

(1977). For examples of the usual practice, see Jackson (1968), Orshansky (1965), Seneca and Taussig (1971) and Deaton (198k).

Although the Engel model is simple to apply, it has the long recognised disadvantage of neglecting any commodity specific dimension to needs. Common observation suggests that changes in demographic composition cause substitution of one good for another as well as the income effects modelled by (86) and (87). In a paper of central importance to the area, Barten (1964) suggested that household utility be written

$$u^h = \dots \quad (88)$$

$$= q_i / t n_i (a^h). \quad (89)$$

So that, using Pollak and Wales' (1981) later terminology, the demographic variables generate indices which "scale" commodity consumption levels. The Barten model is clearly equivalent to writing the cost function in the form

$$c^h(u^h, p, a^h T) = c(u^h p^*), \quad (90)$$

$$P_i^* = P_{im}(a^h), \quad (91)$$

for a cost function $e(u, p)$ for the reference household. Hence, if $g_i(x, p)$ are the Marshallian demands for the household, household h 's demands are given by

$$q_{jl} = r_{n_i}(a^h) g_i(x^h, p^*). \quad (92)$$

Differentiation with respect to a_j gives

$$\frac{d \ln q_j}{d a_j} = \frac{d \ln r_{n_i}(a^h)}{d a_j} + \sum_k e_{ik} \frac{d \ln m_k}{d a_j} \quad (93)$$

where e_{ik} is the cross-price elasticity between i and k . Hence, a change in demographic composition has a direct affect through the change in needs (on m_i) and an indirect effect through the induced change in the "effective" price structure. It is this recognition of the quasi-price substitution effects of demographic change, that "a penny bun costs threepence when you have a wife and child" that is the crucial contribution of the Barten model. The specification itself may well neglect other important aspects of the problem, but this central insight is of undeniable importance.

The main competition to the Barten specification comes from the model originally due to Sydenstricker and King (1921) but rediscovered and popularized by Prais and Houthakker (1955). This begins from the empirical specification,