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Fall 2005, Intermediate Macroeconomics, section 3

ECON 219 Extra credit problem

This problem is due December 8, 2005, in class.

For this problem, you will be working with a simplified student version of the Kydland-Prescott (Econometrica 1982) seminal real business cycle model, one of the two works Kydland and Prescott got the Nobel Prize for in 2004. This model differs essentially in the following ways from the two-period model with investment we used in class:

1. the horizon is infinite, not two periods;
2. there is a permanent component to total factor productivity (technology) shocks: there can be temporary shocks that last only one period and permanent ones that last forever;
3. investment does not necessarily become productive (as capital) the next period, this is what they call *time-to-build*;
4. the model also includes business inventories;
5. in the DOS version, one can also play with the intertemporal preferences over leisure.

You have two choices. Either use i) the online tool, which is simpler to use and available through `http://ideas.repec.org/c/dge/qmrbcd/4a.html` or ii) the DOS executable, which has more choices but is more complex to handle and available at `http://ideas.repec.org/c/dge/qmrbcd/4.html`. You are going to run experimental economies by telling the program the values of various parameters, and the program is then solving your model and provides you with standard deviations and correlations for the endogenous variables. You get therefore a much richer set of results than we had in class, where we could only get the sign of correlations and rarely say anything about volatilities.

When answering the questions below, document everything with printouts. You do not need the so-called *impulse responses*, but if you are curious, these measure the reaction over time to a one-time shock.

1. First run an experiment that will be used as a benchmark: Use T in the 60–160 range, one quarter for the time-to-build of capital (as in the textbook model),

market work in the 0.2–0.33 range, risk aversion (the curvature of the indifference curve in the (c, c') space) somewhere between 1.5 and 3, a labor income share of 0.5 to 0.75, and inventories between 10–35% of GDP. Let both shocks be of the same volatility. Compute the statistics for this benchmark.

2. Compare your results with the stylized facts. What are those we can now look at but could not with the model seen in class? How does the model fit the facts?

3. To see what various changes to this benchmark can induce, run now another experiment: Make permanent shocks zero. What statistics change? Be careful aboout what statistics you should be looking at, especially in the light of the stylized facts. Can you explain these changes? Why can this experiment be better compared to what we did in class?

4. Let us see how important inventories are in explaining business cycles. Do an experiment that could highlight this. Explain.

Make sure to document and explain what you are doing.