CHAPTER VI

Initial State Dependency —Sensitivity Analyses on MOSES

Erol Taymaz

This chapter summarizes the results of "noise" experiments. We made four experiments. The first experiment is the BASE case. In the second experiment, EXP05, we added ±5% random noise to initial wages and the maximum potential output (QTOP) variables. Note that the QTOP variable directly affects the measure of labor productivity.

Noise is created as follows. For each firm and variable, a number, μ_{vf} is randomly drawn from a uniform distribution over [-.05,+.05], where v denotes the variable (W or QTOP) and f represents firms. Then the firm variable is increased μ percentage (for example, $W_f \leftarrow W_f * 1+\mu_{Wf}$).

In the third and fourth experiments, the noise was 10% and 25%, respectively.

Figures 1 and 2 show the relative noises for wage and QTOP variables for each firm. Figure 3 and 4 show absolute noise levels (three firms that have very high QTOP values are not exhibited in Figure 4). As shown in these figures we introduced quite substantial "noises." Figure 5 shows potential labor productivity and the corresponding wage rate distributions (i.e., both variables are ranked by potential labor productivity) for EXP25 (solid lines represent EXP25, dotted lines represent the BASE case). The potential labor productivity curve appears not to have changed significantly, as may be expected from Figure 4. Figure 6 shows potential output (QTOP) and the corresponding wage distributions for the same experiment. There is no dramatic change. Why does a 25% noise in the QTOP variable induce so little (relatively speaking) noise in the QTOP distribution? Figure 7 to some extent explains why.

Figure 7 is similar to Figure 6, but in this figure, the QTOP and W distributions of EXP25 (solid lines) are ranked by the BASE experiment's QTOP values (noiseless case). Figure 7 shows that changes are quite substantial. What happens in Figure 5 and 6 can be explained as follows. We introduce noise randomly, i.e., some firms have higher W and QTOP values than the BASE case, and others have lower values. These changes cancel each other to some extent in Figure 5 and 6. For example, the firm that have the fourth highest QTOP value had a negative noise in EXP25 and the firm that have the fifth highest QTOP value had a positive noise so that they changed their

ranks in EXP25 (compare Figure 6 and 7). Thus, the QTOP distribution as shown in Figure 6 did not change much.

Figures 7-11 compare these experiments for various variables. In all variables, the differences between experiment results are negligible. Figures 12 and 13 show actual labor productivity and potential output (QTOP) distributions at the end of the simulation period. These curves are also quite similar. In brief, we can conclude that *random* noise in initial *micro* variables may not be a serious problem. Hence, if statistical errors in the initial state description of the MOSES database are randomly distributed there should be no problem in medium term in simulations. The MOSES model, as it is currently calibrated (see Section 3 in *MOSES on PC*), is sufficiently robust to accommodate such noise at the macro level.

