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# Conspicuous Consumption and Inequality

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**Abstract**: We analyze the change in consumer demand following a mean preserving change in consumption inequality when there is conspicuous consumption. We model interdependent preferences including "keeping up with the Joneses" (imitating others) and "running away from the Joneses" (distinguishing oneself from others) with multiple peer groups and peer group effects (envy and snob effects). An individual not directly involved in the redistribution increases consumption of the more conspicuous good when she demonstrates i) 'keeping up' and a relatively stronger envy effect, or ii) 'running away' and a relatively stronger snob effect. Behaviors generated by existing models emerge as special cases.

JEL Codes: D01, D11, D31

**Key Words**: Conspicuousness, peer group effects, keeping up with the Joneses, status signaling, envy, snob

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Economic models of consumer behavior assume that an individual's utility is solely determined by her own consumption and is unaffected by the consumption of her peers. Yet since early childhood we observe peer group influences such as children that beg for fancy folders, backpacks, and crayon boxes after their friends bring such items to school, or teenagers that wear t-shirts displaying a designer's name so their friends know that they are current with fashion trends, or adults that drive luxury vehicles to demonstrate their large incomes. The literature has incorporated such peer group influences via a status signaling mechanism based on conspicuous consumption (Hopkins and Kornienko 2004, Glazer and Konrad 1996, Ireland 1994). This treatment of peer group effects does not assume that such influences are an intrinsic feature of consumer preferences but that they are instrumental to achieving traditional economic objectives such as marriage matching and labor market outcomes (Postlewaite 1998). This modification of the consumer choice model is justified through experiments and consumer surveys such as those by Solnick and Hemenway (1998, 2005), Ferrer-i-Carbonell (2005), Alpizar et al (2005), and Luttmer (2005) who find strong evidence that relative consumption significantly affects individual wellbeing.

We develop a model of consumer behavior in the presence of conspicuous consumption and multiple peer groups. We focus on three key features of an individual's preference structure, i) type of conspicuousness, ii) degree of conspicuousness, and iii) relative strength of the peer group effects. Following Dupor and Liu (2003), interdependent preferences imply that a change in reference group consumption changes an individual's marginal rate of substitution, *ceteris paribus.* This definition generates two possible types of conspicuousness, "keeping up with the Joneses," KUJ, and "running away from the Joneses," RAJ (Dupor and Liu 2003 and Chugh 2008). KUJ can be interpreted as mimicry: an individual emulates others' behavior. Some of the strongest examples of conspicuous consumption lie in the world of fashion. An individual "keeps up" when she sees others wearing a new style and is encouraged to purchase clothing that is in line with this trend. It is also possible to imagine an individual that chooses to rebel from current styles. She observes others wearing this new trend and "runs away" by refusing to wear such clothes or even wearing clothes in contradiction to the trend. In the latter instance, she demonstrates RAJ. In our model the individual can have preferences that are consistent with either KUJ or RAJ.

The degree of conspicuousness measures the relative magnitude of the change in an individual's marginal rate of substitution from an equal change in reference group consumption across goods. This follows from conspicuous consumption in multiple goods, but with different magnitudes of conspicuousness. For example, a businessman may be influenced by his co-worker's consumption of both electronics and clothing, where electronics have a higher degree of relative conspicuousness. This implies that if his colleague were to buy a new handheld device such as the latest PDA (personal digital assistant) and a new suit (of equal relative prices), the businessman would be more influenced by his colleagues' purchase of the PDA.

The third feature of our model is that an individual compares herself to at least two different peer groups. Examples of multiple peer group influences are common. For instance, school students often try to associate with different social cliques, such as the honors student who is influenced not only by her academic peers but also by athletically gifted students. In adulthood, an individual might be simultaneously influenced by the luxury consumption of her wealthy friends and the minimalist consumption of her environmentally conscious acquaintances which leads to a seemingly contradictory image of a socialite in designer clothing carrying a reusable and inexpensive tote bag.

Peer group influences lead individuals to purchase items not only for their direct utilitarian value but also for their status signaling power. Higher status is achieved by increasing one's position in the consumption distribution (Sen 1973, Frank 1985, and Hopkins and Kornienko 2004) or by aligning consumption with that of one's peer groups (Ireland 1994 and Glazer and Konrad 1996). Our model is able to incorporate both mechanisms for achieving higher status, but we focus on the second possibility.

Since we focus on the role of consumption inequality, we define two reference groups based on consumption level: the envy or higher consumption group and the snob or lower consumption group. For illustrative purposes we imagine an adjunct instructor with an income and consumption that is relatively small compared to her tenured colleagues (her envy group), but also relatively large compared to her neighbors (her snob group). Therefore, her consumption decisions are influenced by the consumption of her wealthier colleagues (the envy effect) as well as by the consumption of her relatively frugal neighbors (the snob effect).

Our model directly addresses the link between a mean preserving change in consumption inequality and the change in consumption by a neutral individual, that is, an individual not directly involved in the redistribution. By incorporating the type of conspicuousness, degree of conspicuousness and multiple peer groups into an individual's preference structure we isolate the various and potentially conflicting channels through which a change in the distribution of peer group consumption leads to a change in the individual's optimal consumption. We find that an individual will increase her consumption of the more conspicuous good following a mean preserving increase in inequality if her preferences are consistent with either i) KUJ and an envy effect that outweighs the snob effect, or ii) RAJ and a snob effect that outweighs the envy effect.

We show that the behavior generated under the models of Glazer and Konrad (1996) and Hopkins and Kornienko (2004) emerge as special cases under our framework. We then show that incorporating changes in the neutral individual's consumption may alter their results.

## I. Our Model

In the traditional model of consumer choice an individual maximizes $U = U(X, Y;\ \theta)$ subject to the budget constraint $P_X X + P_Y Y = M$, where $X$ and $Y$ refer to her own consumption of the two goods and $\theta$ represents her preference structure which, together with $X$ and $Y$, determines her marginal rate of substitution between $X$ and $Y$ ($MRS_{XY}$). This optimization problem yields optimal consumption bundles $X^* = X\ (P_X, P_Y, M;\ \theta)$ and $Y^* = Y\ (P_X, P_Y, M;\ \theta)$. $\theta$ is predetermined and changes in her optimal consumption bundle arise only through changes in relative prices and income. Specifically, a change in the consumption of the two goods by others in the economy, *ceteris paribus*, leaves the individual's optimal consumption bundle unaffected.

