Homework 7- Fiscal Policy

1. Read the (EROP) Economic Report of the President (2004, CH 6) and the 2012 Trustee’s Report for the Social Security System. Both are available online. Simply Google the title. The Trustee’s Reports are at http://www.ssa.gov/OACT/TR/. Based on these readings, answer the following questions:

- According to the EROP what are the main problems which “justify” a government role in old-age programs?
- What does OASIDI mean? What is the OASIDI tax rate?
- What is the fundamental reason that social security (not medicare) is projected to run out of money under current law? When is the OASI trust fund projected to be exhausted under the intermediate cost projections?
- What is the present value of the unfunded obligation for OASI over the next 75 years? What approximately is this number as a ratio to GDP in 2012?

2. Consider the model developed in the textbook to analyze fiscal policy questions. Suppose an economy is in steady state with a pay-as-you-go social security system that each period taxes each young agent \( s \) and pays each old agent \( s \). Now, suppose that the government abolishes the social security system but still pays off the current old. More precisely, the new government policy is described by the following three points.

1. In the present and all future periods the government no longer collects social security taxes nor pays social security benefits, except to the current old.
2. The government pays off the current old the promised social security benefit by borrowing an amount equal to \( s \) per young agent.
3. The government continues to borrow \( s \) per young agent in all periods beyond the current period and finances this by taxing next period and beyond each old agent an amount equal to the net interest rate on the debt times the debt per young agent (i.e. the tax equals \( sr \)).

What are the effects of this policy over time on the output-labor and the capital-labor ratios? Explain in detail your reasoning. Make an effort to explain your reasoning in an intuitive manner.

BONUS:

3. The US Social Security system provides an old-age benefit. Although the actual system is complicated, a simplified version of the system works as follows. Every dollar of earnings a worker earns \( (\text{earn}_j) \) at age \( j \) is taxed at the combined employee-employer rate of \( \tau_{OASI} = .106 \), provided earnings are below the maximum taxable earnings. When a worker earns an extra dollar in
a year this increases the worker’s average lifetime earnings and old-age benefits increase as a workers average lifetime earnings increases.

Calculate the marginal tax rate on earnings at every age \( j \) between 23 and 64 for a worker whose average lifetime earnings is forecasted to be beyond the ”first bendpoint” but not beyond the ”second bendpoint”? Calculate the marginal tax rate on earnings at every age \( j \) between 23 and 64 for a worker whose average lifetime earnings is forecasted to be beyond the ”second bendpoint”? Present your calculations in the form of a graph plotting age against the marginal tax rate. Explain the logic of your calculation.

**Critical Extra Information:**

1. Interest rate \( r = .04 \)
2. Demographics: a worker works from age 23-64, retires at age 65 and lives to age 80 and then dies.
3. In retirement a worker receives an old-age benefit governed by the formulas below. The first formula holds for an individual with lifetime earnings greater than the ”first bendpoint’ level \( bend_1 \) but less than the second bendpoint \( bend_2 \). The second formula holds for an individual with lifetime earnings beyond the ”second bendpoint’.

\[
b(lifetime \ earnings) = 0.9 \times bend_1 + 0.35 \times (lifetime \ earnings - bend_1)
\]

\[
b(lifetime \ earnings) = 0.9 \times bend_1 + 0.35 \times (bend_2 - bend_1) + 0.15 \times (lifetime \ earnings - bend_2)
\]

\[
lifetime \ earnings = \frac{\sum_{j=23}^{64} earn_j}{64 - 23}
\]
ANSWERS:
1. According the EROP:
(1) some people may not have the foresight and calculating powers to make proper decisions and may not be able to get financial experts to help them.
(2) some risks may not be easily insured in private markets.
(3) some redistribution may be warranted and is pursued by other government programs.

OASI - old age and survivors insurance (tax rate is 10.6 percent)
DI - disability insurance (tax rate is 1.8 percent)
Half of each of these tax rates is on employee and employer

Social security is projected to run out of money largely because the ratio of retirees to workers is expected to rise in the future. Without changes in benefits or tax rates, the existing trust fund is not sufficiently large to cover the imbalance produced by this trend. OASI is projected to exhaust the trust fund in 2035 (based on the 2012 Report) under intermediate cost projections.

2012 Report says unfunded obligation is 8.6 trillion over 75 years under current law. As 2012 GDP is roughly 16 trillion, then the unfunded obligation is roughly 54 percent of GDP.

One upshot of this is that conventional measures of the US national debt, that leave out the implicit debt in social security or medicare, will be very far from a more encompassing notion of what constitutes government debt.

2. The policy described for eliminating social security leaves each agent in the model EXACTLY as well off as in the original model with social security.
One reason for this is that the present value of taxation on each agent is the same under both policies. For this reason, the budget set of all agents remain unchanged.

As a consequence the capital-labor ratio and the output-labor ratio is the same in both models so that the new policy preserves the steady state values of these two ratios.
3. BONUS PROBLEM:
What is the net tax rate implicit in the tax and benefit side of social security?

1. When one earns an extra dollar, social security taxes you at a 10.6 percent rate. However, social security also gives you an extra benefit for the extra dollar earned. Thus, the net tax rate equals the 10.6 percent rate LESS the present value of the extra benefits due to the extra dollar earned.

2. To figure out the answer, do two things. First, write out the formula for the present value of all benefits, where we present value back to age \( j \). We do so for the first bendpoint below.

\[
P_{\text{Benefit}}_j = \sum_{i=65}^{80} \left[ \frac{.9bend_i + .35(lifetime\ \text{earnings} - bend_i)}{(1 + r)^{i-j}} \right]
\]

Second, calculate how this present value moves with an extra dollar of earnings. This is just the derivative of the \( P_{\text{Benefit}}_j \) with respect to age \( j \) earnings. Roughly, the marginal gain in benefits (present valued back to todays dollars) due to an extra dollar earned at age \( j \).

\[
\text{Derivative}P_{\text{Benefit}}_j = \sum_{i=65}^{80} .35 \left( \frac{1}{64-23} \right) \text{ firstbendpoint} \\
\]

\[
\text{Derivative}P_{\text{Benefit}}_j = \sum_{i=65}^{80} .15 \left( \frac{1}{64-23} \right) \text{ secondbendpoint} \\
\]

3. Answer is

\[
Net \ \text{Social Security Tax Rate}_j = .106 - \text{Derivative}P_{\text{Benefit}}_j
\]