Figure 1 Relative wage noise

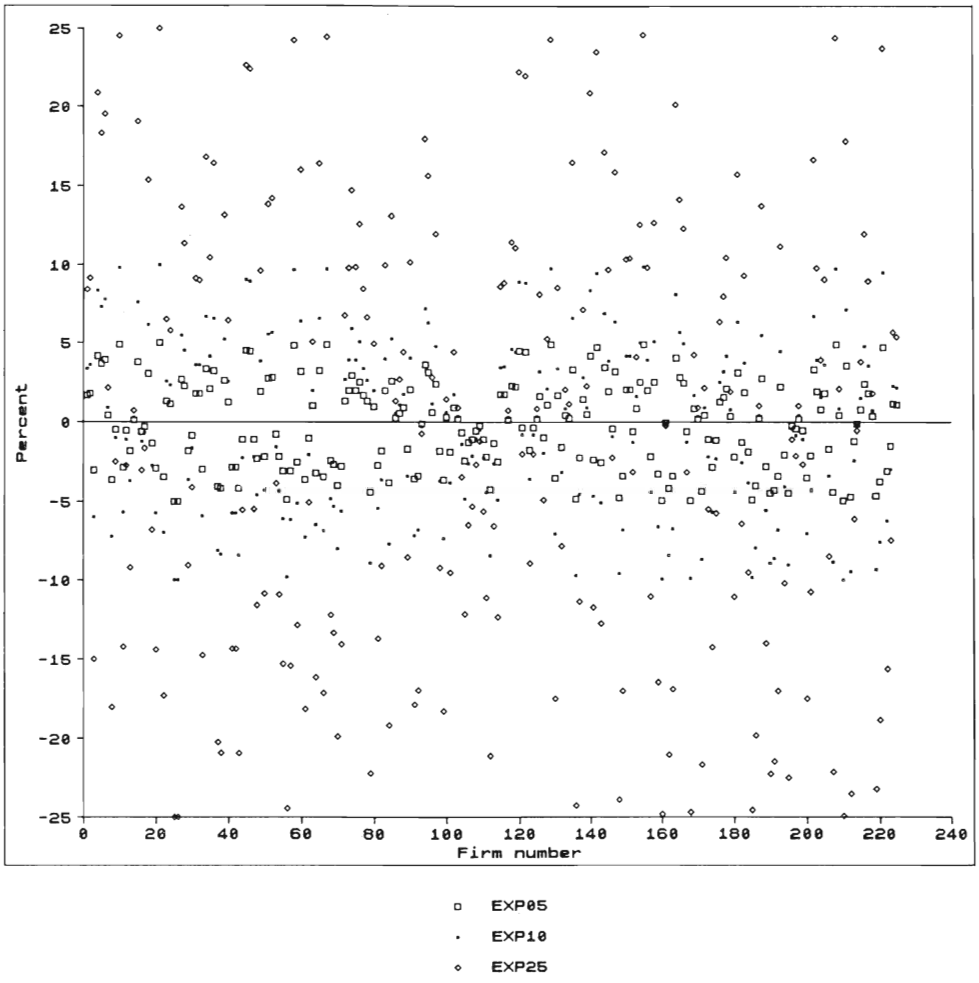

Figure 2 Relative QTOP noise

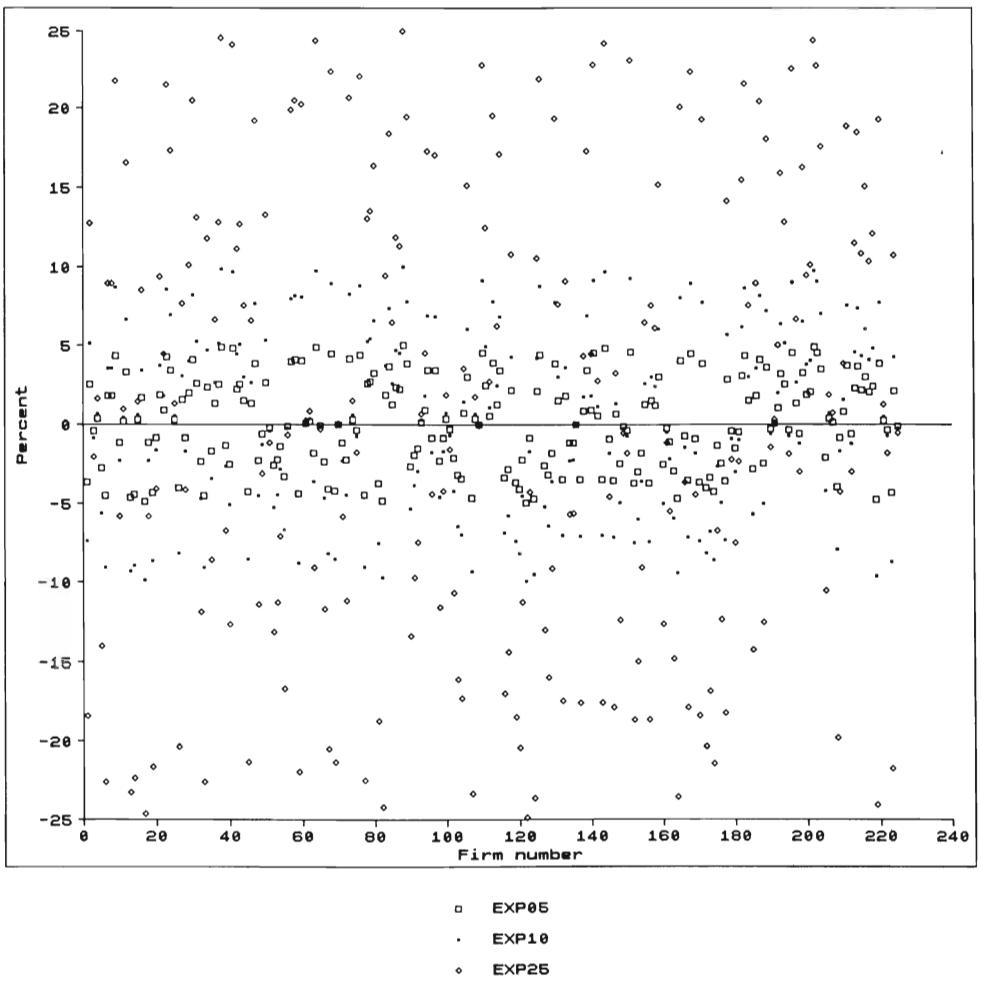

Figure 3 Noises in wages

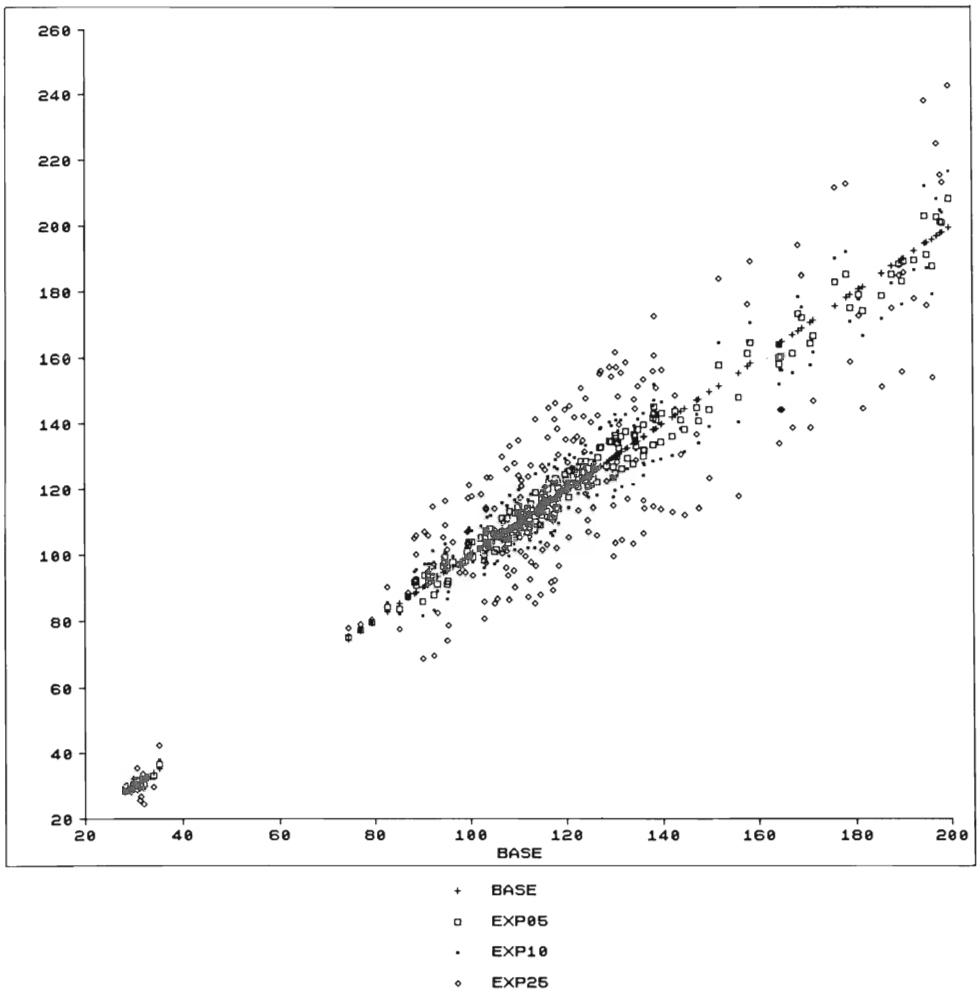

