] The utility function of a charitable person who desires to improve the general well-being of recipients can be written as

$$U_i = U_i\left[x_i, x_j\left(=\frac{I_j + h}{p_j}\right)\right],$$

where h is his charitalbe giving, x_j measures the well-being of recipients, and $\partial U_i/\partial I_j = \partial U_i/\partial h > 0$; that is, a unit increase in the own income of recipients has the same effect on the utility of a charitable person as a unit increase in his giving. The utility function of a person who makes "charitable" contributions to win social acclaim can be written as

$$U_i = U_i\left(x_i, \frac{I_j}{p_j}, \frac{h}{p_j}\right),$$

where still $\partial U_i/\partial h > 0$—an increase in his contributions would increase his acclaim—but now the sign of $\partial U_i/\partial I_j$ is not so obvious. If, however, contributions and the income of recipients were much closer substitutes for each other than for the own consumption of the contributor, which is plausible, then these utility functions have similar implications. Not much generality is sacrificed, therefore, by only considering charity motivated by a desire to improve the well-being of recipients.

long as i continued to give to all of them. For he would simply redistribute his giving until everyone losing income was fully compensated and everyone gaining was fully "taxed." Moreover, all members, not simply i, would try to maximize "family" opportunities and "family" consumption, instead of their own income or consumption alone. In addition, each member of a synthetic "family" is at least partly "insured" against catastrophes because all other members, in effect, would increase their giving to him until at least part of his loss were replaced. Therefore, charity is a form of self-insurance that is a substitute for market insurance and government transfers. Presumably, the rapid growth of these latter during the last 100 years discouraged the growth of charity.

According to the analysis in Section 2, an increase in the income of a charitable person would increase his charitable giving by a greater percentage than the increase in the well-being of recipients. Indeed, his income elasticity of demand for giving would exceed unity, possibly by a substantial amount, as long as his elasticity of demand for their well-being (which I will call his demand for charity) was not much below his average income elasticity. The available evidence on charitable giving clearly supports this implication of the theory: income elasticities estimated by Taussig (1965) from giving in different income classes in 1962 are all well above unity, ranging from a low of $+1.3$ in the under \$25,000 class to a high of $+3.1$ in the \$100,000–\$200,000 class.[35]

A crucial implication of charitable giving in terms of social interaction between the giver and others is that an increase in the incomes of recipients would reduce giving. Therefore, an increase in the incomes of both recipients and givers should not increase giving by as much as an increase in the incomes of givers alone. These implications are tested and confirmed by Schwartz (1970), who analyzes aggregate time series on incomes and charitable giving in the United States between 1929 and 1966 and also compares his findings with the cross-sectional findings of Taussig (1965) reported above.[36]

The usual theory of consumer choice ignores social interactions, and would consider charitable giving simply as a "good" that enters the

[35] These estimates are net of differences in tax rates. Note, however, that charitable giving is estimated from itemized deductions in personal income tax returns. Since only giving to (certain) institutions and not to individuals can be deducted, since many taxpayers, especially with lower incomes, do not itemize their deductions, and since others inflate their deductions, the response of tax-reported giving may not accurately describe the response of actual giving.

[36] Schwartz's study, like Taussig's, is based on personal income tax returns. Both studies also estimate the price elasticity of giving, where price is measured by one minus the marginal tax rate. Schwartz finds considerable response to price, elasticities generally exceeding -0.5, which is consistent with the implications of the theory of social interactions. Taussig, on the other hand, finds only a weak response to price; but Schwartz argues that Taussig's findings are biased downward.

giver's utility function along with his other goods:

$$U_i = U_i(x_i, h) , \tag{3.6}$$

where h measures the amount given by i, and x_i are the other goods that he consumes. This "conventional" approach does not imply that an increase in i's income would increase his giving by a particularly large percentage, or that an increase in the incomes of recipients would lower his giving. Therefore, considerable ad hocery would be required if the "conventional" approach were to explain the evidence on charitable giving that is more readily explained by an approach that incorporates social interactions.

