In spite of its clear misspecifications, there may nevertheless be cases where the linear expenditure system or a similar model may be the best that can be done. Because of its very few parameters, $(2n-1)$ for an n commodity system, it can be estimated in situations (such as the LDC's in Lluch, Powell and Williams book) where data are scarce and less parsimonious models cannot be used. In such situations, it will at the least give a theoretically consistent interpretation of the data, albeit one that is probably wrong. But in the absence of alternatives, this may be better than nothing. Even so, it is important that such applications be seen for what they are, i.e. untested theory with "sensible" parameters, and not as fully-tested data-consistent models.

2.5. Flexible functional forms

The immediately obvious problem with the linear expenditure system is that it has too few parameters to give it a reasonable chance of fitting the data. Referring back to (33) and dividing through by p_i, it can be seen that the γ_i parameters are essentially intercepts and that, apart from them, there is only one free parameter per equation. Essentially, the linear expenditure system does little more than fit bivariate regressions between individual expenditures and their total. Of course, the prices also enter the model but all own- and cross-price effects must also be allowed for within the two parameters per equation, one of which is an intercept. Clearly then, in interpreting the results from such a model, for example, total expenditure elasticities, own and cross-price elasticities, substitution matrices, and so on, there is no way to sort out which numbers are determined by measurement and which by assumption. Certainly, econometric analysis requires the application of prior reasoning and theorizing. But it is not helped if the separate influences of measurement and assumption cannot he practically distinguished.

Such difficulties can be avoided by the use of what are known as "flexible functional forms," Diewert (1971). The basic idea is that the choice of functional form should be such as to allow at least one free parameter for the measurement of each effect of interest. For example, the basic linear regression with intercept is a flexible functional form. Even if the true data generation process is not linear, the linear model without parameter restrictions can offer a first-order Taylor approximation around at least one point. For a system of $(n-1)$ independent demand functions, $(n-1)$ intercepts are required, $(n-1)$ parameters for the total expenditure effects and $n(n-1)$ for the effects of the n prices. Barnett (1983b) offers a useful discussion of how Diewert's definition relates to the standard mathematical notions of approximation.

Flexible functional form techniques can be applied either to demand functions or to preferences. For the former, take the differential of (9) around some