In a model of conspicuous behavior, the optimal bundles $X^*$ and $Y^*$ are also functions of reference group consumption, $\tilde{X}$ and $\tilde{Y}$. In our model $MRS_{X,Y} = MRS\big(X, Y, \tilde{X}, \tilde{Y}\big)$ so that the relative desirability of the goods will change with peer group consumption, *ceteris paribus*.[2] That is, we suppose

(1) $\frac{\partial MRS_{X,Y}}{\partial \tilde{X}} \neq 0$ and $\frac{\partial MRS_{X,Y}}{\partial \tilde{Y}} \neq 0$.

As discussed in Dupor and Liu (2003) and Chugh (2008), this formulation leads to two types of conspicuousness, "keeping up with the Joneses" (KUJ) or the desire to mimic others,

(2) $\frac{\partial MRS_{X,Y}}{\partial \tilde{X}} > 0$ and $\frac{\partial MRS_{X,Y}}{\partial \tilde{Y}} < 0$,

[2] We do not assume that individuals are hard wired to behave conspicuously but rather that conspicuous consumption is instrumental for some other economic purpose (Postlewaite 1998). The specific instrumental purpose is outside the scope of this paper.

and "running away from the Joneses" (RAJ) or the desire to distinguish oneself from others,

(3) $$\frac{\partial MRS_{X,Y}}{\partial \tilde{X}} < 0 \text{ and } \frac{\partial MRS_{X,Y}}{\partial \tilde{Y}} > 0.$$

If an individual has preferences consistent with KUJ, then an increase in $\tilde{X}$, *ceteris paribus*, will raise the desirability of *X*, i.e., her marginal utility of *X*, relative to the desirability of *Y*, or her marginal utility of *Y*. This steepens her indifference curve from $I_0$ to $I_1$ in Figure 1A, so that she increases her consumption of *X* and decreases her consumption of *Y*. If instead her preferences are consistent with RAJ, then an increase in $\tilde{X}$, *ceteris paribus*, will lower her relative marginal utility of *X*, flatten her indifference curves from $I_0$ to $I_1$ and consequently lower her consumption of *X,* as shown in Figure 1B.

We assume that the two goods have different degrees of conspicuousness so that

(4) $$\left|\frac{\partial MRS_{X,Y}}{\partial \tilde{X}}\right| \neq \left|\frac{\partial MRS_{X,Y}}{\partial \tilde{Y}}\right|.$$

If *X* is the more conspicuous good, we have

(5) $$\left|\frac{\partial MRS_{X,Y}}{\partial \tilde{X}}\right| > \left|\frac{\partial MRS_{X,Y}}{\partial \tilde{Y}}\right|,$$

and the sign gets reversed if *Y* is more conspicuous. This assumption is analogous to Hirsch's (1976) and Frank's (1985) assumption that at least one good is positional, while the others are non-positional. For positional goods, it is the relative consumption or rank that matters rather the absolute level of consumption. In our framework, both goods may be positional (conspicuous) and the $MRS_{X,Y}$ is determined by absolute levels of peer group consumption.

Finally, we clarify the determinants of peer group consumption; $\tilde{X}$ and $\tilde{Y}$. There is considerable literature on reference group identification as outlined in Clark, Frijters, and Shields (2008), and Luttmer (2005). While most of the literature focuses upon a single reference group, we allow an individual to identify with multiple social demographics. As shown by the examples in the introduction, there can be many possible characterizations of peer groups. We define them as the envy and snob groups so as to focus the discussion around inequality and the distribution of consumption across peer groups. Following Fehr and Schmidt (1999) and Friedman and Ostrav (2008), an individual's envy group for good *X* is defined as individuals with a larger consumption of *X*, whereas the snob group comprises of individuals with a smaller consumption of *X*. For example, the adjunct instructor's envy group for good *X* is her tenured colleagues who consume more *X* than her, while her snob group is her neighbors who consume less *X* than her.

Let *Z* refer to good *X* or *Y* and let $Z_E$ denote the consumption of the envy group and $Z_S$ denote the consumption of the snob group. It is possible that an individual may be more influenced by a change in her snob group's consumption than an equivalent change in her envy group's consumption, and vice versa. This is a reflection of the individual's subjective evaluation of a given change in the consumption of the envy and snob groups and therefore a characterization of her preference structure. To describe these different effects we introduce a third variable, $\tilde{Z}$, called the aggregate peer group consumption and given by $\tilde{Z} = \tilde{Z}(Z_E, Z_S)$.[3] We refer to a change in $\tilde{Z}$ due to a change in $Z_E$ as the envy effect and a change in $\tilde{Z}$ due to a change in $Z_S$ as the snob effect. Returning to our example of the adjunct instructor, the envy and snob effects refer to her perception of a change in overall peer group consumption following a change in her colleague's consumption and neighbor's consumption, respectively. That is,

(6) Envy effect: $\frac{\partial \tilde{Z}}{\partial Z_E} > 0$, where $Z = X, Y$.

[3] For example, $\tilde{Z} = \alpha_1 Z_E + \alpha_2 Z_S$ where $\alpha_1, \alpha_2 > 0$. While we assume multiple peer groups, it is also possible to define $\tilde{Z}$ as a function of only one peer group. For instance if $\alpha_1 = 0$, then $\tilde{Z}$ is a function of $Z_S$ alone.

(7) Snob effect: $\frac{\partial\tilde{Z}}{\partial Z_S} > 0$, where $Z = X, Y$.