These findings can be used to make very crude, but instructive, calculations of the share of recipient's own incomes in the social incomes of contributors. If the own-income elasticity of demand for giving is taken from Taussig as $+2.0$, the share of own income spent on giving as 0.04 (see Schwartz 1970, p. 1278), and the income elasticity of demand for charity as equal to the average income elasticity (actually, Schwartz's findings suggest that it may be lower than the average), then, according to equation (2.9), charity's share in social income would be $(2 - 1)/(1/0.04 - 1) \approx 0.4$. If the own-income elasticity of giving were taken as $+3.0$ rather than $+2.0$, charity's share would double to 0.08; if, in addition, the income elasticity of charity were only four-fifths of the average elasticity, its share would increase further to 0.11 (a tithe?).

C. *Merit Goods and Multiperson Interactions*

Contributors are content to transfer general purchasing power to recipients if they are concerned about the general welfare or utility of recipients—as seen by recipients. They want to restrict or earmark their transfers, on the other hand, if they are concerned about particular "merit" goods consumed by recipients. For example, parents may want transfers to their children spent on education or housing, or only the money incomes rather than "full" incomes of children may be of concern to parents, or contributors to beggars may not want their giving spent on liquor or gambling.

Assume, therefore, that i transfers resources to j that are earmarked for particular goods consumed by j because the utility function of i depends not only on his own goods but also on these goods of j. If j were permitted to spend his own income as he wished, an assumption modified shortly, he would spend less on these goods as a result of the earmarked transfers from i. Clearly, the reduction in his own spending would be greater, the greater the transfer, the smaller the fraction of his social income spent on these goods, and the smaller their income elasticity. For example, if they

take 20 percent of his social income and have an income elasticity equal to 2.0, he would reduce his own spending by \$0.60 for each dollar earmarked by i.[37]

As long as j continues to spend on the merit goods, earmarked transfers are worth as much to j as a transfer of general purchasing power with equal monetary value. Moreover, i would not have a greater effect on j's consumption of these goods with earmarked transfers than with general transfers. Therefore, as long as j continues to spend on these goods, earmarked transfers are equivalent to general transfers; and the results derived for the latter fully hold for the former. For example, a redistribution of income between i and j would have no effect on the consumption of either as long as both continue to spend on the merit goods, or both i and j want to maximize their combined incomes, not their own incomes alone.

On the other hand, if j did not want to spend anything on the merit goods because earmarked transfers were sufficiently large, such transfers would be worth less to j and more to i than would general transfers with equal money value. Moreover, various results derived for general transfers no longer hold: for example, a redistribution of income to j and away from i would reduce j's consumption of merit goods and increase his consumption of other goods.

If i were aware that j reduced his spending on merit goods when transfers increased, i would be discouraged from giving because j's reaction raises i's private price of merit goods to

$$p_m^i = p_m \frac{1}{1 - r_j} = p_m \frac{1}{v_m n_m},^{38} \tag{3.7}$$

where p_m is the market price of merit goods, and the other terms are defined in note 37. Similarly, if j were aware that i reduced his transfers when j increased his spending on merit goods, j would also be discouraged from spending because i's reaction raises the price to j. Indeed, j could end up consuming fewer merit goods than he would if i were not concerned! That these induced reactions are not simply hypothetical or always minor is persuasively shown in a recent study of higher education (Peltzman 1973). States earmark transfers to higher education mainly through highly subsidized public institutions. Private spending was apparently reduced by (at least) \$0.75 per dollar of public spending in 1966–67; private spending may have been reduced by more than \$1.00 per dollar of public spending in 1959–60, so that *total* spending on higher education in that year would have been reduced by public spending.

[37] It is easily shown that $r_j = 1 - v_m n_m$, where v_m is the share spent on merit goods; n_m, their income elasticity; and r_j, the reduction in j's own spending per unit increase in i's contribution. Therefore, if $v_m = 0.2$, and $n_m = 2.0$, $r_j = 0.6$.

