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FIXED PREFERENCES AND CHANGING TASTES

By Edi Karni and David Schmeidler*

No man is an island, entire of itself....
John Donne

The phenomenon colloquially referred to as "fashion" manifests itself to some extent in the consumption of many goods and services, as well as in other aspects of human activity. Thus, we talk about fashionable attire, neighborhoods, furniture, contemporary painters, eighteenth-century composers, as well as fashionable scientific ideas. Although variations in demand caused by fashion affect the risks borne by entrepreneurs and consumers, and the utilization of durable consumer goods (thus exerting important influence on the allocation of resources in the economy), neoclassical demand theory has failed to produce a satisfactory treatment of this phenomenon. This failure may be attributed to the presumption that, by taking individual preferences on the commodity space as given, neoclassical theory is incapable of dealing with phenomena that presumably reflect changing tastes. (Note that while changing tastes due to habit formation may explain certain aspects of variations in individual demands over time, it does not explain the correlated changes in individual demands that constitute a fad.)

In this paper we show that, appropriately extended, neoclassical consumer theory can accommodate the phenomenon of fashion. In other words, within the extended framework, covariations in demand for a given product in the market at large (or among a specific group of customers) that are not accounted for by variations in incomes or relative prices are consistent with fixed individual preferences. The main idea is that the consumption of many commodities is, in part, a social activity. To capture the social aspects of consumption behavior, the standard definition of a commodity, which includes its physical attributes, delivery date, location, and (in the case of contingent commodities) the state of nature, must be extended to include the commodity's social attributes. We claim that the observed patterns of change in the consumption of standard commodities are consistent with constant preferences over the space of extended commodities.

Our concept of extended commodities may be described using the approach of the Austrian School. According to this approach, the utility of bundles of standard commodities is induced by a utility over a space of wants or needs. (See Carl Menger, 1950; Eugene von Bohm-Bawerk, 1959; and for a more recent exposition, Houston McCulloch, 1977.) Standard commodities are consumed as a means of satisfying these wants. In our approach, we distinguish between material needs (for example, hunger) and social needs (for example, respect, social distinction).

The satisfaction of social needs associated with the consumption of a particular standard commodity depends on the consumption of that commodity and related commodities by other consumers. For example, the satisfaction of a consumer's social needs associated with a pair of brand name sneakers depends on who the wearers of the given brand name are, and who the wearers of other brands of shoes are. The satisfaction of the material need (i.e., the need to protect the feet) depends on the quality of the shoes. The given brand may not differ in this respect from other brands of sneakers. In other words, the social attributes of an extended commodity consist of information concerning the users of this commodity and of information concerning the users of other commodities satisfying the same material needs. Therefore, in terms of the standard commodity space, a consumer's preferences between two standard commodity bundles depend on

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the entire allocation in the economy. In the usual terminology, we have a model with consumption externalities. As shown below, the consequences of these externalities for the behavior of demand depends on their specific nature.

To illustrate these ideas, we analyze a dynamic game in which the aforementioned consumption externalities are of the kind that may emerge when there is an exogenous partition of consumers into several (social) classes. The social attributes of a commodity (a vector in this case) are defined by the per capita consumption of the standard commodity in each class; the preferences over standard commodities depend on these social attributes and the class affiliation of the individuals. We show that, in equilibrium, the existence of fixed preferences on the space of extended commodities is consistent with cyclical variations in the demand for standard commodities that resembles the pattern usually associated with fashion. We view the results in this paper less as an end in themselves, but more as a demonstration of the potential of the main idea, and as a first step in the development of a more comprehensive theory that incorporates the social aspects of consumption behavior. (For this reason, we also chose to present our ideas in the context of an overlapping-generations economy. The overlapping-generations structure is not essential for the example below, however, it is a useful dynamic framework that will become handy in further developments of these ideas.)