Figure 4 Noises in QTOP

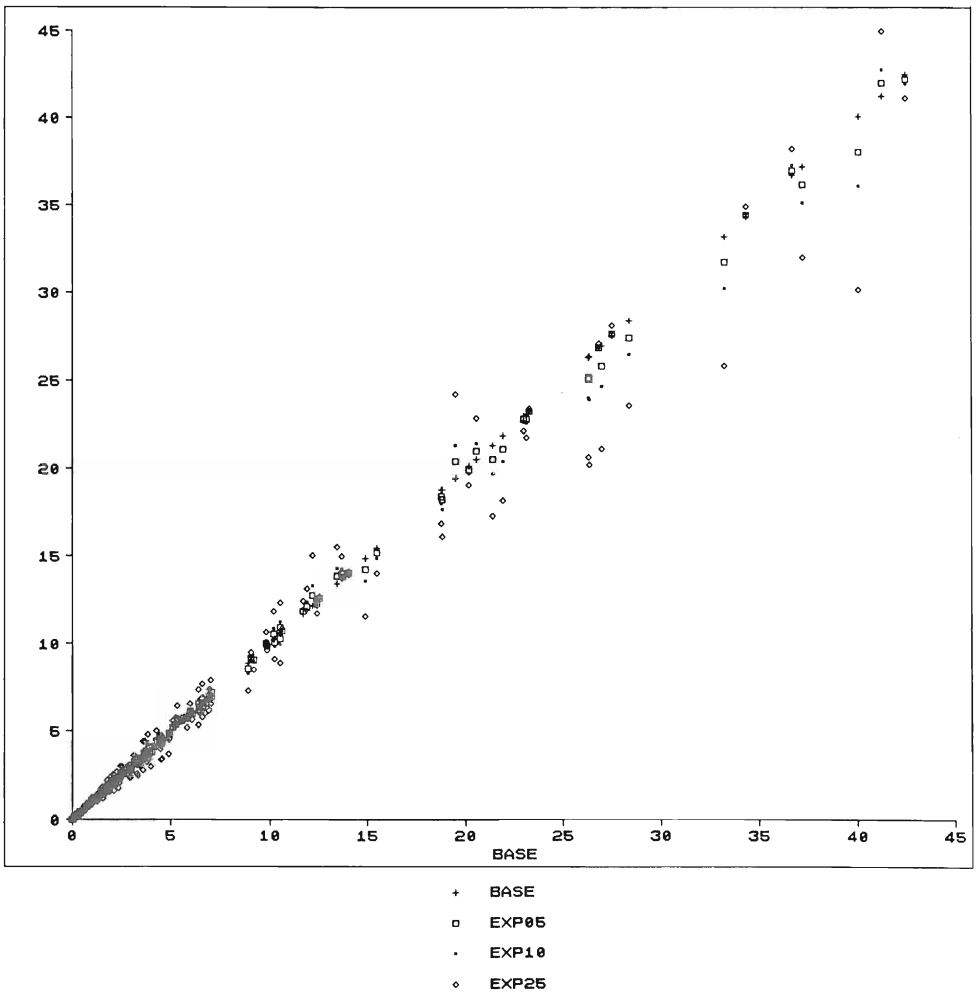

Figure 5 **Potential labor productivity (100 units of output/employee) and wages (4000 SEK/employee)**

