Macroeconomics A
Problem Set 9 (Practice Short Questions)

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1. True/false/uncertain: "According to the Solow growth model, as long as the saving rate is above zero, the economy will experience positive per-capita growth."

   Answer: In the Solow Model the saving rate (s) determines investment in new capital, and higher s means more investment to cover for depreciation of capital (and population growth if included in the model). Therefore a $s > 0$ is not enough to guarantee positive growth in an economy going towards the steady state. If s is higher than depreciation we'll have positive growth up to the SS where growth in output per capita is exactly 0. Having a positive saving rate alone doesn't guarantee positive per-capita growth in the Solow model. In fact, in the basic model without technological progress, per-capita growth eventually falls to zero regardless of the saving rate (as long as it's below 100%). Only if we add technological progress to the model do we get sustained per-capita growth in the long run. The saving rate level has effects in the short run but not in the long-run

2. Explain two problems that early real business cycle models (i.e. our models discussed in Lecture 3) were facing and outline attempts at solving these problems.

   Answer: Basic RBC models face significant challenges in explaining endogenous persistence and shock amplification. While capital accumulation increases temporarily following a shock, it fails to generate sufficient persistence to match empirical observations. Similarly, the hump-shaped response of output, evident in VAR analyses, is not replicated by basic RBC models. Instead, output dynamics largely mirror the assumed dynamics of shocks, highlighting the absence of endogenous persistence mechanisms. Regarding shock amplification, the responses of inputs, such as labor supply and capital accumulation, are typically too small compared to empirical data. Only under extreme assumptions can these responses be strong enough to produce multiplier-like effects, where the change in output exceeds the initial shock to productivity.

3. Briefly explain the identification problem in vector autoregressions that seek to estimate the dynamic response of real variables to monetary shocks, and outline possible identification strategies.

   Answer: Discuss the endogeneity problem of a two equations model where the two variable of interest contemporaneously affect one another. Provide an example, for example with the standard Sims equations of Money and Output.
   Discuss possible solution to the problem by assuming that one contemporaneous coefficient is zero in one of the two equations.

4. Why may it not be in the interest of the central bank to implement a target interbank interest rate by making the "channel" between borrowing rate and deposit rate very small?

Answer: A narrower channel has certain advantages. It guarantees that interest rate fluctuations are smaller and reduces the need for "fine-tuning" open market operations. However, there are notable disadvantages. For example, in the extreme case when the deposit rate (i_d) equals the borrowing rate (i_b), trading in the interbank market dries up. In such cases, the central bank becomes the intermediary for all borrowing and lending between banks. Consequently, the central bank incurs all the costs of monitoring the creditworthiness of banks, a function that is beyond the traditional role of central banks. So the correct width of the channel system depends on the CB preferences and markets conditions.

5. When prices are flexible but firms update their information only at random points in time, how does the Phillips curve change? How does it change the response of output and inflation to a money supply shock?

Answer: In the Mankiw and Reis (2002) model firms, instead of having a probability of $1 - \phi$ of being allowed to reset prices (Calvo/NK), can always update them (fully flexible) but receive new information only at random points with probability $1 - \phi$.
In this model we derive the Sticky Information PC, where now past expectations of current economic conditions determine the current inflation rate. So the inflation rate is backward looking.
Inflation and output will respond sluggishly to a money supply shock, since the past matters more than the future and firms will take time to update their prices until new information has come. The shape of the IRFs will be hump-shumped and more delayed compare to the standard NK Model a là Galì. This model better matches empirical evidence on delayed inflation responses, among others.

6. Explain the unemployment volatility puzzle (also known as "Shimer puzzle") and one way of solving it.

Answer: Shimer (2005) demonstrates that standard search and matching models of the labor market fail to replicate key empirical patterns. While these models can successfully match the Beveridge curve (the relationship between unemployment and vacancies), they fail to generate sufficient volatility in key labor market variables. The core mechanism works as follows: After a positive productivity shock, wages adjust upward but not by as much as marginal product of labor (MPL). This should create an incentive for firms to post more vacancies since $MPL - w$ increases. Over time, more vacancy posting should reduce unemployment. However, the model generates insufficient volatility because due to high elasticity of wage the gap between MPL - w is too small to increase employment following an increase in vacancies posting. Possible solution are: Sticky wages, making unemployment not a big deal or fixed costs for vacancy posting.

7. True/false/uncertain: "The question of which financial assets households can use to save will determine their ability to smooth consumption over time."

Answer: Look at the two extremes in the consumption set of slides. If households have no ways of transferring consumption from one state or time period to another, then $c = y$ and if y is very volatile, so is c. If markets are complete (I. E. Arrow-debreu securities) then idiosyncratic risk will not matter (so if there is no aggregate risk, consumption will be constant).