I. A Three-Color Game

Preliminaries. Consider an economy or a game that evolves through countably many periods, \( Z = \{ \ldots, -2, -1, 0, 1, 2, \ldots \} \), without a first or a last period. Suppose that there is one good that appears on the market in three different colors, say, red, white, and blue. To highlight the role of the social attributes, we assume that the products under consideration are identical in terms of their ability to satisfy their intended material needs. To avoid unnecessary complications, we assume further that the marginal rate of substitution in production of any two colors is unity, and that this marginal rate of substitution determines the relative prices.

In each period, there is a continuum of players (represented by the unit interval) belonging to distinct social classes, \( \alpha \) and \( \beta \). Every player participates in the game during nine consecutive periods. At the end of each period, one-ninth of the players in each class dies and is replaced at the outset of the following period by the same proportion of players of the same class. One unit of the product is capable of satisfying the consumer's material needs for exactly three consecutive periods, replacing it prematurely is prohibitively costly and replacing it after three periods is mandatory. Thus, each consumer must make a decision on the color of the product every three periods, beginning with the period in which he enters the game. The sequence of choices of all the players defines a play of the game. A play of the game is an equilibrium play if no player may increase his utility by switching unilaterally to another sequence of choices.

The information available at the end of each period consists of the proportions of the consumers of each class that chose each of the colors at the outset of the same period. For each period \( t \in Z \), we denote by \( \alpha_t^j \) and \( \beta_t^j \), \( j = 1, 2, 3 \), the corresponding proportions, where the three colors are indicated by the numbers 1, 2, and 3.

Social attitudes and payoffs. We assume that consumers' evaluations of a given product's color are determined by the proportion of \( \alpha \) consumers and \( \beta \) consumers that use the given color and by their social attitudes. We assume further that social attitudes are, by and large, a reflection of the class affiliation of the individuals. In particular, *ceteris paribus*, (a) the preferences of \( \alpha \) consumers for a given color increase monotonically with the fraction of players belonging to their own class that use the same color, and decrease monotonically with the fraction of players belonging to \( \beta \) that use the same color, and that (b) the preferences of \( \beta \) consumers for a particular color increase monotonically with the fraction of players from both classes that use this color. Let the utility function of each consumer be the discounted sum of his one-period utilities over
his lifetime,

\[ U^i = \sum_{k=0}^{\delta} 8^k u^i(a_{i+k}^i) \]

\[ \left( \alpha_{i+k}, \beta_{i+k} | j = a_{i+k}^i \right) \]

where \( a_{i+k}^i \in \{1, 2, 3\} \), \( t \) denotes the first period in which player \( i \) enters the game, and \( \delta \in (0, 1) \) is a discount factor. Regarding the temporal utility \( u^i \), we assume that for every period \( \tau \) and \( j = 1, 2, 3 \), \( u^i(j, \alpha^i_{\tau}, \beta^i_{\tau}) = \alpha^i_{\tau} - 2\beta^i_{\tau} \) for \( \alpha \) consumers and \( u^i(j, \alpha^i_{\tau}, \beta^i_{\tau}) = \alpha^i_{\tau} + 2\beta^i_{\tau} \) for \( \beta \) consumers.

This rather simple model may be applied, with appropriate modifications, in analyzing the demand for housing in an urban area. In particular, the colors in our example may be taken to represent residential neighborhoods, and the class structure the ethnic composition of the population. Regarding the specification of the preferences, John Yinger (1979) reports findings of surveys conducted in the late 1960s indicating that the great majority of whites surveyed object to living in integrated neighborhoods, while the majority of blacks participating in these surveys expressed preferences for living in integrated neighborhoods over living in black neighborhoods. While the expressed preferences may be no more than a reflection of the valuation of the amenities that are associated with neighborhoods populated with specific ethnic groups, the resulting equilibrium may be a constant state of flux as illustrated below.