Since the magnitudes of the snob and envy effect for a given good need not be the same, one of these effects may be quantitatively larger than the other. When the envy effect is stronger than the snob effect we have

(8) $\frac{\partial\tilde{Z}}{\partial Z_E} > \frac{\partial\tilde{Z}}{\partial Z_S}$, where $Z = X, Y$

and when the snob effect is stronger than the envy effect we have

(9) $\frac{\partial\tilde{Z}}{\partial Z_E} < \frac{\partial\tilde{Z}}{\partial Z_S}$, where $Z = X, Y$.[4]

Let us consider a particular case. Suppose the envy effect is stronger than the snob effect and that the envy group's consumption of *X* rises marginally whereas the snob group consumption of *X* declines marginally, *ceteris paribus*. The relatively larger magnitude of the envy effect implies that the individual perceives a larger increase in $\tilde{X}$ due to the rise in the consumption of the envy group compared to the decrease in $\tilde{X}$ she perceives due to the fall in the consumption of the snob group. As a result, she perceives an overall increase in $\tilde{X}$. In this sense, when the envy effect is stronger than the snob effect, the individual is more influenced by a change in the consumption of her envy group than an equivalent change in consumption of her snob group.

We assume that for a given peer group the magnitudes of the envy and snob effects are equal *across* goods, that is

(10) $\frac{\partial\tilde{X}}{\partial X_i} = \frac{\partial\tilde{Y}}{\partial Y_i}$, where $i = E, S$.

[4] It is possible that the magnitudes of the envy and snob effects are equal so that $\frac{\partial\tilde{Z}}{\partial Z_E} = \frac{\partial\tilde{Z}}{\partial Z_S}$. In this case mean preserving changes in income inequality will leave an agent's optimal consumption unaltered. This special case is examined in section 2.

This means that there is no difference in the individual's subjective evaluation of a change in the consumption of either good by a given peer group. Equations (9) and (10) together imply that if the individual is more influenced by a change in her envy group's consumption of good *X* compared to a change in her snob group's consumption of this good, she is also more (and equally) influenced by a change in their consumption of good *Y*. This assumption allows us to separate the impact of the relative strength of peer group effects from the relative degree of conspicuousness of the two goods on an individual's consumption decision.

These three properties of an individual's preference structure, namely, i) the type of conspicuousness (KUJ or RAJ), ii) the relative degrees of conspicuousness of the two goods (whether good *X* or good *Y* is the more conspicuous good), and iii) the relative magnitudes of the peer group effects which determines whether the envy effect is stronger than the snob effect, or vice versa, lead to many possible preference structures. For instance, the adjunct instructor in our example may have preferences consistent with KUJ, view *X* as the more conspicuous good, and a change in her colleagues' consumption of a good may influence her own consumption decisions more than a change in her neighbors' consumption. Table 1 summarizes the eight possible preference structures that arise when we assume that the type of conspicuousness is the same across goods. That is, if an individual's preferences demonstrate KUJ with respect to good *X* they also demonstrate KUJ with respect to good *Y*, and vice versa, and that the peer group effects are symmetric across goods (equation 10).[5]

[5] If we relax these assumptions then an individual may have one of 32 preference combinations. Restricting ourselves to the eight preference structures summarized in Table 1 makes the analysis less cumbersome without diminishing the predictive power of our model.

Incorporating conspicuous consumption and multiple peer groups into an individual's utility function yields, $U = U(X, Y, \tilde{X}, \tilde{Y})$, where $\tilde{X}$ and $\tilde{Y}$enter indirectly via the marginal rate of substitution. This results in the following consumer problem,

$$(11)\qquad \begin{array}{ll} Max_{X,Y} U = U[X, Y, \tilde{X}(X_E, X_S), \tilde{Y}(Y_E, Y_S); \theta] & \\ s.t. \qquad P_X X + P_Y Y = M & \end{array},$$

which leads to

$$(12)\qquad \begin{array}{l} X^* = X[\tilde{X}(X_E, X_S), \tilde{Y}(Y_E, Y_S), P_X, P_Y, M; \theta\,] \\ Y^* = Y[\tilde{X}(X_E, X_S), \tilde{Y}(Y_E, Y_S), P_X, P_Y, M; \theta\,] \end{array}.$$

PROPOSITION 1.A: *If X is the more conspicuous good, the individual has preferences that satisfy KUJ, and her envy effect outweighs her snob effect, then a mean preserving increase in consumption inequality with an equal absolute change in the consumption of both goods by the peer groups, ceteris paribus, will result in an increase in X* and a decrease in Y*.*

PROOF: The proof follows from the total derivative of $X^*$.

$$(13)\qquad dX^* = \left(\frac{\partial X^*}{\partial \tilde{X}}\frac{\partial \tilde{X}}{\partial X_E}\right) dX_E + \left(\frac{\partial X^*}{\partial \tilde{X}}\frac{\partial \tilde{X}}{\partial X_S}\right) dX_S + \left(\frac{\partial X^*}{\partial \tilde{Y}}\frac{\partial \tilde{Y}}{\partial Y_E}\right) dY_E + \left(\frac{\partial X^*}{\partial \tilde{Y}}\frac{\partial \tilde{Y}}{\partial Y_S}\right) dY_S.$$

Recall that a change in peer group consumption changes the individual's marginal rate of substitution $MRS_{X,Y} = f[X, Y, \tilde{X}(X_E, X_S), \tilde{Y}(Y_E, Y_S);\ \theta\,]$. This implies that

$$(14a)\qquad \frac{\partial X^*}{\partial \tilde{X}} = \left(\frac{\partial X^*}{\partial MRS_{X,Y}}\right)\left(\frac{\partial MRS_{X,Y}}{\partial \tilde{X}}\right)$$

where

$$(14.b)\qquad \frac{\partial X^*}{\partial MRS_{X,Y}} > 0 \text{ and } \frac{\partial Y^*}{\partial MRS_{X,Y}} < 0.$$

Equations (14.a) and (14.b) allow us to rewrite the total derivative of $X^*$ as

(15) $$dX^* = \left(\frac{\partial X^*}{\partial MRS_{X,Y}} \frac{\partial MRS_{X,Y}}{\partial \tilde{X}} \frac{\partial \tilde{X}}{\partial X_E}\right) dX_E + \left(\frac{\partial X^*}{\partial MRS_{X,Y}} \frac{\partial MRS_{X,Y}}{\partial \tilde{X}} \frac{\partial \tilde{X}}{\partial X_S}\right) dX_S$$
$$+ \left(\frac{\partial X^*}{\partial MRS_{X,Y}} \frac{\partial MRS_{X,Y}}{\partial \tilde{Y}} \frac{\partial \tilde{Y}}{\partial Y_E}\right) dY_E + \left(\frac{\partial X^*}{\partial MRS_{X,Y}} \frac{\partial MRS_{X,Y}}{\partial \tilde{Y}} \frac{\partial \tilde{Y}}{\partial Y_S}\right) dY_S$$

