sector. In the case of the persistent pollution sector, the basic mode of behavior in response to the set of driving functions shown in Figure 6-30 is exponential growth in the index of pollution PPOLX. This behavior is exhibited by Run 6-4 (Figure 6-31), and that run will thus serve as our reference in establishing the sensitivity of the sector. Except when a change is specifically mentioned, the inputs illustrated in Figure 6-30 are those employed to obtain Runs 6-5 through 6-15.

Persistent pollution is assumed to have two negative effects outside the pollution sector. It affects the life expectancy LE of the population and increases the rate of land fertility degradation LFDR. Both LE and LFDR are defined as functions of PPOLX, the pollution level in the model relative to the pollution that exists in 1970. As a consequence we will not use changes in the absolute level of pollution PPOL to determine the sector's sensitivity to a revision in a parameter estimate. Instead we will examine the extent to which a different parameter value changes the behavior of PPOLX over time. Because PPOLX is renormalized for each run to equal 1.0 in 1970 of that run, the sector will be insensitive to any parameter change that simply alters PPOL by a constant factor throughout the course of the run. Only changes that cause the rate of growth in PPOL to differ over the course of the run from that existing in Run 6-3 will alter the time form of PPOLX.

This subtle, but important, point can be illustrated by changing the sector's parameter estimates in a way that merely alters PPGR and thus PPOL by a constant factor over the course of the entire run. Run 6-5 (Figure 6-32) presents the behavior of the persistent pollution sector when the inputs employed in Run 6-4 were revised to represent a different estimate of the toxicity indices of industrial and agricultural materials. As described in section 6.5, the toxicity indices are measures of the relative biological impact of persistent materials from industrial sources and agricultural activities. To obtain Run 6-5 the industrial materials toxicity index IMTI was reduced from 10 to 1, and the agricultural materials toxicity index AMTI was reduced from 1 to 0.5.

A reduction in both indices reduces the total amount of persistent pollution that is generated and eventually assimilated throughout the run; PPGR, PPAPR, and PPASR are significantly lower in Run 6-5 than in Run 6-4. As a consequence the level of pollution in 1970 is also lower, and it was thus necessary in Run 6-5 to decrease the value of the normalizing constant PPOL70. Once PPOLX is renormalized, its behavior is the same in Runs 6-4 and 6-5. We would not conclude that the behavior of the sector is sensitive to the changes we made in the toxicity indices. Since the rates of growth in the two components of pollution generation—persistent pollution generated by industrial output PPGIO and persistent pollution generated by agricultural output PPGAO—are somewhat different, reducing one of the toxicity indices to zero would slightly alter the time form of PPOL and PPOLX. However, the change would not be significant and would be, in any event, predicated on an unrealistic assumption about the nature of persistent materials.

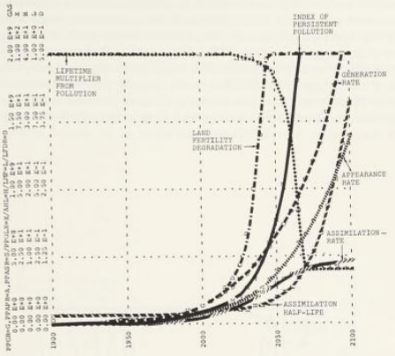

Figure 6-32 Run 6-5: behavior of the pollution sector with decreased toxicity indices

We assumed that most of the sector's parameters are constant over the course of the run. A specification error different from that analyzed in Run 6-5 could occur if there were future technological or social changes that altered the toxicity indices or other sector coefficients at some point beyond 1970. PPOL70 would not be altered by these changes and the time form of PPOLX could be influenced significantly. Later runs in Chapter 6 will illustrate the sector's sensitivity to changes of this sort. So long, however, as the specification errors are constant throughout the run, the insensitivity of the sector observed in Run 6-5 for changes in the toxicity indices is characteristic of the sector's response to other changes as well.