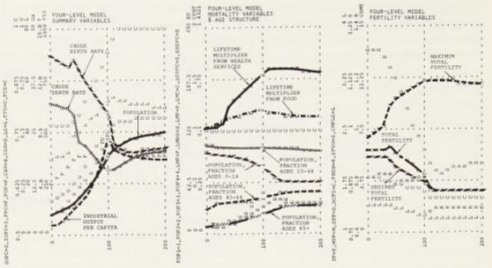

Figure 2-105 Run 2–20: no crowding effect

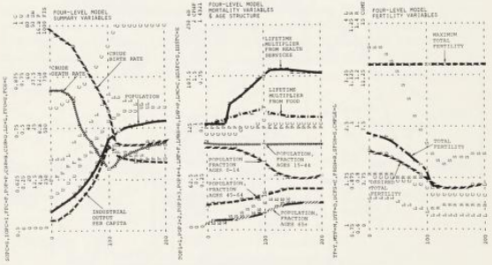

Figure 2-106 Run 2–21: constant maximum total fertility

In Run 2–20 (Figure 2–105), the lifetime multiplier from crowding is removed completely from the model by setting the crowding multiplier from industrialization to zero. A comparison of this run with Run 2–16 shows that the crowding loop has a very small quantitative effect on the model output. The only circumstance under which the crowding loop may become important is one of high urbanization and low

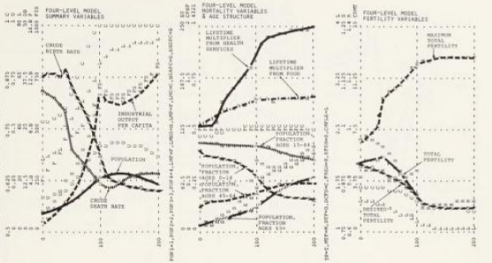

Figure 2-107 Run 2–22: lower family size norm

industrialization, a combination that can occur only during a complete economic collapse.

The sensitivity of the model to the assumption of varying fecundity is shown in Run 2–21 (Figure 2–106). Here the dependence of maximum total fertility on overall health conditions is removed, and fecundity is assumed to be constant at 12 children per woman. This change increases the birth rate somewhat and increases the gap between desired and actual fertility, but its effect on the overall behavior of the model is small.

The influence of family size norms is tested in Run 2–22 (Figure 2–107). The table representing the variation in social family size norm as a function of industrialization is shifted downward, so that it reflects a family norm ranging from 4 to 2 children rather than the standard assumed range of 5 to 3 children. This change brings about a significant decrease in the birth rate, even resulting in a population decline in the stagnant economy, where the family response to social norm FRSN also has a low value.

Another variation of this family norm function is shown in Run 2–23 (Figure 2–108). Here SFSN is held constant at 0.75, representing an unvarying social norm of 3 children. Again there is a marked change in the model behavior. The population begins and ends the run nearly in equilibrium; its slow growth rate results in an extremely high per capita income.

The social family size norm SFSN is unquestionably the most sensitive variable in the population sector. A shift in the socially approved family goal from 3 children to 2 children may be a small difference in absolute numbers, but it results in a large difference in system performance, since it reduces the relative strength of a major positive feedback loop. If it seems reasonable that this sensitivity is a property not