Economics 2103A **Intermediate Macroeconomic Theory II**
Final Exam **April 2012**

SECTION A

1. FALSE - the money supply is given by $M = B\mu$ where $\mu = (1 + cr)/(rr + cr)$. Substituting in the numerical values for cr and rr gives $\mu = 1.2/0.3 = 4$ and therefore if $M = 500$, the monetary base must be $B = 125$.

2. UNCERTAIN - Under rational expectations agents figure out that the central bank has a feedback rule and so they adjust their expectations accordingly. This means that they anticipate the Bank's policy and the effects of the policy on macroeconomic variables. If the ability of the central bank to manipulate the economy depends on its ability to "fool" the public then it cannot smooth output fluctuations in this case. On the other hand if the public do not have rational expectations then there maybe a role for such a policy.

3. TRUE - If policy makers consistently used the Phillips curve to determine how much inflation was needed to lower unemployment, people would react to this policy by expecting the policy maker to to raise inflation every time unemployment was high. This change in inflation expectations would cause an outward shift in the Phillips curve, and an even higher rate of inflation would now be needed to lower unemployment.

4. UNCERTAIN. This depends whether one assumes Ricardian equivalence holds. If it does, then the statement is true: households foresee the increase in future taxes, and thus save the entirety of the transfer, leading them to consume exactly the same amount as before the tax cut. If Ricardian equivalence does not hold, the statement is false. For instance, credit-constrained households would spend at least a fraction of the transfer in period 1, thus changing their optimal consumption. This goes also for myopic households.

5. TRUE - If the fiscal authority continues to run large deficits then any attempts to reduce the growth rate of the money supply may only have temporary effects. With an ever increasing debt the monetary authority might eventually be forced to print more money in order to finance interest payments and this leads to higher inflation. Therefore eliminating fiscal deficits might make it possible for the monetary authority to stick to its tighter policy.

SECTION B

1. Use the Phillips curve to get:
$$u = 4 + 2(\pi^e - \pi) \tag{1}$$
Sub this into the policymaker's loss function to get:
$$L = \alpha\pi^2 + 4 + 2(\pi^e - \pi) \tag{2}$$
   (a) If the policymaker keeps its promise then $\pi = \pi^e = 0$ and so $u = 4$ and $L = 4$.

(b) Minimizing the above equation for L with respect to π gives the first order condition:

$$\frac{dL}{d\pi} = 2\alpha\pi - 2 = 0 \tag{3}$$

and so $\pi^\star = 1/\alpha$. Sub this and $\pi^e = 0$ into the Phillips curve to get $u = 4 - 2/\alpha$ and the loss function to get $L = 4 - 1/\alpha$.

(c) No, in order to satisfy Bellman's principle the announced policy of $\pi = 0$ must still be optimal in 2015 when the public has $\pi^e = 0$. However the optimal policy is $\pi = 1/\alpha$.

(d) If the public have rational expectations then they anticipate that the policymaker will want to set $\pi = 1/\alpha$ and so the intersection of the two reaction functions gives $\pi = \pi^e = 1/\alpha$ and therefore $u = 4$ and $L = 1/\alpha$. The diagram should include the public's reaction function $\pi^e = \pi$ and the policymaker's reaction function $\pi = 1/\alpha$. The policy does not satisfy Bellman's principle because at $\pi = \pi^e = 0$ the policymaker is off her reaction function and so has an incentive to deviate from the announcement. At $\pi = \pi^e = 1/\alpha$ neither player has an incentive to change their behaviour and so this is the Nash equilibrium.

(e) The higher α the lower the rate of inflation set by the policymaker as a higher value of α means a greater weight on inflation in the loss function.

2. .

(a) In period 1 the budget constraint is:

$$150 = T_1 + B_1 \tag{4}$$

as $B_0 = 0$. In period 2 the budget constraint is:

$$100 + rB_1 = T_2 + B_2 - B_1 \tag{5}$$

In period 3 the budget constraint is:

$$50 + rB_2 = T_3 - B_2 \tag{6}$$

as $B_3 = 0$.

(b) The same amount of tax in each period implies:

$$G_1 + \frac{G_2}{1+r} + \frac{G_3}{(1+r)^2} = T + \frac{T}{1+r} + \frac{T}{(1+r)^2} \tag{7}$$

Sub in the values for G and r to get

$$150 + \frac{100}{1.1} + \frac{50}{(1.21} = T + \frac{T}{1.1} + \frac{T}{1.21} \tag{8}$$

which gives $341.5 = 3.31T$ and so $T = 103.17$ in each period. Therefore in period one the debt is $B_1 = 150 - T_1 = 150 - 103.17 = 46.83$. In period two $B_2 = 100 + (1+r)B_1 - T_2 = 100 + 1.1 \times 46.83 - 103.17 = 48.34$. Confirm debt at the end of period three is zero, $B_3 = 50 + (1+r)B_2 - T_3 = 50 + 1.1 \times 48.34 - 103.17 = 0$.

(c) The change in taxes relative to the tax smoothing case are $\Delta T_1 = 150 - 103.17 = 46.83$, $\Delta T_2 = 100 - 103.17 = -3.17$ and $\Delta_3 = 50 - 103.17 = -53.17$. The present value of these is:

$$46.83 + \frac{-3.17}{1.1} + \frac{-53.17}{(1.21} = 46.83 - 2.88 - 43.94 = 0 \tag{9}$$

While the move to balanced budgets implies a tax hike in period 1, this is offset by lower taxes in periods 2 and 3 as the government no longer has debt to repay. Therefore the household is unaffected by this change in the timing of taxation.

(d) If the public discounts at rate $R = 0.2$ then the present value of the tax changes is:

$$46.83 + \frac{-3.17}{1.2} + \frac{-53.17}{(1.44} = 46.83 - 2.64 - 36.92 = 7.27 \tag{10}$$

Now consumers are made worse off by the tax-hike in period 1. With the government effectively being able to borrow at a rate of $r = 0.1$ it is able to borrow on behalf of households at a lower rate than households themselves can borrow ($R = 0.2$).