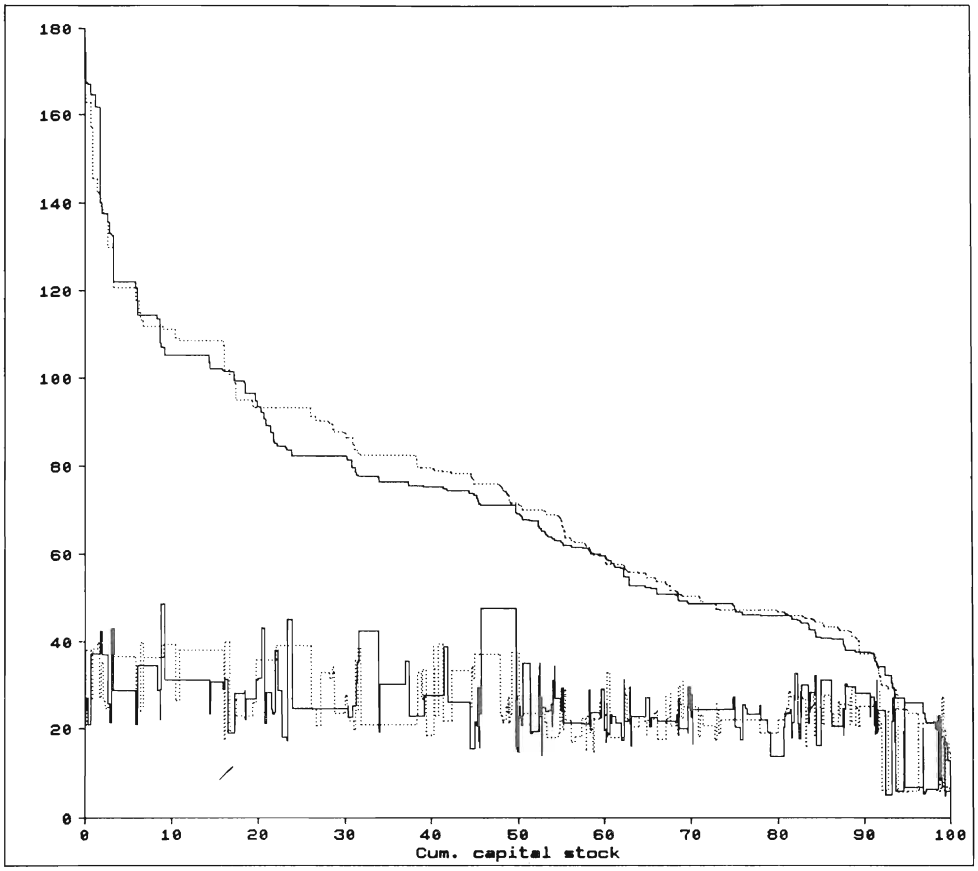

Figure 6 **Potential quarterly output (QTOP) and wages (1000 SEK/employee) (10^7 units of output)**

