

and the continuing presence of measurement error have made it difficult even to describe the "facts" of dynamic household behavior. Beyond that, the use of the PSID in the more ambitious research programs on life-cycle labor supply and consumption can only be described as a disaster, [see Card (1991) for a review of the labor supply literature and Deaton (1992a, Chapter 5) for the work on the intertemporal allocation of consumption].

1.2.3. Panels from a series of cross-sections

Many countries carry out their household surveys on a regular basis, often using the same instrument over time, in which case there will exist a time-series of cross-sections. Such data can be used for many of the purposes to which panel data are put, and in some respects provide a superior database.

Consider, for example, the Surveys of Personal Income Distribution that have been carried out in Taiwan every year since 1976. While it is not possible to track individuals or households from 1976-1991, it is perfectly feasible to track *cohorts* of individuals. If for example, we are interested in how individual earnings have changed in any economy experiencing very rapid growth, we can follow the mean earnings of the same group through time by looking at the members of the group who are randomly selected into each survey. If our first cohort is those born in 1951, who were 25 years old in 1976, we use the 1976 survey to calculate average earnings or average log earnings, if that is the variable of interest — for all 25 year-olds, the 1977 survey for the average earnings of 26 year-olds, and so on, up to the average earnings of 40 year-olds in 1991. Figure 33.1, taken from Deaton and Paxson (1994a), shows the results for every fifth cohort; the connected lines track the behavior of each cohort. The figure shows a life-cycle pattern in earnings, together with strong cohort effects, with the younger cohorts earning more. As a result, it is the youngest groups whose earnings have grown the most rapidly; the average 55 year-old in 1976 had relatively little earnings growth over the subsequent fifteen years.

Such data cannot be used to look at income dynamics; even if the membership of the cohort is constant, we can estimate only the marginal distributions of income in each year, whereas estimation of income dynamics require us to observe the joint distributions, which can only come from panel data. That case apart, time-series of cross-sections can perform many of the other functions of panel data. Linear regressions with individual fixed effects can be averaged to give cohort relationships with cohort fixed effects, and can be consistently estimated by differencing the cohort level data or by using within estimators. Note too that, since we start from the individual data, the aggregation can be done over whatever function of the data is prescribed by the theory; averages of logs or of powers are as easily calculated as averages of levels. Since the cross-sections draw new households in each survey, there is no

