For some populations, enough information is available or can be inferred about average values of MTF, DTF, and TF to calculate an approximate value for FCE from the preceding equation. For example, in the villages of the Khanna district of North India in 1959, the average total fertility was 7.5 children, of whom 4.7, or 62.5 percent, survived childhood (Wyon and Gordon 1971, p. 170). The minimum family size goal widely agreed upon by the population was 2 sons, which would imply, on the average, 4 children. Allowing for the very high infant and child mortality in the region, an average of 6.4 children would have to be born to ensure a goal of 4.0 survivors. If the actual operational goal was about 4.0 surviving children (most surveys in rural India indicate an ideal between 4 and 5 children) and if parents were compensating accurately for both infant and child mortality, the fertility control effectiveness FCE under various maximum fertility assumptions would be:

$$\text{MTF} = 12 \qquad \text{FCE} = \frac{12-7.5}{12-6.4} = \frac{4.5}{5.6} = 0.80$$

$$\text{MTF} = 11 \qquad \text{FCE} = \frac{11-7.5}{11-6.4} = \frac{3.5}{4.6} = 0.76$$

$$\text{MTF} = 10 \qquad \text{FCE} = \frac{10-7.5}{10-6.4} = \frac{2.5}{3.6} = 0.70$$

If the completed family size goal were higher than 4.0 children or if parents tended to overcompensate for mortality, the value of FCE would be higher than that calculated here.

Given the many assumptions involved, the precise value of FCE estimated for these North Indian villages is not significant. It is interesting to note, however, that in this nonindustrial Asian population, generally unexposed to modern family-planning techniques, the fertility control effectiveness actually practiced was on the order of 0.7–0.8 rather than 0.5 or less. These calculations can be made for other nonindustrial populations with similar results:

Tunisia, 1964 (Morsa 1966)

Total fertility		5.9
Surviving children		4.7
Percent survival		80.0
Desired surviving family size		4.0
Desired total fertility		5.0
Fertility control effectiveness	MTF = 12	0.87
	MTF = 11	0.85
	MTF = 10	0.82

Thailand, 1964 (Hawley and Prachuabmoh 1966)

Total fertility	6.2
Surviving children	5.2
Percent survival	84.0
Desired surviving family size	4.2
Desired total fertility	5.0

Fertility control effectiveness	MTF = 12	0.83
	MTF = 11	0.80
	MTF = 10	0.76

A calculation of fertility control effectiveness in an industrialized population can be made from results of the 1965 national fertility survey in the United States (Bumpass and Westoff 1970). The cohort of women aged 35 to 44 in that survey reported an average total fertility of 3.0 and stated that 16 percent of these births were unwanted (of course, self-admission of an unwanted birth leads to underreporting and thus a value for FCE that is probably too high). Thus for this cohort of American women:

Total fertility		3.0
Surviving children		3.0
Percent survival		100 (assumed)
Desired surviving family size		2.5
Desired total fertility		2.5
Fertility control effectiveness	MTF = 13	0.95
	MTF = 12	0.95
	MTF = 11	0.94

These sample calculations indicate that the operational FCE in diverse areas of the world does not vary numerically over a wide range. We assumed, as will be explained further, that the global average FCE under all conditions will remain within the 0.75 to 1.0 range.

This assumption does not imply that family-planning policies designed to increase FCE will necessarily prove ineffective in changing the behavior of the model. Under conditions where MTF is relatively high and DTF is low, such as in the United States, a small change in the value of FCE can have a large effect on the population growth rate. For example, using the figures MTF = 13 and DTF = 2.5, if FCE = 1.0 the total fertility actually experienced would be 2.5 children, quite close to the replacement value that would lead to a zero growth rate. If FCE = 0.90 the resultant total fertility would be 3.6 children, and if FCE = 0.85 it would be 4.1 children, which would lead to a doubling of the population nearly every generation.

On the other hand, in populations where MTF is low and DTF is high (as in most of the nonindustrialized populations), the same change in FCE would have considerably less effect on the population growth rate. In the Khanna population, for example, if MTF = 10 and DTF = 6.4, increasing FCE from 0.75 to 0.95 would reduce total fertility from 7.5 to 6.6, or only one child per family. In contrast, changing the FCE of the American family by the same amount, 0.75 to 0.95, would change total fertility from 5.1 to 3.0 children, or more than two children per family. Model runs illustrating the effectiveness of FCE as a control variable on the whole model system are shown in section 2.6 and in Chapter 7.

Another way of assessing the fertility control effectiveness FCE practiced by any population is to examine in detail the various methods of control actually available to that population in terms of the cost and potential effectiveness of their use. This approach is more tedious and requires more detailed information about the population in question than the macro approach described previously. On the other