In our model, the impact of a change in consumption inequality is identified through a change in reference group consumption. A mean preserving increase in consumption inequality leaves the average consumption of the reference groups unchanged so that

(16.A) $dX_E = -dX_S > 0$

and

(16.B) $dY_E = -dY_S > 0.$

Furthermore, an equal absolute change in the consumption of both goods by the peer groups implies

(17.A) $dX_E = dY_E$

and

(17.B) $dX_S = dY_S,$

so that

(17.C) $dX_E = dY_E = -dX_S = -dY_S > 0$.[6]

Then equation (15) can be expressed as

(18) $$dX^* = \left(\frac{\partial X^*}{\partial MRS_{X,Y}}\right)\left[\left(\frac{\partial MRS_{X,Y}}{\partial \tilde{X}} \frac{\partial \tilde{X}}{\partial X_E}\right) - \left(\frac{\partial MRS_{X,Y}}{\partial \tilde{X}} \frac{\partial \tilde{X}}{\partial X_S}\right) + \left(\frac{\partial MRS_{X,Y}}{\partial \tilde{Y}} \frac{\partial \tilde{Y}}{\partial Y_E}\right) - \left(\frac{\partial MRS_{X,Y}}{\partial \tilde{Y}} \frac{\partial \tilde{Y}}{\partial Y_S}\right)\right] dX_E.$$

Using our assumption of equal envy and snob effects across goods, equation (10), we get

(19) $$dX^* = \left(\frac{\partial X^*}{\partial MRS_{X,Y}}\right)\left[\left(\frac{\partial MRS_{X,Y}}{\partial \tilde{X}} + \frac{\partial MRS_{X,Y}}{\partial \tilde{Y}}\right)\left(\frac{\partial \tilde{X}}{\partial X_E} - \frac{\partial \tilde{X}}{\partial X_S}\right)\right] dX_E.$$

[6] An equal absolute change in the consumption of both goods allows us to isolate the impacts of the three key properties: type of conspicuousness, relative degree of conspicuousness, and relative strength of peer group effects. We relax this condition in Proposition 2.

Equations (14.b) and (16.A) imply that the first and last terms in equation (19) are positive. KUJ, $X$ as the more conspicuous good, and a relatively stronger envy effect, equations (2), (5), and (8) respectively, guarantee that the third term is also positive, that is

(20.a) $\left(\frac{\partial MRS_{X,Y}}{\partial \tilde{X}} + \frac{\partial MRS_{X,Y}}{\partial \tilde{Y}}\right)\left(\frac{\partial \tilde{X}}{\partial X_E} - \frac{\partial \tilde{X}}{\partial X_S}\right) > 0.$

Thus, $dX^* > 0$. Given the consumer's budget constraint we also conclude that $dY^* < 0$. ■

The intuition behind proposition 1.A can be explained using our example of the adjunct instructor. The increase in inequality implies that her colleagues increase their consumption of $X$ and $Y$ (equally), and therefore $X_E$ and $Y_E$ rise. Because we focus upon a mean preserving change in consumption inequality, her neighbors' consumption of $X$ and $Y$ ($X_S$ and $Y_S$) will fall by the same absolute magnitude. Since we assume that her envy effect is stronger than her snob effect, she will perceive an increase in overall peer group consumption of both goods, that is, $\tilde{X}$ and $\tilde{Y}$ will rise.

Furthermore, because we assume that the adjunct's preferences satisfy KUJ, the increase in $\tilde{X}$ and $\tilde{Y}$ will encourage her to increase $X^*$ and $Y^*$. However, given the adjunct's budget constraint she can only increase the consumption of one good. Because she views $X$ as the more conspicuous good, she will choose to raise her consumption of $X$ and lower her consumption of $Y$.

Proposition 1.B demonstrates that the result in Proposition 1.A hinges upon the preference structure.

PROPOSITION 1B: *If X is the more conspicuous good, the individual has preferences that satisfy RAJ, and the envy effect is relatively stronger than the snob effect, then a mean preserving* *increase in consumption inequality with an equal absolute change in the consumption of both goods by the peer groups, ceteris paribus, will result in a decrease in X* and an increase in Y*.*

PROOF: The derivation of equation (20.a) remains the same as in proposition 1.A. However our assumption of RAJ results in

(20.b) $\left(\frac{\partial MRS_{X,Y}}{\partial \tilde{X}}+\frac{\partial MRS_{X,Y}}{\partial \tilde{Y}}\right)\left(\frac{\partial \tilde{X}}{\partial X_E}-\frac{\partial \tilde{X}}{\partial X_S}\right)<0.$

Therefore, an increase in consumption inequality leads to a decrease in $X^*$ and an increase in $Y^*$.■

Returning to our example of the adjunct instructor, she again observes that $\tilde{X}$ and $\tilde{Y}$ have increased. But under Proposition 1.B she has preferences consistent with RAJ, which implies that she wishes to decrease consumption of both *X* and *Y*. In order to maintain her budget constraint, she will only lower her consumption of one good. Since *X* is the more conspicuous good, she will lower her consumption of *X* and simultaneously raise her consumption of *Y*.

These are only two of the eight possible preference structures that arise when we assume that the type of conspicuousness is the same across goods and that the peer group effects are symmetric across goods (equation 10). The change in the individual's optimal consumption bundle due to a change in consumption inequality under the other six possibilities can be determined following the same logic as in Propositions 1.A and 1.B.[7] Table 2 summarizes the results. We find that if *X* is the more conspicuous good, then rising consumption inequality will increase the individual's demand for *X* if her preferences are consistent with either i) KUJ and a relatively stronger envy effect or ii) RAJ and a relatively stronger snob effect. However if her preferences satisfy i) KUJ with a relatively stronger snob effect or ii) RAJ with a relatively

[7] The detailed derivations are available from the corresponding author upon request.

stronger envy effect, then an increase in inequality will decrease her demand for the more conspicuous good.