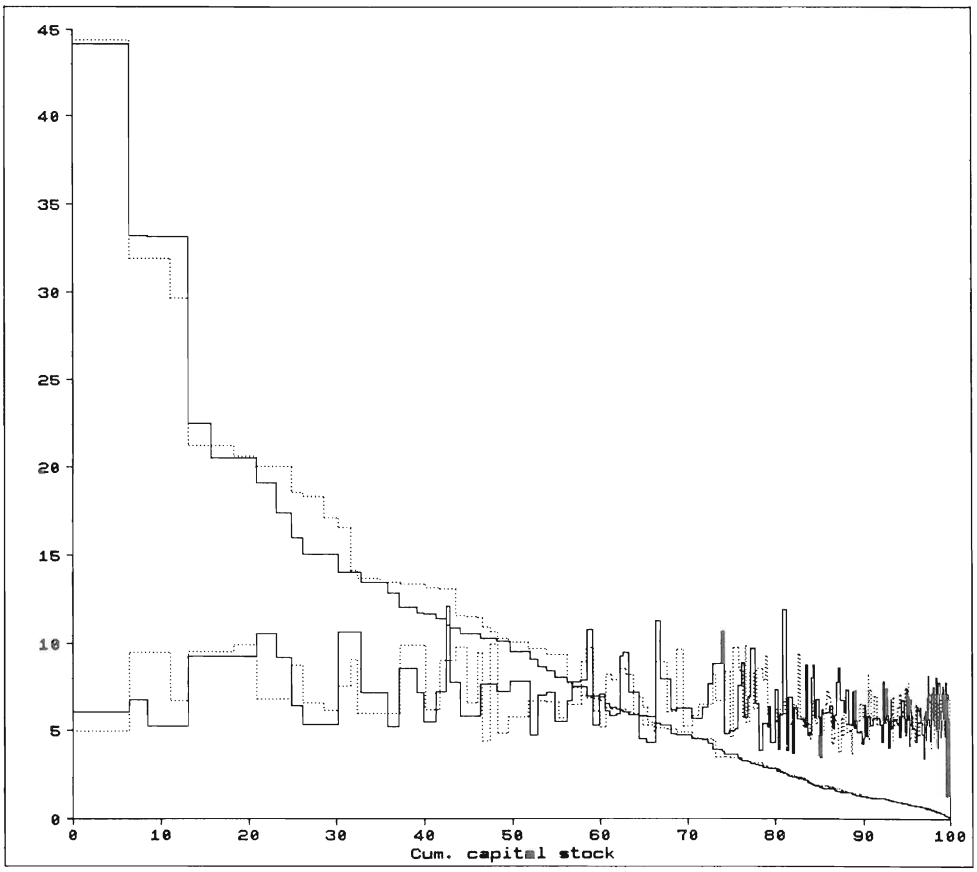

Figure 7 **Potential quarterly output (QTOP) and wages (1000 SEK/employee)**
(10^7 units of output)