[38] For example, if j spent \$0.60 less for each dollar transferred by i, the price to i would be $p_m^i = p_m(1/0.4) = 2.5\, p_m$, or more than twice the market price.

Both i and j want to limit the induced reactions of the other because such reactions reflect the incentive to "underreveal" preferences about merit goods and "free-ride" in their consumption. Since equation (3.7) shows that these reactions raise the price of merit goods to i and j, in effect, both want to lower these prices. Indeed, it is well known from the theory of public goods, and a merit good is a particular kind of "public" good, that efficient prices to i and j would be less than the market price; indeed, these efficient prices would *sum* to the market price of the merit good.[39] Efficient prices might be achieved, for example, by i and j matching each other's spending in specified proportions, or each might be given a spending quota.

I intentionally say "might" be achieved because any agreement has to be "policed" to insure that each lives up to his commitment. Policing is relatively easy for the consumer of the merit goods, j, since he usually automatically knows how much is spent by i, but is much more difficult for i, since he does not automatically know how much is spent by j.[40] Parents may use their children's grades in school to measure the input of time and effort by children that presumably "matches" the money contribution by the parents.[41] Or parents may save a large part of their total transfer to children for a bequest when they die in order to provide an incentive for children to spend "appropriately," at least while their parents are alive.[42] This may explain why the inheritance tax on bequests apparently has induced relatively little substitution toward gifts to children (see Shoup 1966; Adams 1974).

The "underrevealing," "free-riding," coordination of efforts, and "policing" discussed for merit goods are common to all multiperson interactions—that is, all situations where two or more persons are affected by the consumption, attitudes, or other behavior of the same person. The analytical issues for multiperson interactions are the same as for other "public" goods: is public intervention desirable—for example, should charitable giving be deductible from personal income in arriving at tax liabilities in order to lower the private price of giving—and do private equilibria without government intervention more closely approximate joint maximization, a Nash noncooperative game solution, or something quite different? Since space is limited, I refrain from discussing further these and related issues.

[39] A proof of this well-known summation formula can be found in Samuelson (1954).

[40] The difficulty of policing "merit" goods is shown amusingly in a recent Wizard of Id cartoon. Two drunks meet, and one says, "Could you spare a buck for a bottle of wine?" The other answers, "How do I know you won't buy food with it?"

[41] I owe this example to Lisa Landes.

[42] This conclusion about the incentives provided by large bequests is a special case of a more general result proven elsewhere (see Becker and Stigler 1974) that relatively large pensions discourage employees from acting contrary to the interests of their employers (a bequest serves the same purpose as a pension).

D. Envy and Hatred

An envious or malicious person presumably would feel better off if some other persons become worse off in certain respects. He could "harm" himself (i.e., spend his own resources) in order to harm others: in figure 2, he gives up k_o units of his own consumption in order to harm others by h_o units. The terms of trade between his own harm and the harm to others, given by the curve $E_oS_o^1$ in figure 2, is partly determined by his skill at "predatory" behavior and partly by public and private expenditures to prevent crime, libeling, malicious acts, trespass, and other predatory behavior. Since an increase in these expenditures would increase the cost to him of harming others, he would be discouraged from harming them. The limited evidence available on predatory expenditures supports this implication of the theory. Crimes against persons provide some evidence on predatory behavior, since most assaults and murders probably are motivated by the harm to victims.[43] The frequency of assaults and murder (and also crimes against property) apparently is strongly negatively related to the probability of conviction, punishment, and other measures of the cost of committing these crimes (see Ehrlich 1973).

Section 2 suggests that a rise in own income would tend to reduce predatory expenditures. An increase in the social environment,[44] on the other hand, would necessarily increase these expenditures, unless own consumption were an inferior good. Therefore, a rise in the social environment and own income by the same percentage would reduce predatory expenditures by less than would a rise in own income alone, and might even increase them.