In propositions 1.A. and 1.B we assume that the mean preserving increase in consumption inequality results in an equal absolute change in the consumption of both goods by the peer groups (equations 17.A and 17.B). If we relax this assumption so that only equations 16.A and 16.B hold, then as shown in Proposition 2, it is possible for a mean preserving increase in consumption inequality to result in a lower (higher) $X^*$, even though all the other conditions of Proposition 1A (1B) hold.

PROPOSITION 2: *If X is the more conspicuous good, the individual's preferences satisfy KUJ, and the envy effect is stronger than the snob effect, then a mean preserving increase in consumption inequality that does not lead to an equal absolute change in the consumption of both goods by the peer groups will result in a decrease in X* if the consumption of the less conspicuous good by the envy group,* $Y_E$*, increases sufficiently relative to the consumption of the more conspicuous good by the envy group,* $X_E$ .

The proof for Proposition 2 is provided in the appendix. Returning to our example of the adjunct instructor, if her colleagues increase their consumption of *Y* by sufficiently more than they increase their consumption of *X*, then it is possible that her desire to emulate the increased $\tilde{Y}$ would overcome the desire to emulate the increased $\tilde{X}$, even though *X* is more conspicuous. This is due to the relatively larger change in $Y_E$. The change in $Y_E$ that yields such a response is formally derived in the appendix.

## II. Special Cases

Our model of conspicuous consumption yields several results in the existing literature as special cases. In discussing these results we assume that both goods are normal goods so that an increase/decrease in an individual's income results in an increase/decrease in the consumption of both goods. We also assume that a change in income inequality manifests as an equivalent change in consumption inequality so that a mean preserving increase/decrease in income inequality yields a mean preserving increase/decrease in consumption inequality.

### *A. Models with absolute peer group consumption*

The earliest models of conspicuous consumption (for example, Duesenberry 1949, Leibenstein 1950, Pollak 1976) incorporated absolute levels of reference group consumption directly into the individual's utility function. More recently, Ireland (1994), Konrad and Lommerud (1993), and Glazer and Konrad (1996), among others, use absolute reference group consumption as a signal for status. These latter papers assume that an individual's utility is determined by her own consumption as well as a status function that depends on her own conspicuous consumption and that of her peer group. That is, when the reference group's consumption increases, *ceteris paribus*, the individual achieves a higher level of status and consequently lowers her consumption of the conspicuous good. Conversely, when the reference group's consumption level falls, the individual's status falls and she increases her conspicuous consumption in an attempt to maintain her status.

Glazer and Konrad's (1996) paper presents two key results regarding the relationship between a change in the distribution of reference group consumption and an individual's consumption decisions. They claim that if more poor individuals are added to a population so that the lowest income level in the economy declines, thereby increasing inequality, then each individual will increase her own consumption of the conspicuous good.[8] We demonstrate in proposition 3 that these results can be derived within our framework if the individual's preferences are consistent with RAJ.

PROPOSITION 3: *Suppose that more low income consumers are added to the population which causes the average consumption of both goods by the snob group to decline. Then, if an individual's preference structure satisfies RAJ, she will increase her consumption of the more conspicuous good.*

The formal proof of Proposition 3 is in the appendix. As more poor people are added to the population there is a decline in the consumption of the individual's snob group, i.e. $X_S$ and $Y_S$ fall, while the envy group's consumption, $X_E$ and $Y_E$, remains the same. An individual with RAJ preferences will increase her consumption of the more conspicuous good to distinguish herself from this poorer population.[9] Similarly, if more rich consumers were added to the population so that the envy group's consumption of both goods increases, *ceteris paribus,* she will decrease her demand for the more conspicuous good.

The second key result from Glazer and Konrad is that a mean preserving increase in income inequality will decrease per capita consumption of the more conspicuous good, provided that the Engel curve is a concave function of income (Glazer and Konrad property 3). This holds because in their model the decrease in the consumption by the poor individuals outweighs the

[8] See Glazer and Konrad (1996, property 4). A similar claim is made on page 103 of Ireland (1994).

[9] Under this proposition, we do not assume mean preserving changes in inequality, but we continue to assume that $dX_S=dY_S$.

increase in the consumption by the rich. This proposition however assumes that a neutral individual (i.e., an individual not directly involved in the redistribution) will not alter her consumption choices. Under our model, so long as the envy and snob effects aren't equal, the neutral individual will alter her optimal consumption bundle following a mean preserving change in consumption inequality.

PROPOSITION 4: *If the magnitudes of an individual's envy and snob effects are equal, then she will change her optimal consumption bundle only under a non-mean preserving change in consumption inequality.*

The proof is in the appendix. Intuitively, if the magnitudes of the envy and snob effects are equal then a mean preserving change in consumption inequality will leave overall peer group consumption of both goods unchanged. This is because the individual perceives the change in overall peer group consumption due to a change in the envy group's consumption in exactly the same way as she perceives the change in overall peer group consumption due to a change in the snob group's consumption so that the envy and snob effects for both goods offset each other . With equal envy and snob effects, $\tilde{X}$ and $\tilde{Y}$ will only change if $dX_S \neq dX_E$ and if $dY_S \neq dY_E$ , respectively, i.e. under a non-mean preserving change in consumption.

If however, the magnitudes of the envy and snob effects are different, then our model predicts that a mean preserving change in the consumption inequality will also yield a change in consumption by the neutral agent. This additional change in the consumption by the neutral agent, not accounted for by Glazer and Konrad (1996), could either amplify or mitigate their result depending upon the relative strength of the envy and snob effects.

Glazer and Konrad's Property 3 hinges upon the decrease in consumption of the poor outweighing the increase in the consumption of the rich. We have shown in Proposition 3 that Glazer and Konrad implicitly assume that the neutral individual's preferences are consistent with RAJ. Suppose that $X$ is the more conspicuous good and the individual's snob effect is relatively stronger than her envy effect. Then as shown in Table 2, she will increase her consumption of $X$ following an increase in inequality. It is possible that the increase in consumption by the neutral individual coupled with the increase in consumption of the rich is sufficiently large to outweigh the decrease in the consumption by the poor individuals. In this case redistribution from the poor to the rich will cause per capita consumption of $X$ to fall.[10]

*B. Models with relative peer group consumption*

An alternative class of conspicuous consumption models, for example, Frank (1985) and Hopkins and Kornienko (2004), utilize status functions that are based on relative consumption (social rankings). These models assume that an individual's utility is a function of her own consumption and a status function that is determined by her position in the consumption distribution. This implies that an increase in average consumption causes an individual to increase her conspicuous consumption to avoid losing her position in the rankings. The results of these models can be obtained under our model if the individual has preferences consistent with KUJ.