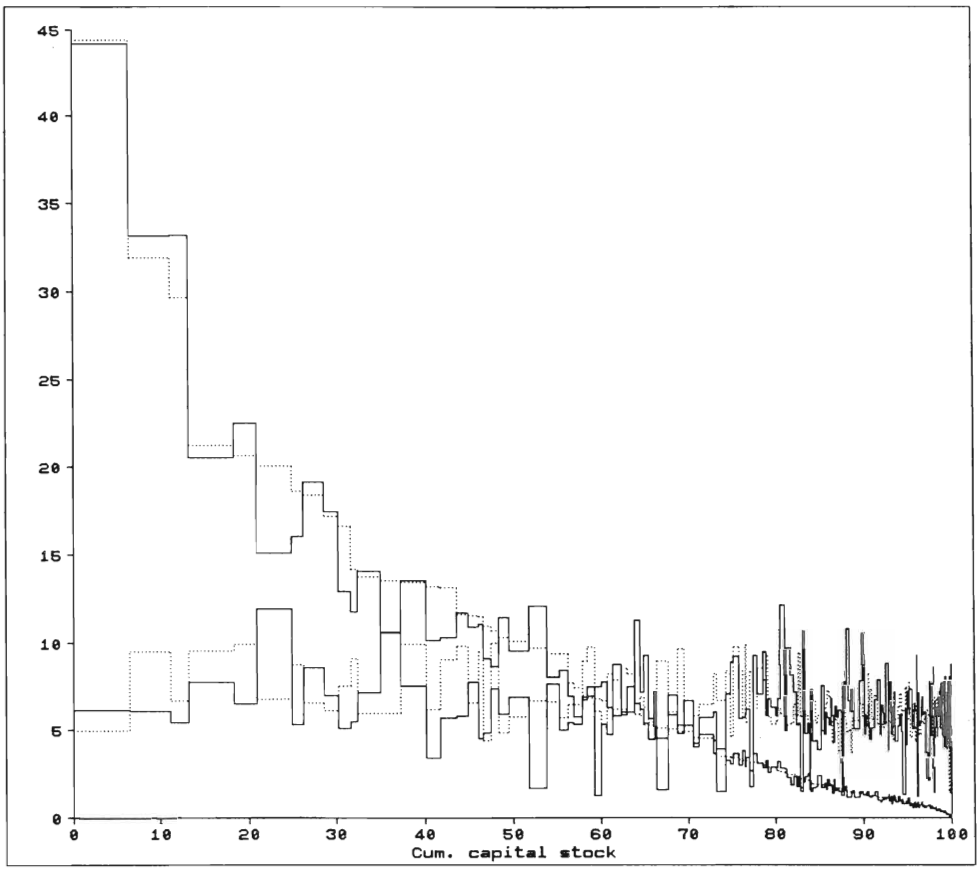

Figure 8 QTOP

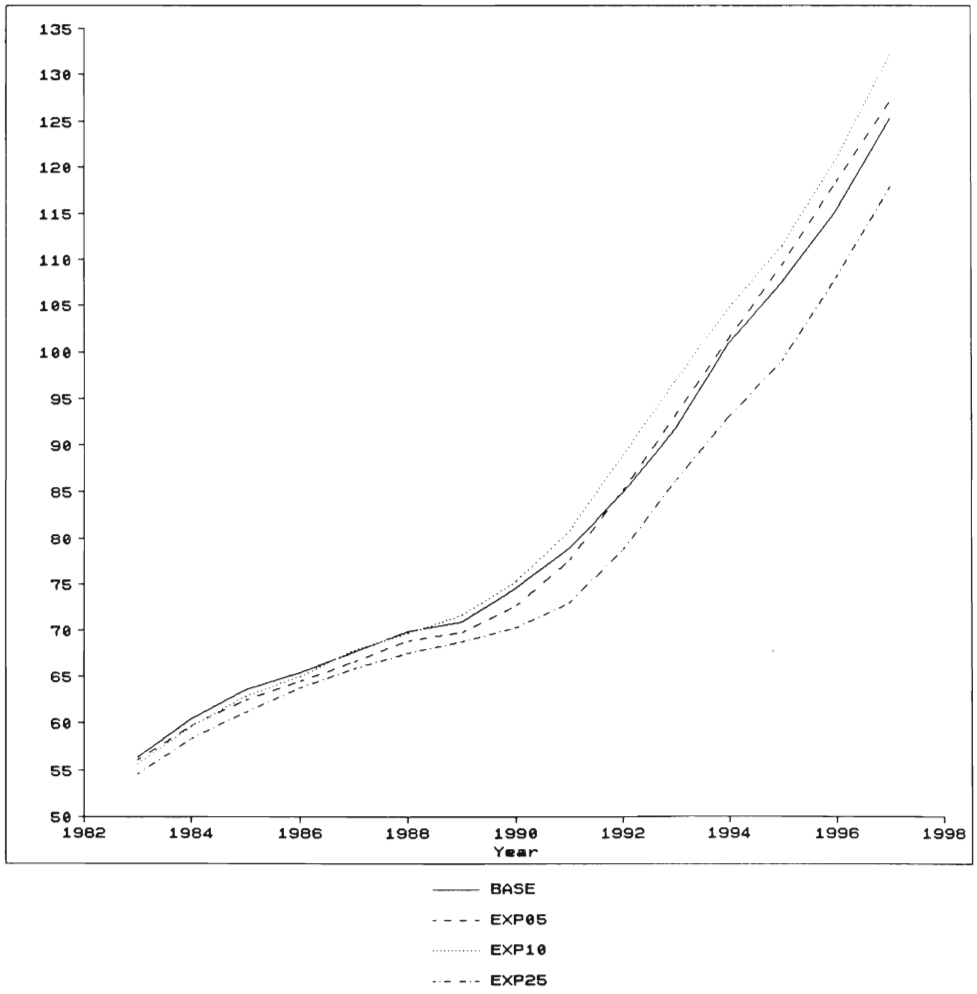

Figure 9 TEC

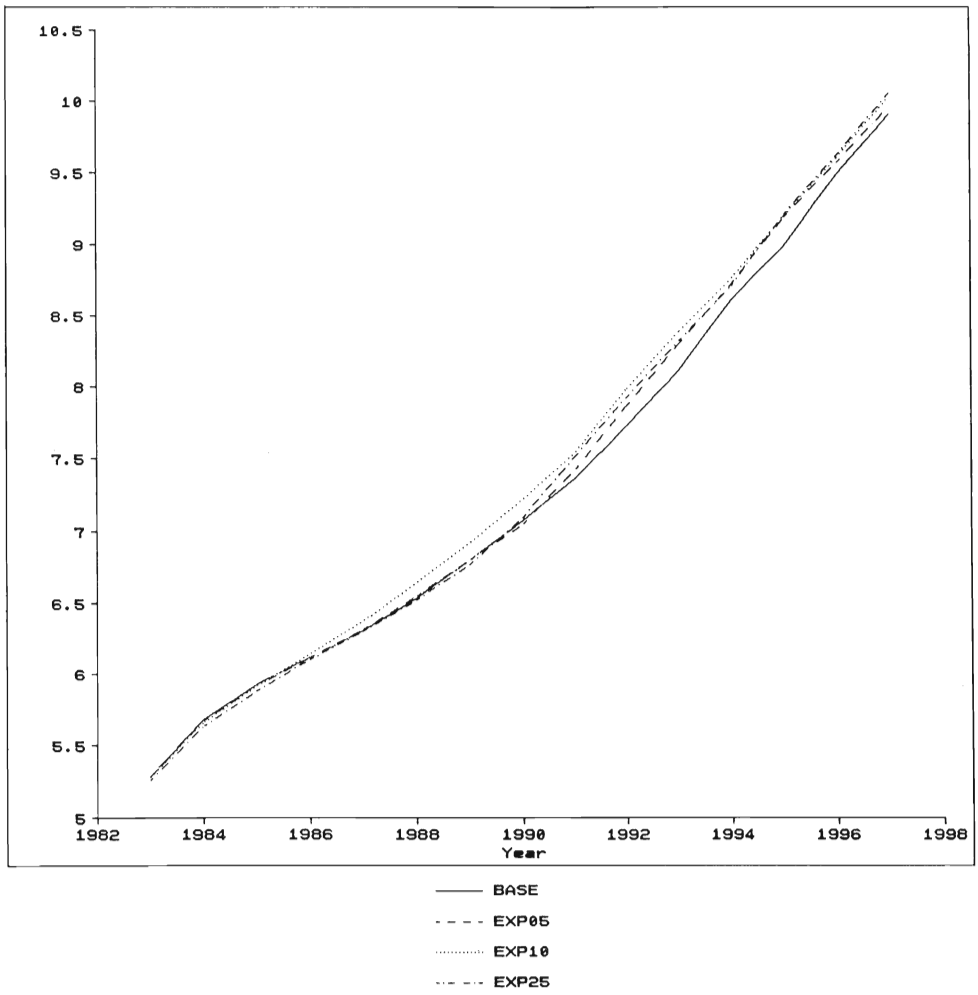
10.5
10
9.5
9
8.5
8
7.5
7
6.5
6
5.5
5
1982
1984
1986
1988
1990
1992
1994
1996
1998
Year
BASE
EXP05
EXP10
EXP25

