

Macroeconomic Policy

Exercise set 6

1. Suppose a truly laissez-faire economy in which government expenditure and taxes have always been zero and the money stock is constant. So b_t , the stock of debt at the beginning of time t , equals zero. In the efficient decentralized (without government intervention) equilibrium individuals supply the same amount of labour in every time instant. At time t the country has to face a war which costs g_t . After time t government expenditure will be zero forever. The government is infinitely lived and faces two alternatives: a) balancing the budget at all times; b) financing the war by issuing debt. The only tax available is a distortionary proportional tax on the amount of labour supplied. The equilibrium aggregate labour supply is a decreasing function of the tax rate given by $L = \bar{L} - t$. All the above quantities are in real terms. Find:
 - a) The general expression for the tax rate necessary to finance g_t . The corresponding level of labour supply in the current and all future periods. Is there any possibility that the government is not able to finance g_t only by raising taxes in the current period?
 - b) Suppose the government finances the war by issuing debt in a way which minimizes the intertemporal distortion in labour supply. How should the tax burden be spread across time? If the real interest rate is r , derive the analytic expression for the tax revenue at every present and future instant necessary to guarantee solvency under the assumption that the tax revenue is constant across time.
2. The Aztec empire has a real stock of debt $b_t = 100$ billion units of the consumption good at the end of year t . The IMF conditions its next loan package on the Aztec empire adopting measures of fiscal restraint which ensure that the real stock of debt will be 50 billion units of the consumption good at the end of year $t + 5$. If the real interest rate is r and assuming that the Aztec empire wants to maintain the sum of the primary surplus plus seignorage $s_i + \sigma_i$ constant in every year between t and $t + 5$, write down the analytic expression for the quantity $s + \sigma$ necessary to achieve the IMF target.
3. If there has to be no arbitrage between equities and bond the following no arbitrage relationship has to hold

$$r = \frac{d_t}{p_t} + \frac{p_{t+1} - p_t}{p_t} \quad (1)$$

where r is the interest rate on bonds (assumed constant), d_t is the dividend paid by a share at time t , p_t is the price of the share at the beginning of period t . Equation (1) just states that the interest rate on the bond must equal the rate of dividend plus the capital gain on the share. Equation (1) can be rewritten as

$$p_{t+1} = -d_t + (1 + r)p_t \quad (2)$$

which is very similar to the equation which describes the dynamics of government debt. Can you think of any condition which has to hold for you to be willing to buy the share? Does this condition provide any insight about whether the stock market is overvalued or not?