Hopkins and Kornienko's Proposition 4 states that, with a fixed number of agents in the economy, as income inequality increases individuals will adjust their consumption based upon

[10] If, however, the neutral agent's preferences are such that her envy effect is relatively stronger, then she will decrease her consumption of the more conspicuous good. This in turn will reinforce the increase in per capita consumption due to an increase in inequality that is identified by Glazer and Konrad.

the fraction of the population with higher/lower income. Their framework implies that a mean preserving increase in income inequality would lead wealthier individuals to raise their consumption of the conspicuous good. This is because the redistribution increases the fraction of the population with a larger income causing these individuals to lose status at their current level of consumption. Therefore, these individuals must increase their consumption of the conspicuous good to maintain their social status. However poorer individuals benefit from the more unequal society. With a larger fraction of the population with lower consumption, these individuals gain social status, and they decrease their consumption of the conspicuous good.

While we don't model the population distribution directly, we can define the envy and snob effects in terms of the population's consumption probability density function. Suppose that $X_E$ and $Y_E$ refer to the fraction of the population that comprises the individual's envy groups for goods $X$ and $Y$. Under this definition, the individual's $MRS_{X,Y}$ is a function of peer group consumption PDF so that rank orderings within each peer group drive consumer choice. An increase in $X_E$ and $Y_E$, *ceteris paribus*, implies that more consumers in the envy group have moved ahead of the individual and, under the assumption of KUJ, she must increase her consumption of the conspicuous good in order to regain her social ranking.

Although we can transform our framework into a model of relative consumption, there are advantages to the absolute levels of peer group consumption formulation of our model. Consider a society whose consumption is rearranged so that there is lower inequality after the change, but the individuals' relative consumption rankings are preserved. Models of relative consumption however, would not predict any change in consumption by the median agent, since no rank orderings were altered. However, under our model, the median individual will change her optimal consumption following the redistribution in accordance with her preference structure (see Table 2). Therefore, our model provides a more general framework that does not rely on relative rank or position yet generates behaviors obtained by Hopkins and Kornienko (1996) which is based on relative peer group consumption.

*C. Traditional Demand Functions*

Although there is considerable evidence that individuals behave conspicuously, our model is also able to yield traditional demand functions as a special case.

Suppose that the two goods have equal degrees of conspicuousness, so that

$$(21) \qquad \left|\frac{\partial MRS_{X,Y}}{\partial \tilde{X}}\right| = \left|\frac{\partial MRS_{X,Y}}{\partial \tilde{Y}}\right|$$

Then the consumer's problem presented by equation (11) will predict the same change in the consumption of *X* as the traditional consumer's problem for an individual with non-conspicuous preferences and $X^{*}=X\,(P_{X,}\,P_{Y,}\,M)$.[11]

*PROPOSITION 5: If an individual's preferences are such that X and Y are equally conspicuous, then any change in peer group consumption that leads to an equal absolute change in the consumption of both goods, ceteris paribus, will not affect her optimal consumption of X and Y, so that she responds as if* $X^*=X(P_{X,}P_{Y,}M)$.[12]

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[11] The more trivial case is where neither good is conspicuous. In this case equation (1) becomes zero and the optimal consumption bundle does not respond to changes in peer group consumption.

[12] For proposition 6, we only require that $dX_E=dY_E$ and that $dX_S=dY_S$. We do not need to assume mean preserving changes in income inequality. However, as before, we assume that the snob and envy effects are equal across both goods so that equation (10) holds.

The proof to proposition 5 is in the appendix. Intuitively, since the two goods are equally conspicuous, the individual's $MRS_{X,Y}$ is unchanged by an equal and opposite change in the consumption of *X* and *Y* by her peer groups and her optimal consumption bundle remains unaltered. Returning to our example with the adjunct instructor, when her colleagues increase their consumption of good *X,* her tendency to adjust her own consumption of *X* is exactly offset by the effects from her colleagues' simultaneous increase in the consumption of *Y* since the relative desirability of both goods remains the same.

The adjunct would respond similarly if her neighbors were also to change their consumption so that there was a mean preserving change in consumption. The equal degrees of conspicuousness imply that the effects of lower consumption of *X* and of *Y* by her snob group would also nullify each other, leaving her unaffected.

## III. Conclusion

We develop a partial equilibrium model of consumer behavior in the presence of conspicuous consumption and multiple peer groups. We use this model to analyze the relationship between a change in an individual's optimal consumption bundle and a change in the distribution of peer group consumption. Our framework is very general and can be applied in many different contexts. Because we focus on the impact of a change in consumption inequality, we focus on the consumption of the snob (relatively poorer) and the envy (relatively richer) groups. However, our model is applicable whenever there are one or more peer groups. For example, it can be used to analyze a change in the vehicle choice of an individual who is simultaneously influenced by the environmentally conscious owners of hybrid vehicles and by parents of young children with relatively safe but fuel-inefficient vehicles.

Another application of our model is found in the health economics literature According to the Income Inequality Hypothesis, there is a negative correlation between health outcomes and income inequality, *ceteris paribus* (see Deaton (2003) for a detailed discussion). Our model provides a theoretical foundation for this hypothesis by identifying the sufficient conditions under which this hypothesis holds. Given that health care is often viewed as the less conspicuous good (Charles et al 2007), rising income inequality and the associated increase in consumption inequality could cause health care expenditures to decline. For instance, if the adjunct instructor in our example has preferences that are consistent with KUJ and a relatively stronger envy effect, then she will raise her consumption of the more conspicuous goods and lower her consumption of health care in the face of rising inequality. Assuming a positive relationship between expenditures and outcomes, this will lead to a decline in her health.

Our model provides a framework to compare and contrast the results obtained in other work. For example, we are able to show that the results of Glazer and Konrad (1996) and Hopkins and Kornienko (2004) are obtained under specific restrictions on an individual's preference structure. It can be used to analyze the change in an individual's optimal consumption bundle when status is defined via different mechanisms such as social rank and by aligning one's consumption with that of a peer group.

