How normal is normality in consumption? ☆

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ABSTRACT

It is shown by robust example that if a household's financial budget and its Gossenian time budget are binding in equilibrium then at least one commodity must be inferior in the household's consumption.

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1. Introduction

In the construction of small general-equilibrium models it is often assumed that all traded goods are normal in consumption. For example, many two-commodity textbook versions of the Lerner–Samuelson model of international trade rely on the assumption of price-taking representative households with homothetic preferences so that, both at the household level and at the community level, neither commodity is inferior at any level of income or for any value of the commodity price ratio.

However, combined with the assumption of normality is the conventional neoclassical model of household behavior. In that model, consumption is constrained by household preferences and by a single *financial* budget. Thus the model neglects the fact that all consumption takes time and that each household is subject to a second, always-binding *time* budget of 24 h a day. The importance of the time constraint was emphasized by Gossen (1854, 1983), whose work was praised by Edgeworth (1896) and Pantaleoni (1898) and, in more recent times, has been discussed in depth by Georgescu–Roegen (1983, 1985), Niehans (1990) and Steedman (2001).

In the present paper it is shown by means of a robust two-commodity example that if both budget constraints are accommodated and binding in equilibrium then local inferiority, conventionally

defined, must also be accommodated *even when household preferences are homothetic.* Any proposition that rests on the assumption of universal normality must therefore be treated with reserve. One thinks in particular of well-known results concerning the possibility of impoverishing technical improvements; see Mill (1848), Edgeworth (1894, 1899) and Kemp (1964, p. 87). In terms of the same example, it is shown also that if initially a household is a net purchaser of a locally inferior commodity then both commodities are, locally, strict Giffen goods *even when the household's preferences are homothetic.* Thus the so called *law of demand* must also be questioned.

The example of time-constrained household behavior, presented in Section 2, is constructed with no unnecessary complications. In particular, I neglect the possibility of interhousehold joint consumption and variable rates of consumption per unit of time. [The former complication has been considered by Kemp (in press), the latter by Steedman (2001).] I also neglect the possibility of distinguishing separate budgets for day time and night time.

2. Analysis

Consider Fig. 1, which depicts a particular price-taking household's consumption of two traded but non-produced commodities. Each commodity is perishable but (unlike the Israelites' manna) is available each day in a steady flow, represented by point E. The household's financial constraint, determined by the regular commodity flows and given commodity prices, is represented by the triangle ODD'. The household's time constraint is determined by a fixed number of hours available each day for the consumption of traded commodities. The number of hours available each day is 24 less the fixed number of

ally assume that the utility function is continuous, increasing and strictly quasi-concave. The chosen point then depends on the slope of the household indifference curve passing through Q. If at Q the indifference curve is steeper than TT' then the chosen point will lie to the right of Q, possibly at P; see Fig. 2(a). In the case displayed in that figure, the household does not consume all of its income, simply because it does not have the time to do so. The case may be exceptional, even in wealthy countries; but it is not unimaginable. Starting at the initially chosen point P, no sufficiently small change in income, in either direction, would induce the household to change its
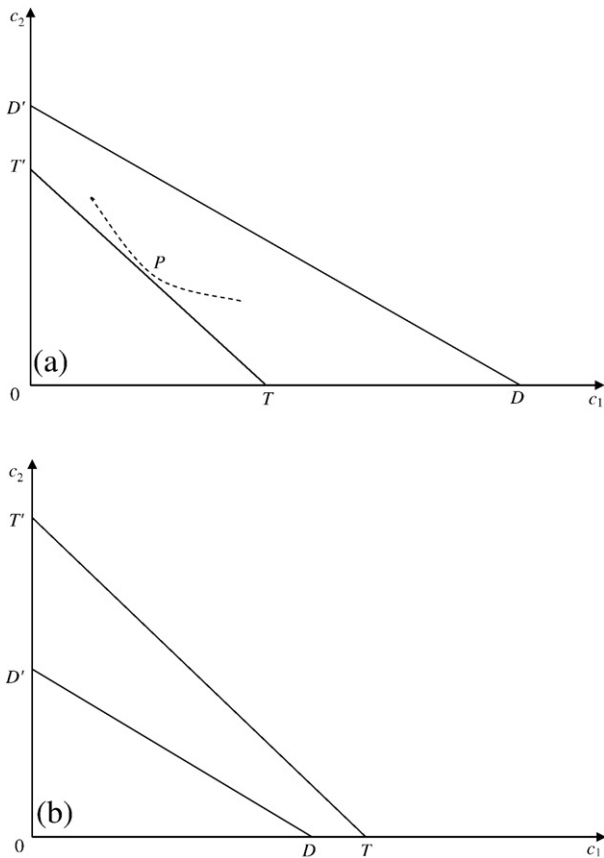
Fig. 1. (a) The financial constraint is not binding in equilibrium. (b) No equilibrium exists.

hours devoted to sleep, to leisure and to the consumption of non-traded commodities. On that understanding, the household's time constraint is represented by the interval TT'.