Figure 10 Labor productivity

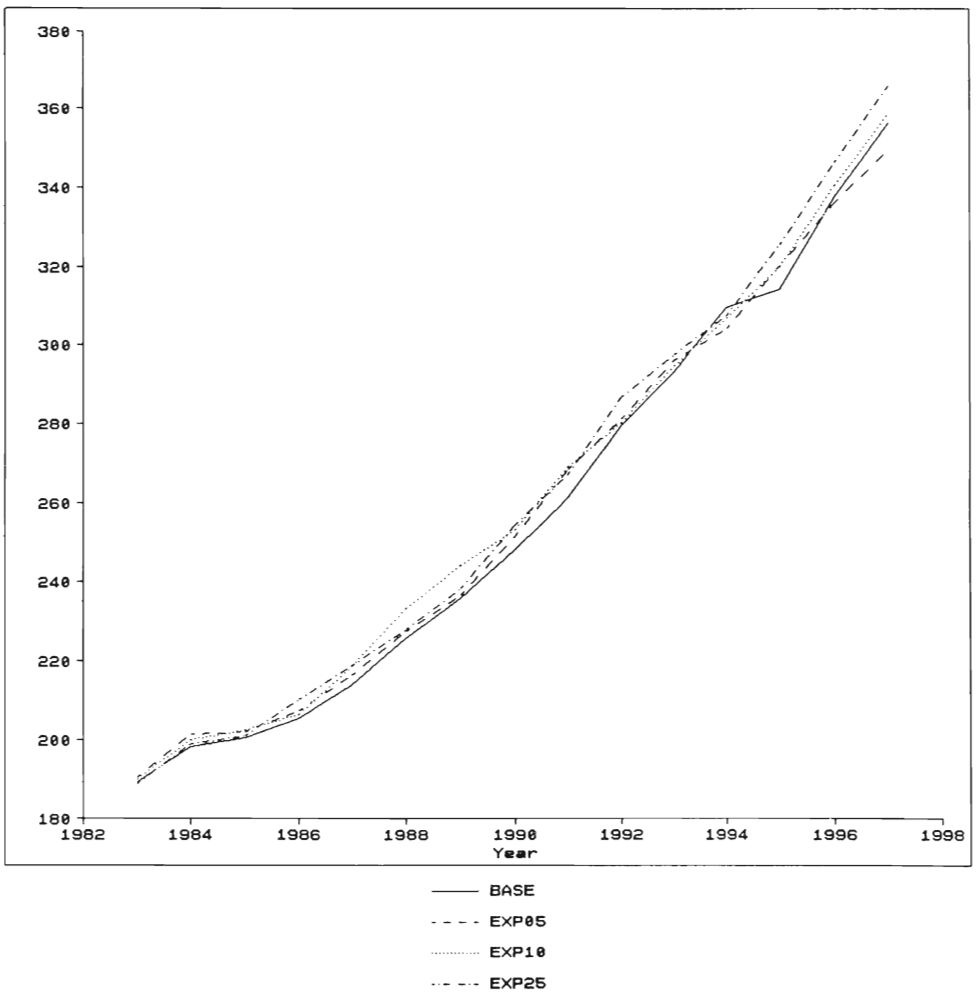

Figure 11 Annual output growth rates

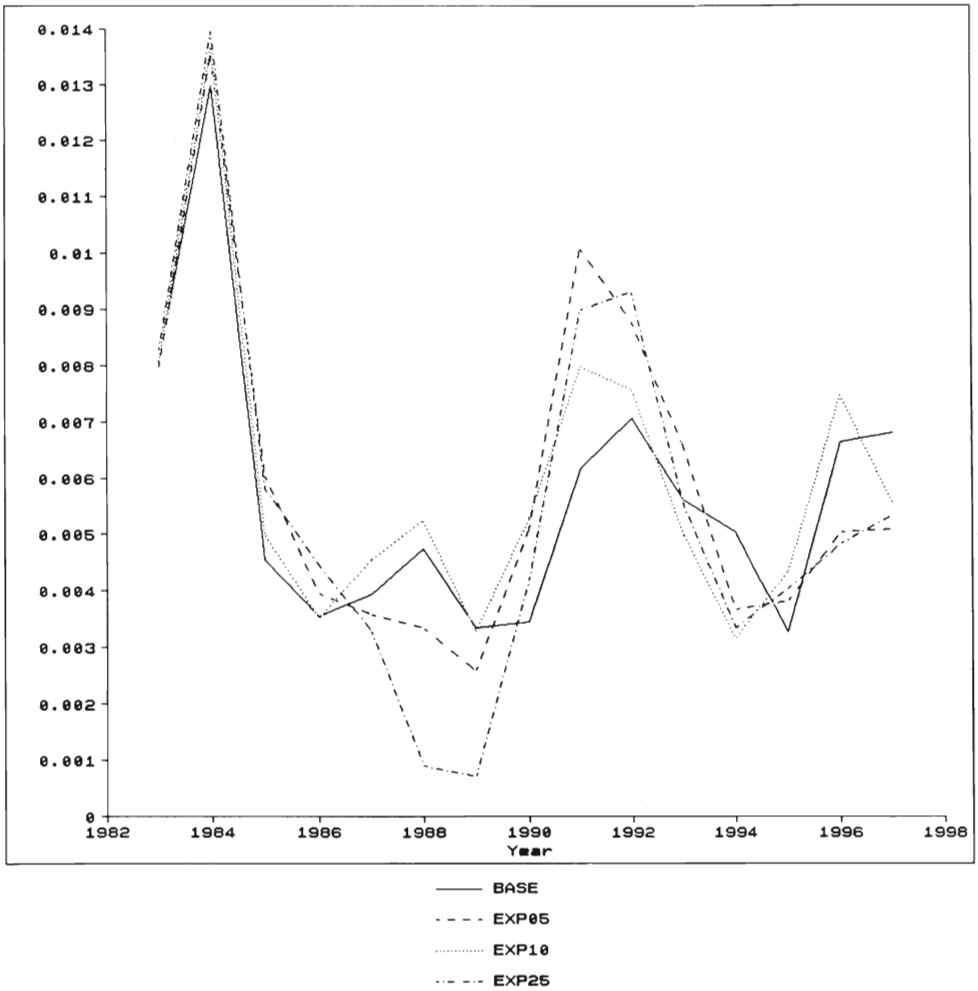