Again, the implications of the theory can be tested with evidence on crimes against persons. Since assaults and murders have been more frequent at lower income levels,[45] an increase in own income appears to reduce crimes against persons, if differences in own income alone are measured by differences in the incomes of individuals at a moment in time (as in the discussion of charity in Section 3*B*). As predicted by the theory, an increase in own income that is accompanied by an increase in the social environment (as measured by the income of others) does not have such a negative effect on these crimes. Indeed, the frequency of assaults and murders has not been reduced by the sizeable growth in aggregate incomes during the last 40 years, nor do higher-income states presently have fewer crimes against persons than other states.[46]

[43] Most robberies, burglaries, and larcenies, on the other hand, probably are motivated by the prospects of material gain.

[44] That is, in that part of the social environment that motivates predatory expenditures.

[45] Persons committing crimes against other persons as well as against property are much more likely to live in low income areas (see Crime Commission 1967*a*, table 9).

[46] The rate of assaults grew significantly from 1933 to 1965 in the United States, and the murder rate remained about the same (Crime Commission 1967*b*, figs. 3, 4). Higher-

Over the years, even acute observers of society have differed radically in their assessment of the importance of envy and hatred. Two hundred years ago, for example, Adam Smith recognized these "passions" but shunted them aside with the comment: "Envy, malice, or resentment, are the only passions which can prompt one man to injure another in his person or reputation. But the *greater part of men are not very frequently under the influence of those passions,* and the very worst men are so only occasionally. As their gratification too, how agreeable soever it may be to certain characters, is not attended with any real or permanent advantage it is in the greater part of men commonly restrained by prudential considerations. Men may live together in society with some tolerable degree of security, though there is no civil magistrate to *protect them from the injustice of those passions*" (Smith 1937; my italics).[47] To Thorstein Veblen, on the other hand, writing many years later, there motives are the very stuff of life that dominate everything else: "The desire for wealth can scarcely be satiated in any individual instance, and evidently a satiation of the average or general desire for wealth is out of the question. However widely, or equally, or 'fouly,' it may be distributed, no general increase of the community's wealth can make any approach to satiating this need, the ground of which is the desire of everyone to excel everyone else in the accumulation of goods" (Veblen 1934, p.32).[48]

In principle, the importance of envy and hatred can be measured using equation (2.9) by the contribution of the relevant social environment to social income; this is done in a crude way in Section 2*B* for charity. Unfortunately, not enough information is available either on the own-income elasticity of demand or on the fraction of own income spent on "predatory" behavior to make even crude estimates of the relative contribution of envy and hatred.

Still, it may be useful to note several implications of the differing views about the significance of envy and hatred. For example, Veblen's belief that the welfare of a typical person primarily depends on his relative income position implies that social income essentially is zero: that the value of the social environment causing envy would exactly offset the value of own income.[49] For then, and only then, would a rise in this

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income states do not have fewer crimes against persons even when the probability of conviction, the punishment, and several other variables are held constant (Ehrlich 1973, tables 2–5). Note that Ehrlich's study, unlike the evidence from the Crime Commission, holds the "price" of crime constant when estimating the effects of income (and holds income constant when estimating the effects of price).

[47] Not much later, Jeremy Bentham reached a similar conclusion: "The pleasure derivable by any person from the contemplation of pain suffered by another, is in no instance so great as the pain so suffered" (Bentham 1952–54).

[48] Similarly, a sociologist recently has argued that envy is a powerful motive in primitive as well as advanced societies, communist as well as capitalist ones, and is critical in determining economic progress and public policy (see Schoeck 1966).