Existence and characterization of equilibrium plays. We shall now specify a play for the game (a path for the economy) and show that this is an equilibrium play. Let the position of the economy in period \( t \) be represented by the triplet of points in the unit square \( \left( \alpha_t^i = 0; \beta_t^i = 1/3, \alpha_t^i = 1/3; \beta_t^i = 2/3, \alpha_t^i = 2/3, \beta_t^i = 0 \right) \). In other words, in period \( t \), one-third of the \( \alpha \) consumers consume the product in color 2. Furthermore, one-third of these consumers will die at the end of period \( t \), and, at the outset period \( t + 1 \), the survivors as well as the newly born \( \alpha \) consumers will have to choose a color for the next three periods. The remaining two-thirds \( \alpha \) consumers consume the product in color 3. They include one-third of the \( \alpha \) consumers that had to choose a color at the outset of period \( t \). Similarly, one-third of the \( \beta \) consumers consume the product in color 1 and two-thirds consume the product in color 2. Furthermore, all the \( \beta \) consumers that had to choose a color at the outset of period \( t \) (including the newly born) choose color 2, and all those who are currently consuming color 1 will either die at the end of period \( t \), or will have to choose a color at the beginning of period \( t + 1 \). This position is depicted in Figure 1 by the points indicated by \( 0^j \), where for \( j = 1, 2, 3 \), \( (a_t^j, \beta_t^j) \) are given by the projections of \( 0^j \).

We claim that the equilibrium path of the economy (i.e., the path induced by the equilibrium play) includes the positions indicated by \( 1^j, 2^j \), in periods \( t + 1, t + 2 \), respectively. Note that the position depicted by the triplet of points \( \{2^1, 2^2, 2^3\} \) in Figure 1 is a rotation of the initial position in which color 1 replaces color 3, color 3 replaces color 2, and color 2 replaces color 1. Clearly, once the position \( \{2^1, 2^2, 2^3\} \) has been attained, the next position of the economy is a rotation of the position \( \{1^1, 1^2, 1^3\} \) with color 1.
replacing color 3, color 3 replacing color 2, and color 2 replacing color 1. The equilibrium path consists of an infinite number of repetitions of these positions in the same order. To show that this path is an equilibrium play, consider the position of the economy at the outset of period \( t \). At this point one-third of the \( \alpha \) consumers and one-third of the \( \beta \) consumers must choose the color of their product for the next three periods. Because the utility functions are additively separable, the choice of the most preferred color in each period is independent of previous or subsequent choices. For instance, if \( i \) is a new entrant, then he must choose a sequence of three colors, the first to be used in the periods \( t, t + 1, t + 2 \), the second to be used in the periods \( t + 3, t + 4, t + 5 \), and the last to be used during the remaining periods of his lifetime, (i.e., the periods \( t + 6, t + 7, \) and \( t + 8 \)). Given the structure of \( i \)'s preferences, however, these choices are independent and may be analyzed independently.

The utility corresponding to a choice of color \( j \) by player \( i \) in period \( t \) is

\[
\tilde{u}^i(j) = u^i(j, \alpha^i_t, \beta^i_t) \\
+ \delta u^i(j, \alpha_{t+1}^i, \beta_{t+1}^i) \\
+ \delta^2 u^i(j, \alpha_{t+2}^i, \beta_{t+2}^i).
\]

Given the temporal utility functions and taking \( \delta = 2/3 \), it is easy to verify by direct calculation that the sequence of moves specified by the given play constitutes an equilibrium.

Other than cyclical equilibrium play, the three-color game also has two stationary equilibrium plays: A uniform equilibrium play in which, in every period, one-third of the \( \alpha \) consumers and one-third of the \( \beta \) consumers choose each of the three colors, and a segregating equilibrium play in which each class consumes a different color. Note, however, that if the model is modified to allow for the possibility that individuals have preferences regarding the three colors (say, \( \text{ceteris paribus} \), red is preferred to white, which in turn is preferred to blue), it is possible to specify games in which the uniform equilibrium does not exist. Furthermore, if the preferences of the \( \beta \) consumers are such that each \( \beta \) consumer would rather use the color that is used by the entire set of \( \alpha \) consumers and none of the \( \beta \) consumers than the color that is used by all the \( \beta \) consumers and none of the \( \alpha \) consumers, then a segregating equilibrium may not exist. Finally, note that in the present example, the segregating equilibrium Pareto dominates the cyclical equilibrium specified above.

