Econ 410: Midterm 2
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Instructions. Please write neatly and label all diagrams clearly.

1. [30 marks]. Consider the following overlapping generations model. Let
   N_t denote the number of young agents at date t. There is an initial old
   generation N_0 and the population grows according to $N_t = nN_{t-1}$. The
   young live for two periods and have preferences $u(c^y, c^o)$. The initial old
   live for one period only and care only for c^o. The young have a nonstorable
   endowment $y > 0$. The initial old are in possession of the economy's money
   supply M_0. Assume that the government expands the money supply at an
   exogenous rate $z > 1$ and that it uses this new money to purchase (and
   consume) output g (note that g is endogenous here).

   (a) Let $MRS = (c^o/c^y)^{1/2}$. For a given rate of return on money R (the
       inverse of the gross inflation rate), solve analytically for the demand
       for real money balances $q^D(R)$. Show that $dq^D/dR > 0$ (i.e., that
       the demand for money is inversely related to the expected inflation
       rate). Explain this result.

   (b) Solve for the equilibrium R^* and (using the result for q^D in the
       question above) derive an expression for the first-period price-level
       p_1^*. Show that p_1^* is an increasing function of z (the expected inflation
       rate). [Note: an increase in z has no effect on the money supply
       today]. Explain. How would an exogenous increase in z affect the
       welfare of the initial old? Explain.

   (c) Write down an expression for the government's **equilibrium** budget
       constraint (seigniorage revenue will be a function of n, z, and y).
       Explain why g is not necessarily an increasing function of z. What
       does this imply about the limits to seigniorage as a revenue device
       for the government?

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