Although models of conspicuous consumption and status signaling have a long history, they do not fully address the relationship between the change in the distribution of reference group consumption and a change in consumer demand. While Glazer and Konrad (1996) and Hopkins and Kornienko (2004) incorporate distributional concerns in their analyses, they do not always address the impact of a change in inequality on the neutral individual who is not directly involved in the redistribution or on the individual whose relative position in the consumption distribution is unchanged by the redistribution. Our model focuses precisely on such individuals. We show that, in the presence of multiple peer groups, the change in an individual's optimal consumption bundle due to a change in the distribution of peer group consumption is determined by the interaction of three features of her preference structure: (i) whether she 'keeps up' or 'runs away' from her peer groups' consumption patterns, (ii) the relative degrees of conspicuousness of the goods in her consumption bundle, and (iii) whether she is more influenced by one peer group than the other.

**Figure 1A**

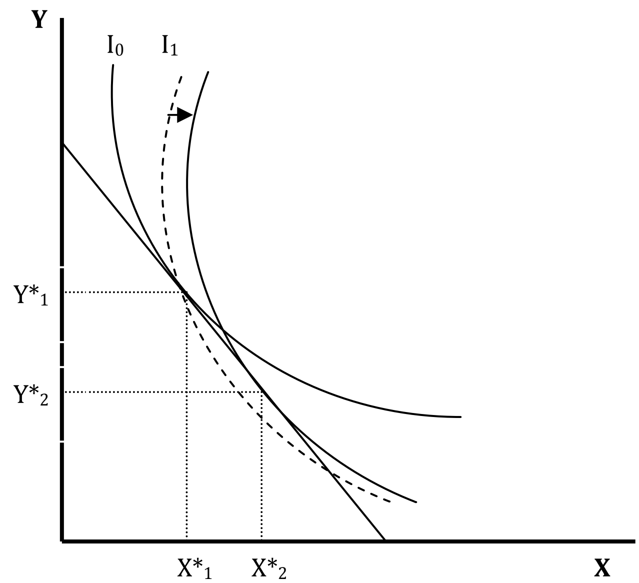
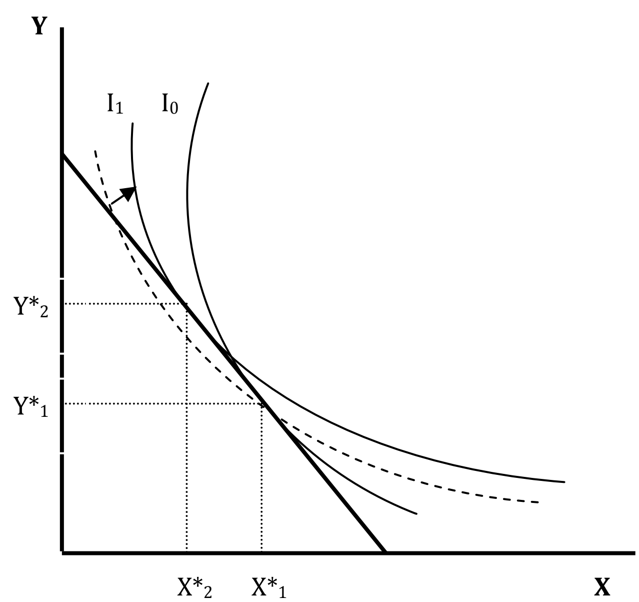



**Figure 1B**



| Table 1: Possible preference structures | | |
|---|---|---|
| **Type of conspicuousness** | **Degree of conspicuousness** | **Relative strength of peer effects** |
| Keeping up | X is more conspicuous | Envy effect > snob effect |
| Keeping up | X is more conspicuous | Snob effect > envy effect |
| Keeping up | Y is more conspicuous | Envy effect > snob effect |
| Keeping up | Y is more conspicuous | Snob effect > envy effect |
| Running away | X is more conspicuous | Envy effect > snob effect |
| Running away | X is more conspicuous | Snob effect > envy effect |
| Running away | Y is more conspicuous | Envy effect > snob effect |
| Running away | Y is more conspicuous | Snob effect > envy effect |
| *Note: We assume that the type of conspicuousness is the same across goods and that the peer group effects are symmetric across goods.* | | |

| Table 2: Predicted changes in an individual's $X^*$ and $Y^*$ | | | | |
|---|---|---|---|---|
| | **X is more conspicuous** | | **Y is more conspicuous** | |
| | **KUJ** | **RAJ** | **KUJ** | **RAJ** |
| **Envy effect is relatively stronger** | $X^*\uparrow$, $Y^*\downarrow$ | $X^*\downarrow$, $Y^*\uparrow$ | $X^*\downarrow$, $Y^*\uparrow$ | $X^*\uparrow$, $Y^*\downarrow$ |
| **Snob effect is relatively stronger** | $X^*\downarrow$, $Y^*\uparrow$ | $X^*\uparrow$, $Y^*\downarrow$ | $X^*\uparrow$, $Y^*\downarrow$ | $X^*\downarrow$, $Y^*\uparrow$ |
| *Note: $\uparrow$ indicates that the individual's consumption will increase while $\downarrow$ indicates that consumption will fall in response to a mean preserving increase in consumption inequality. We assume that the type of conspicuousness is the same across goods and that the peer group effects are symmetric across goods.* | | | | |

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## Appendix

PROPOSITION 2: *If X is the more conspicuous good, the individual's preferences satisfy KUJ, and the envy effect is stronger than the snob effect, then a mean preserving increase in consumption inequality that does not lead to an equal absolute change in the consumption of both goods by the peer groups, will result in a decrease in X* if the consumption of the less conspicuous good by the envy group,* $Y_E$ *increases sufficiently relative to the consumption of the more conspicuous good by the envy group,* $X_E$.

