Note that if we multiply each sample observation by its inflation factor and add, we obtain an unbiased estimate of the population *total,* something that is often of separate interest. However, if the inflation factors are scaled *by* their total to derive sampling weights $w_i = \theta_i / \sum \theta_k$, and we calculate a weighted mean, when we take expectations we get

$$E\left(\sum w_i x_i\right) = \frac{n_1 \pi_1 \mu_1 + n_2 \pi_2 \mu_2}{n_1 \pi_1 + n_2 \pi_2} = \frac{N_1 \mu_1 + N_2 \mu_2}{N_1 + N_2} = \mu \qquad (8)$$

which is the right answer. Similar weighting schemes can be applied to the estimation of any other population statistic that can be written as an average, including variances, quantiles, measures of inequality and of poverty. The simple idea to remember is that each household should be inflated to take account of the households that it represents but were not sampled, so as to make the inflated sample "as like" the population as possible.

While the underlying population in these exercises is finite (it is the population of all households in the country at the time of the survey), and although much of the inference in the sampling literature is conducted explicitly from such a perspective, so that expectations are taken over all the possible samples that can be drawn from the finite population, this is not the *only* framework for inference. In particular, the finite population can be regarded as itself being a "sample" from a "superpopulation" of similar households, households that might have existed or might exist in the future. In this way, the parameter μ_1 (for example) is not the mean characteristic for the current population, but a parameter that characterizes the distributional law by which that population was generated. In this way, the superpopulation approach brings survey-sampling theory much closer to the usual sampling theory in econometric analysis where we are usually making inferences about behavioral parameters, not characteristics of finite populations.

1.1.7. Econometric estimation in stratified samples

All this is so familiar and so natural that it seems hardly worth the exposition. However, the simple weighting of observations is less obviously appropriate once we move from the estimation of means to even the simplest of econometric estimates, including ordinary least squares regression. Again. consider the simplest possible case, where there exists a linear relationship between y and *x,* but with coefficients β_1 and β_2 that differ by sector. Assuming zero means for both variables, write this

$$y_i = x_i \beta_s + u_i, \quad s = 1, 2. \qquad (9)$$