Cobb-Douglas Utility – Eventually!
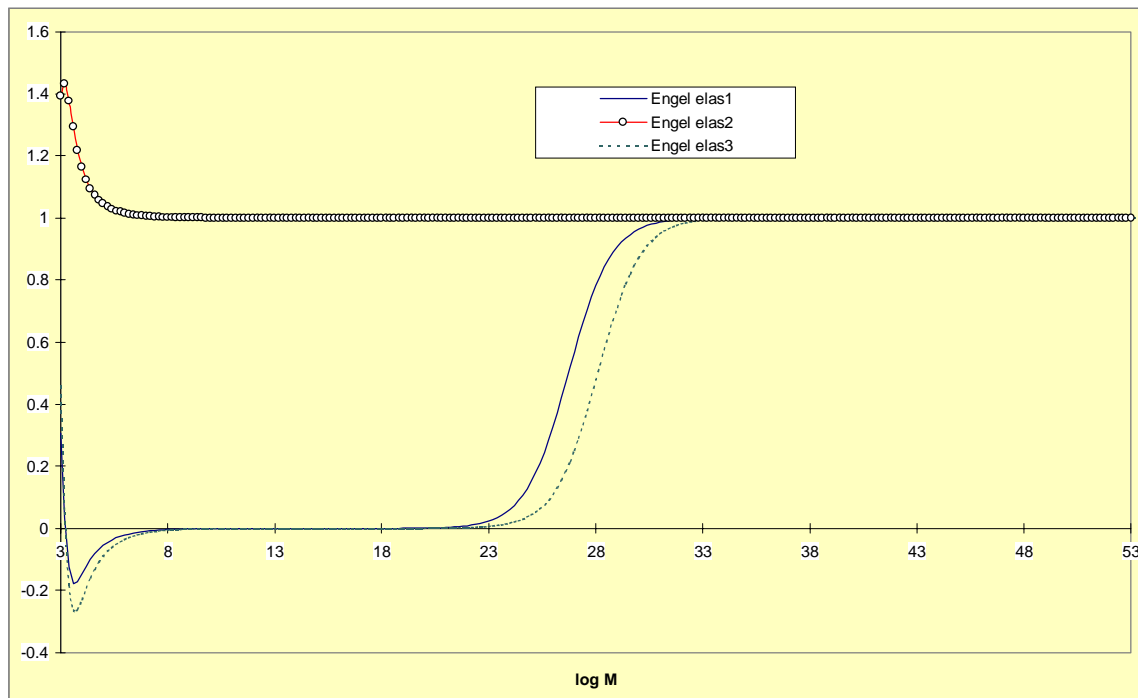
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Consider the following two opinions, both of which can be found in the literature of consumer demand systems:

(a) As the real income of a consumer becomes indefinitely large, re-mixing the consumption bundle becomes irrelevant: having chosen the ultimately satisfying budget shares at any given set of relative prices, the superlatively wealthy continue to allocate additional income in the same proportions. With very large and increasing per capita income, ultimately the utility function becomes indistinguishable from Cobb-Douglas.

(b) Consumer demand systems in which the income elasticities monotonically approach one (from above, in the case of luxuries; from below, in the case of necessities) are unsatisfactory both theoretically and empirically. For instance, a necessity with a low (< 1) income elasticity may very well become *less* elastic with further increases in income.

The issue is important for CGE modelers because *explicit* direct additivity (as in the linear expenditure system [LES]) is often the modeler's default choice: this leaves us firmly in the world of (a).

Hanoch's *implicit* direct additivity exhibits very flexible Engel properties. Rimmer and Powell's AIDADS system belongs to this class. Within such a system it is possible to satisfy the motivations underlying both (a) and (b), as the Engel (income) elasticities for a 3-commodity AIDADS system shown in the diagram below illustrate (M is total expenditure per head). Whilst the system *eventually* converges to Cobb-Douglas, some income elasticities can be effectively zero at any imaginable actual income level. Inferiority can also be accommodated over a range of incomes.

The paper discusses the above in more detail, strengthening the case for implicit direct additivity, particularly in situations in which the information available to estimate substitution elasticities is scant. This has at least tangential relevance for modeling sustainability: such studies necessarily have a lengthy time horizon, raising the possibility of very large changes in per capita income.