Figure 12 Labor productivity 1997
(1000 units of output/employee)

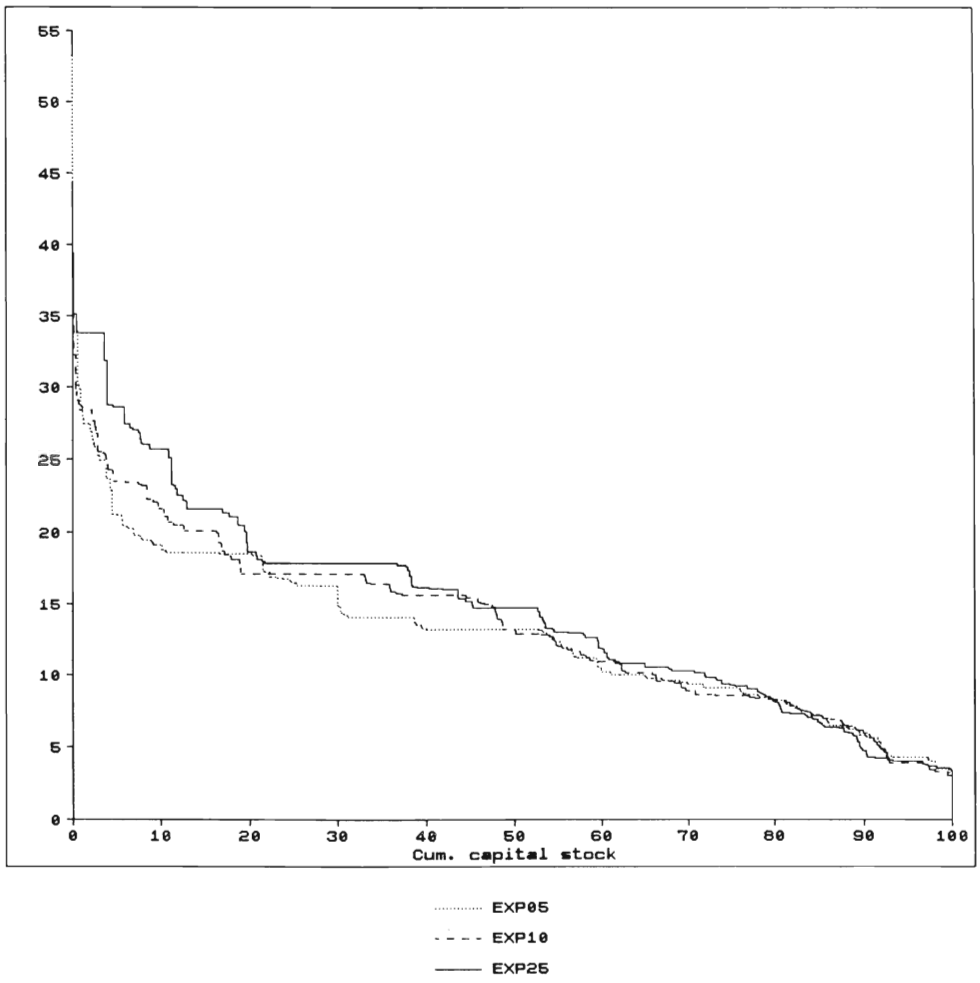

Figure 13 Potential output (QTOP) 1997
(10^7 units of output)