PROOF: The consumption of $X^*$ decreases when $dX^*<0$. Rewriting equation 15 and incorporating a mean preserving increase in inequality as given by equations 16.A and 16.B, leads to

(A.1) $$dX^* = \frac{\partial X^*}{\partial MRS_{X,Y}}\left[\frac{\partial MRS_{X,Y}}{\partial \tilde{X}}\left(\frac{\partial \tilde{X}}{\partial X_E} - \frac{\partial \tilde{X}}{\partial X_S}\right)dX_E + \frac{\partial MRS_{X,Y}}{\partial \tilde{Y}}\left(\frac{\partial \tilde{Y}}{\partial Y_E} - \frac{\partial \tilde{Y}}{\partial Y_S}\right)dY_E\right].$$

Equation 14.B, the assumption that the envy effect is relatively stronger, and the definition of KUJ ensure that only $\frac{\partial MRS_{X,Y}}{\partial \tilde{Y}} < 0$. Therefore if $dY_E$ is large enough relative to $dX_E$ it is possible for $dX^*<0$. Specifically,

(A.2) $$dY_E > -\left(\frac{\partial MRS_{X,Y}}{\partial \tilde{X}} \Big/ \frac{\partial MRS_{X,Y}}{\partial \tilde{Y}}\right) dX_E. \qquad \blacksquare$$

PROPOSITION 3: *Suppose that more low income consumers are added to the population which causes the average consumption of both goods by the snob group to decline. Then, if an individual's preference structure satisfies RAJ, she will increase her consumption of the more conspicuous good.*

PROOF: When an individual increases her consumption of the more conspicuous good, *X*, $dX^*>0$. When poor consumers are added to the economy, *ceteris paribus*, equation (15) becomes

(A.3) $$dX^* = \frac{\partial X^*}{\partial MRS_{X,Y}}\left[\frac{\partial MRS_{X,Y}}{\partial \tilde{X}}\frac{\partial \tilde{X}}{\partial X_S}dX_S + \frac{\partial MRS_{X,Y}}{\partial \tilde{Y}}\frac{\partial \tilde{Y}}{\partial Y_S}dY_S\right],$$

because $dX_E = dY_E = 0$. Assuming equal envy and snob effects across goods (equation 10), and that the additional poor consumers result in equal changes in the snob group's consumption of both goods ($dX_S = dY_S < 0$) leads to

(A.4) $$dX^* = \frac{\partial X^*}{\partial MRS_{X,Y}}\frac{\partial \tilde{X}}{\partial X_S}\left[\frac{\partial MRS_{X,Y}}{\partial \tilde{X}} + \frac{\partial MRS_{X,Y}}{\partial \tilde{Y}}\right]dX_S$$

Equations 14.B and 7 ensure that the first two terms are positive. Since *X* is the more conspicuous good, the sign of $\frac{\partial MRS_{X,Y}}{\partial \tilde{X}}$ will determine the sign of the bracketed expression. Since $dX_S<0$, the bracketed term must also be negative to ensure that A.4 remains positive. Therefore $\frac{\partial MRS_{X,Y}}{\partial \tilde{X}} < 0$,which is defined as RAJ. ■

PROPOSITION 4*: If X is the more conspicuous good, and the magnitudes of the individual's envy and snob effects are equal, then she will change her optimal consumption bundle only under a non-mean preserving change in consumption inequality.*

PROOF: First we demonstrate that an individual with equal envy and snob effects will be unaffected by a mean preserving increase in consumption inequality as described by equations 16.A and 16.B. For $X*$ to remain unchanged, $dMRS_{X,Y} = 0$.

(A.5) $$dMRS_{X,Y} = \frac{\partial MRS_{X,Y}}{\partial \tilde{X}}\left(\frac{\partial \tilde{X}}{\partial X_E}dX_E + \frac{\partial \tilde{X}}{\partial X_S}dX_S\right) + \frac{\partial MRS_{X,Y}}{\partial \tilde{Y}}\left(\frac{\partial \tilde{Y}}{\partial Y_E}dY_E + \frac{\partial \tilde{Y}}{\partial Y_S}dY_S\right) = 0$$

With equal envy and snob effects, we get

(A.6) $$dMRS_{X,Y} = \frac{\partial MRS_{X,Y}}{\partial \tilde{X}}\left[\frac{\partial \tilde{X}}{\partial X_E}(dX_E + dX_S)\right] + \frac{\partial MRS_{X,Y}}{\partial \tilde{Y}}\left[\frac{\partial \tilde{X}}{\partial X_E}(dY_E + dY_S)\right] = 0.$$

Since we assume a mean preserving increase in inequality the above expression will always hold since $dX_E$=-$dX_S$ and $dY_E$=-$dY_S$. Second, any non-mean preserving change in inequality will result in$dX^* \neq 0$, since it would then be true that $dX_E \neq -dX_S$ and $dY_E \neq -dY_S$. ■

PROPOSITION 5: *If an individual's preferences are such that X and Y are equally conspicuous, then any change in peer group consumption, that leads to an equal absolute change in the consumption of both goods, ceteris paribus, will not affect her optimal consumption of X and Y, so that the individual responds as if* $X^{*}=X(P_{X,} P_{Y,} M)$.

PROOF: Taking the total derivate of the MRS yields

(A.8) $$dMRS_{X,Y} = \frac{\partial MRS_{X,Y}}{\partial \tilde{X}}\left(\frac{\partial \tilde{X}}{\partial X_E} dX_E + \frac{\partial \tilde{X}}{\partial X_S} dX_S\right) + \frac{\partial MRS_{X,Y}}{\partial \tilde{Y}}\left(\frac{\partial \tilde{Y}}{\partial Y_E} dY_E + \frac{\partial \tilde{Y}}{\partial Y_S} dY_S\right).$$

With equal degrees of conspicuousness and symmetric envy and snob effects,

(A.9) $$dMRS_{X,Y} = \frac{\partial MRS_{X,Y}}{\partial \tilde{X}}\left[\frac{\partial \tilde{X}}{\partial X_E}(dX_E - dY_E) + \frac{\partial \tilde{X}}{\partial X_S}(dX_S - dY_S)\right].$$

An equal absolute change in peer group consumption implies that $dX_E=dY_E$ and $dX_S=dY_S$, which ensures that $dMRS=0$. That is, regardless of how the peer group distribution changes, so long as the goods are viewed as equally conspicuous by the individual, there will be no change in the relative desirability of the two goods and the individual will not alter her optimal consumption bundle. ■