These are variations on the `https://lectures.quantecon.org/jl/lake_model.html`. Recall that in the example, the fiscal policy had a lump-sum tax paid by all in the workforce (i.e. τN_t was the revenue) which paid for the unemployment benefits, and the balanced budget constraint is $\tau N_t = cU_t$.

Taxing Only Workers

Consider a variation where the government only taxes those who are working, but maintains the lump-sum tax. That is, the post-tax income for the unemployed is c and the post-tax income for workers is $w - \tau$. With this, the revenue generated is now τE_t and the balanced budget is now $\tau E_t = cU_t$, or after normalizing by the population $\tau e = cu$

1. Replicate the key figures from the code which show the Unemployment Rate, Employment Rate, Tax, and Welfare as a function of the unemployment benefits in equilibrium.

2. Given your solution above, compare it to the highest welfare in the previous example with a lump-sum paid by the entire workforce. Which policy should a the government implement to maximize welfare? Interpret the results.

(Optional) Proportional Tax

As a bonus, and/or consider it as a final project.

Consider another variation where the tax is a fraction of income for the employed. That is, for some τ_w, the post-tax income of a worker is $(1 - \tau_w)w$ while the unemployed are not taxed. Replicate the key figures from the code, as before, and compare the policy to the others.[1]

You can even consider a variation with a progresive tax. That is, τ_w is a function of w itself. For example, each wage could have its own $\tau_w(w)$ tax-rate, which is typically increasig in w.

[1] Hint: the tricky part of this problem is figuring out what the balanced budget requirement is. The revenue the government spends is still cU_t, but to find the revenue collected you will need to use the distribution of wages conditional on working and use it to find the revenue required.