**Demand variations.** The path of the economy depicted by the cyclical equilibrium play gives rise to cyclical demand for each color reminiscent of variations in demand generally associated with fashion. In addition to the other properties of the model, the specific properties of the cycle depend on the distribution of the population between the two types of consumers. The color life cycle is characterized as follows. Each color displays a life cycle of six periods. In two consecutive periods, say, \( t + 1 \) and \( t + 2 \), a given color is adopted by all the \( \alpha \) consumers who must choose a color in these periods, and by these consumers only. In periods \( t + 3 \) and \( t + 4 \), \( \alpha \) consumers no longer choose this color, but all the \( \beta \) consumers that must choose in these periods select this color. In periods \( t + 5 \) and \( t + 6 \), no new players of either type choose the given color. At the outset of period \( t + 7 \), the process starts to replicate itself.

The amplitude of the cycle depends on the measure of the two consumer types in the population. If, for instance, the measure of \( \beta \) consumers is twice that of \( \alpha \) consumers, then the resulting life cycle of a color will have an amplitude of \( 2/9 \). (To see this, note that the measure of \( \beta \) consumers in the population is \( 2/3 \), hence when one-third of the \( \beta \) consumers buy the product in a given period, the total demand is \( 2/9 \).)

**II. Concluding Remarks**

The main thesis of our paper is that consumption, taking place in a social environment, is intended to satisfy the social needs as well as the material needs of the consumers. To capture the social aspects of the consumption activity, we propose that the
standard specification of commodities in terms of their physical attributes be extended to include their social attributes. Within the extended framework, dynamic variations in the demand for products is an equilibrium phenomenon consistent with fixed preferences and production technology. This analysis suggests that phenomena such as fashion and advertisements aimed at endowing products with a "social image" that could not be adequately analyzed within the framework of neoclassical economic theory, may be explicated using our notion of extended commodities. In addition, a modification that allows the introduction of new product colors is a natural extension of the three-color game. This extension may capture the process of everchanging design of consumer products.

The idea that the demand for standard commodities is induced by their ability to satisfy more basic needs or wants has already been expressed by economists of the Austrian School. More recently, a similar idea appeared in the work of Kelvin Lancaster (1966, 1971), and Gary Becker (1965). Our approach differs from these theories in an essential respect, namely, the recognition of role of standard commodities in satisfying consumers' social needs and the associated externalities. The externalities resulting from the interdependence of preferences in the context of the dynamic general equilibrium framework are responsible for the dynamic variations of demand in equilibrium.

The notion of interdependent preferences is at least as old as modern economic theory (see, for example, Adam Smith, 1937, Book I, ch. XI; Thorstein Veblen, 1899). Harvey Leibenstein (1950) presents a static, partial equilibrium analysis incorporating the Veblen effect and consumption externalities known as the "snob effect" and the "bandwagon effect." More recently, dynamic models incorporating interdependent preferences were studied by Wilhelm Krelle (1973), Wulf Gaertner (1974), and Robert Pollak (1976). The latter two contributions used the framework of linear expenditure systems to formalize the notion of interdependence of preferences. Space limitations preclude a detailed discussion of this literature. (The interested reader will find an insightful discussion in Pollak, 1978.) It should be mentioned, however, that in addition to departing from the linear expenditure system, the approach presented here differs from the previous treatments in an important respect. In previous studies, the utility function of each individual was assumed to depend on the past consumption of other individuals, while the approach presented here is based on simultaneous determination of consumption, thus allowing individuals to anticipate the actions of others. The game theoretic framework adopted here seems adequate to handle this formulation.

Finally, it should be mentioned that George Stigler and Becker (1977) discuss the desirability of modeling fashion with fixed preferences. They regard fashion as a means of achieving social distinction. However, except offering some general observations, they did not develop this idea.

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