[49] "Own" income here includes the value of other aspects of the social environment.

social environment and own income by the same percentage, prices held constant, not affect social income or welfare. That is, a rise in all incomes in a community by the same percentage would not improve anyone's welfare in Veblen's world.[50]

If social income were negative, if the environment causing envy were more important than own income, a rise in the environment and own income by the same percentage would lower social income and welfare. That is, a general rise in incomes in a more extreme Veblenian world would actually lower welfare![51]

On the other hand, Smith's belief that envy is a relatively minor determinant of welfare implies that social income is positive: the environment causing envy is less important than own income. A rise in the environment and own income by the same percentage would then raise social income and welfare. That is, Veblen's general rise in the community's income would raise the welfare of the typical person.

4. Summary

This essay uses simple tools of economic theory to analyze interactions between the behavior of some persons and different characteristics of other persons. Although these interactions are emphasized in the contemporary sociological and anthropological literature, and were considered the cornerstone of behavior by several prominent nineteenth-century economists, they have been largely ignored in the modern economic literature.

The central concept of the analysis is "social income," the sum of a person's own income (his earnings, etc.) and the monetary value to him of the relevant characteristics of others, which I call his social environment. The optimal expenditure of his own income to alter these characteristics is given by the usual marginal conditions. By using the concept of social income, I can analyze the effect on these expenditures of changes in different sources of income and in different prices, including the "price" of the social environment. Perhaps the most important implication is that a change in own income alone would tend to cause a relatively large change in these expenditures; in other words, the own-income elasticity of demand for these expenditures would tend to be "large," certainly larger than the elasticity resulting from equal percentage changes in own income and the social environment.

[50] If $U_i = U_i(I_i/\bar{I})$, where $\bar{I}$ is the average community income, then $S_i = I_i - p_r\bar{I}$, where S_i is i's social income, and p_r is the price of $\bar{I}$ in terms of I_i. If i did not engage in predatory behavior, p_r would simply equal the slope of his indifference curve: slope $= dI_i/d\bar{I} = I_i/\bar{I} = p_r$. Hence $S_i = I_i - I_i/\bar{I} \cdot \bar{I} = 0$.

[51] When envy is so important, economic development is undesirable because it lowers welfare. See Schoeck's (1966) discussion of what he calls "the envy-barrier of the developing countries."

Interactions among members of the same family receive the greatest attention. The "head" of a family is defined not by sex or age, but as that member, if there is one, who transfers general purchasing power to all other members because he cares about their welfare. A family with a head is a highly interdependent organization that has the following properties:

A redistribution of income among members does not affect the consumption or welfare of any member because it simply induces offsetting changes in transfers from the head. As a result, each member is at least partially insured against disasters that may strike him.

Not only the head but other members too act "as if" they "loved" all members, even when they are really selfish, in the sense that they maximize not their own income alone but family income. As it were, the existence of a head economizes on the amount of true love required in a family.

A family acts "as if" it maximized a consistent and transitive utility function subject to a budget constraint that depended only on family variables. This utility function is the same as the head's not because he has dictatorial power, but because his concern for the welfare of other members integrates all their utility functions into one consistent "family" function.

Transfers from parents to children in the form, say, of schooling, gifts, and bequests tend to be negatively related to what the income of children would be relative to their parents in the absence of these transfers. Therefore, the relative income of children *inclusive* of transfers could be unrelated or even negatively related to these transfers. Consequently, one cannot infer anything about the stability across generations of economic or social positions simply from knowing the relation between parental position and the amount transferred.

More briefly treated are charity and envy, with special attention to the effects of different kinds of income change on charitable contributions and expenditures to alleviate envy. For example, the much higher income elasticity of demand for charitable contributions estimated from differences in individual incomes at a moment in time than from aggregate changes in incomes over time is shown to be implied by this theory of social interactions, but not readily by the traditional theory of choice.

From a methodological viewpoint, the aim of the paper is to show how another relation considered important in the sociological and anthropological literature can be usefully analyzed when incorporated into the framework provided by economic theory. Probably the main explanation for the neglect of social interactions by economists is neither analytical intractability nor a preoccupation with more important concepts, but excessive attention to formal developments during the last 70 years. As a consequence, even concepts considered to be important by earlier economists, such as social interactions, have been shunted aside.

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