To avoid uninstructive complications, it is assumed that, in the absence of a time constraint, the household's consumption set would be the entire non-negative quadrant c_1Oc_2. The time-adjusted consumption set is the (convex) set defined by TT'.

It is possible that TT' and DD' (the upper boundary of the household's financial constraint) do not intersect in the quadrant c_1Oc_2. Thus, in the circumstances depicted by Fig. 1(a), the household must under-spend its income; no small change in its income will affect its consumption.[1] Similarly, in the circumstances depicted by Fig. 1(b), the household cannot afford any consumption basket on TT'; there is no solution to the household's problem either before or after any small change in income. In what follows, I will neglect these polar cases and simply assume that TT' and DD' intersect at Q in the interior of c_1Oc_2, as in Fig. 2.[2]

The household must choose a point on TT'. However, points on TT' to the left of Q violate the financial constraint. Hence the household must choose a point on QT. The point that will be chosen depends on the properties of the household's utility function. Let us convention-

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[1] Nor will any sufficiently small change in commodity prices affect the household's consumption. That is, for the case depicted in Fig. 1(a) and for any conventional (continuous, increasing and strictly quasi-concave) utility function, both commodities are, locally, weak Giffen goods. For a modern treatment of Giffen goods, without Gossen's time constraint, the reader may consult Doi et al. (2007).

[2] The polar cases depicted in Fig. 1(a) and (b) might be taken to represent (income-rich and time-poor) developed countries and (income-poor and time-rich) underdeveloped countries, respectively. However, one must bear in mind that the figures are based on the neglect of interpersonally joint consumption, which is dominant in all countries.
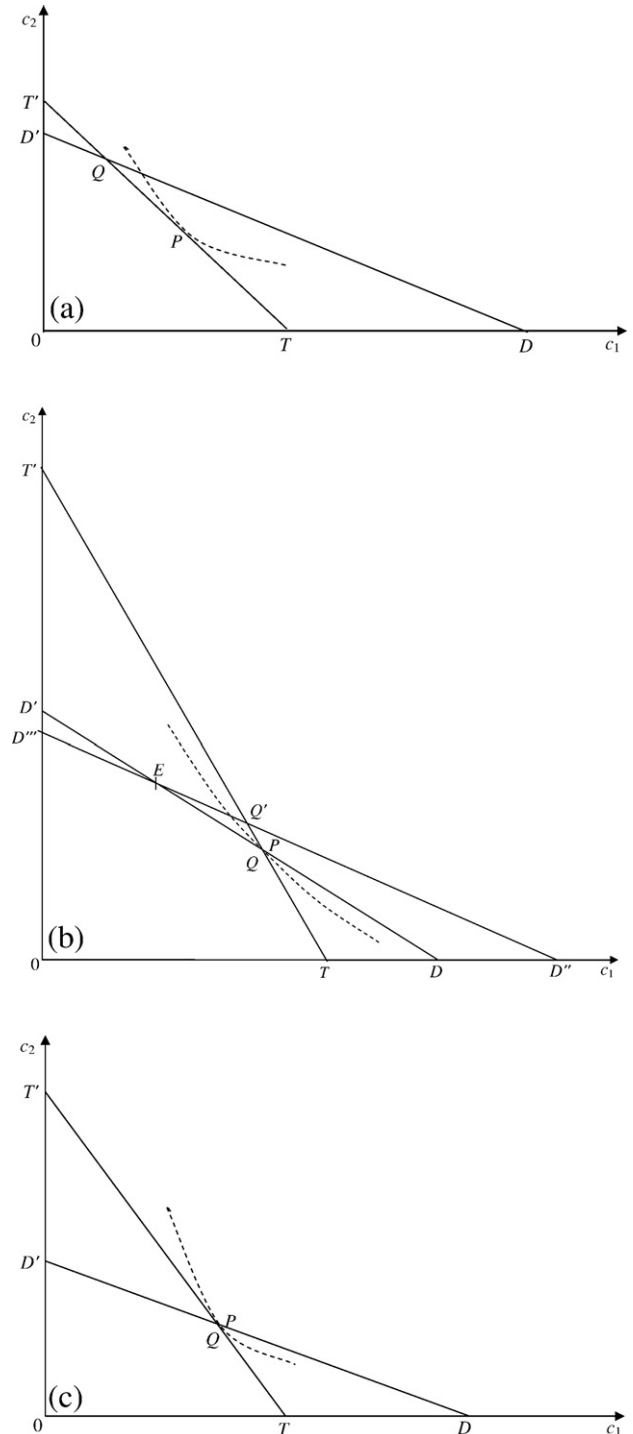

Fig. 2. (a) The financial constraint is not binding in equilibrium. (b) Both constraints bind in equilibrium. (c) Both constraints bind in equilibrium.