

study of family size desires: "One should not have more children than one can support, but one should have as many as one can afford" (Rainwater 1965). The standard of "support" is defined by society; what the average member of society can "afford" is determined by the state of the economy and by the equality of the distribution of economic resources among the population.

Again, the detailed dynamics of this system are worth a separate study and can be only approximated in a highly aggregated model. We made two simplifying assumptions to represent the dynamics of the individual family's reaction to the prevailing family size norm. First, we assumed that income distribution in all populations is skewed toward the lower end of the income scale—that most people receive less than the average GNP per capita—and that this inequality of distribution does not change as a function of time. Second, we assumed that people adjust their reproductive goals to their personal expectations of income, and that their expectations about the future are determined by the average rate of change of their incomes.

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FRSN,K=TABUL(FRSTN,FIE,K,-2,.2,.1)          41, A
FRSTN=.5/.6/.7/.85/1                          41.1, T
FRSN=.82                                         41.2, N

FRSN  - FAMILY RESPONSE TO SOCIAL NORM
        (DIMENSIONLESS)
TABUL  - A FUNCTION WITH VALUES SPECIFIED BY A TABLE
FRSTN  - FRESH TABLE
FIE    - FAMILY INCOME EXPECTATION (DIMENSIONLESS)

FIE,K=(IOPC,K-AIOPC,K)/AIOPC,K                42, A
FIE    - FAMILY INCOME EXPECTATION (DIMENSIONLESS)

IOPC  - INDUSTRIAL OUTPUT PER CAPITA (DOLLARS/
        PERSON-YEAR)
AIOPC - AVERAGE INDUSTRIAL OUTPUT PER CAPITA
        (DOLLARS/PERSON-YEAR)

AIOPC,K=SMOOTH(IOPC,K,IEAT)                    43, A
IEAT=3                                           43.1, C
AIOPC  - AVERAGE INDUSTRIAL OUTPUT PER CAPITA
        (DOLLARS/PERSON-YEAR)
SMOOTH - FIRST-ORDER EXPONENTIAL INFORMATION DELAY
IOPC    - INDUSTRIAL OUTPUT PER CAPITA (DOLLARS/
        PERSON-YEAR)
IEAT    - INCOME EXPECTATION AVERAGING TIME (YEARS)

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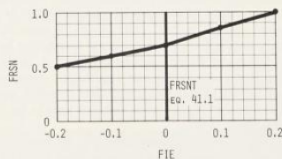


Figure 2-71 Family response to social norm table

Family income expectation FIE is calculated by comparing a running average industrial output per capita AIOPC over a three-year averaging time with the actual present income IOPC. Thus family income expectation FIE is a measure of whether and how fast income is increasing or decreasing:

$$FIE = \frac{IOPC - AIOPC}{AIOPC}$$

If income has been stagnant, FIE = 0. If income has been growing steadily at 3 percent per year, FIE equals approximately +0.07, and if income is falling, FIE is a negative number. The family response to social norm FRSN is then a function of family income expectation as shown in Figure 2-71. If income is stagnant or falling, the value of FRSN is 0.7 or below, indicating that most families will not feel that they can afford the socially ideal number of children. If income is rising, the slope of the function is slightly steeper, representing the probability that families under good economic conditions will be highly motivated to achieve the social reproductive norm. There is no delay in this function, other than the three-year time period during which families are assumed to observe present income trends and form their expectations of future income. It should be clear that the numerical values chosen for this function are hypothetical; we only tried to create a function with a positive slope and with a value less than 1.0 under normal economic circumstances.

The two multipliers SFSN and FRSN create a long-term, slowly moving inverse relationship between industrialization and family-size goals, superimposed on a short-term, rapidly fluctuating direct relationship. In the early stages of industrialization, when falling child mortality and improving methods of fertility control reinforce the trend toward decreasing fertility, the inverse relationship predominates. When the industrial system has reached high output and maintained it long enough for all other factors to stabilize, the direct relationship through FRSN is the only dynamic function still active.

The hypothesis that industrialization brings about two opposing effects on human fertility, with widely differing time constants, offers a possible resolution of the confusion in the population literature on this point. Attempts to analyze the influence of different fertility determinants by regression techniques have generally concluded that there is no relationship, or a weak positive relationship, between per capita income and fertility (Heer 1966, Weintraub 1962, Adelman 1963). On the other hand, the same studies have found a strong negative relationship between education and fertility, although it is well known that education and per capita income are strongly and positively correlated.

This apparent dilemma was clarified when Friedlander and Silver (1967) carried out a statistical analysis on fertility in the industrialized and the nonindustrialized countries separately. They discovered that per capita income was indeed correlated with fertility, but that the relationship was negative for the nonindustrialized countries and positive for the industrialized countries. Thus the previous regression analyses over all countries, slightly weighted in favor of developed countries with better statistics, produced confusing results. Further evidence for the bimodal influence of