Q6A: **After the war ends, is Economy A in BGE? Is Economy B in BGE?**

An economy is in BGE if $\frac{Y}{K}$ (output-capital ratio) is constant. g($\frac{Y}{L}$) = g($\frac{K}{L}$)

In Economy A, the capital stock (K) decreases by around 25 percent. This would decrease the capital-labor ratio $\frac{K}{L}$. The BGE output-capital line does not move. This decrease in $\frac{K}{L}$ would show up as a downward movement **along** the $\frac{Y}{L}$ production function ($\frac{Y}{L}_{0} \rightarrow \frac{Y}{L}_{A}$). Economy A is no longer at the point of balanced-growth equilibrium ($\frac{Y}{L}_{0}$), therefore Economy A is not in BGE.

In Economy A and B, the 1% change in L moves the economy out of BGE. The decrease in L will slightly increase $\frac{Y}{L}$ and $\frac{K}{L}$ for both Economy A and B. This moves economy B out of BGE.

Q6B is on bottom half of the next page

***Q6C:* Suppose that natural population growth is endogenous: in both economies, natural population growth is inversely related to output per worker. Explain why the war will therefore cause the economies of these two countries to diverge.**

$g(L) = n$

Slope of BGE $\frac{Y}{K}$ line = $\frac{(\delta + n + g)}{s}$

Economy A:

$\downarrow \frac{Y}{L} \Rightarrow \uparrow p \Rightarrow \uparrow n \Rightarrow \uparrow \frac{Y}{K} \Rightarrow \downarrow \frac{Y}{L}$ and $\downarrow \frac{K}{L}$

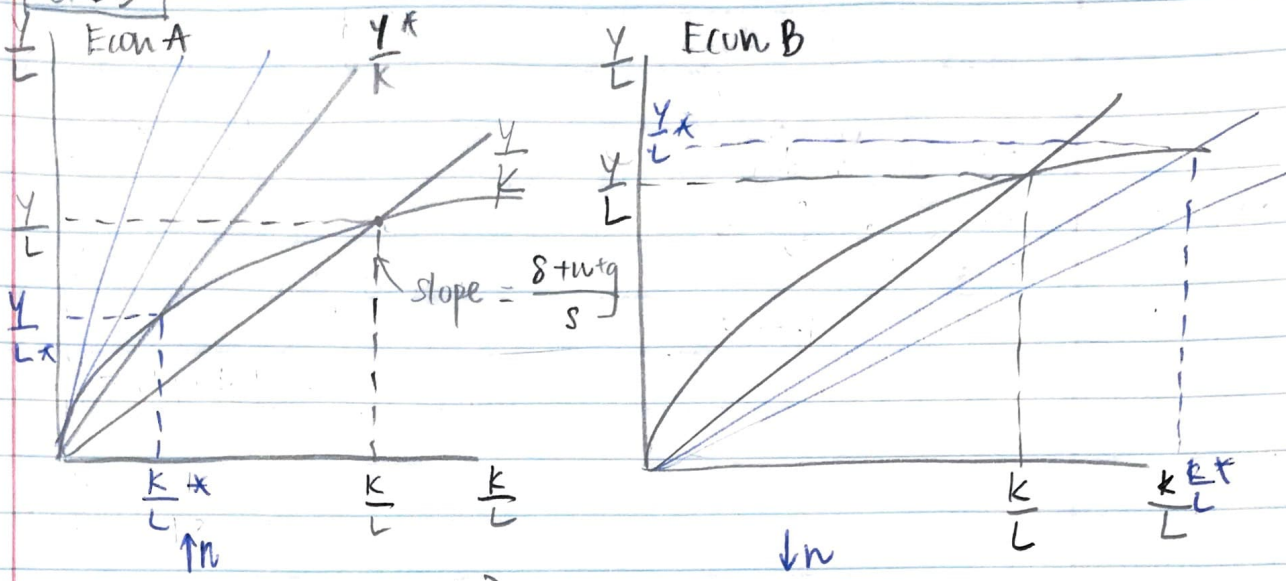
Assuming α and E are constant, a decrease in $\frac{Y}{L}$ will cause an increase in population, which leads to an increase in n (which is growth of labor force). If $n \uparrow$ then the numerator for the slope of the BGE will also increase. As $\frac{Y}{L}$ decreases, the BGE $\frac{Y}{K}$ line becomes steeper.

Both $\frac{Y}{L}$ and $\frac{K}{L}$ are at lower values now. This makes sense because there are now more workers for the same amount of capital, so there is less capital per worker. The lower $\frac{K}{L}$ is correlated to a lower output per worker ($\frac{Y}{L}$), which is our proxy for standard of living. The effects of this downward movement will be exacerbated over time because Economy A's lower standard of living and lower $\frac{K}{L}$ will slow down growth over time.

Economy B: The opposite happens for economy B. Assuming α and E are constant, an increase in $\frac{Y}{L}$ will cause an decrease in population which leads to an decrease in n. If $n \downarrow$ then the numerator for the slope of the BGE will also decrease. As $\frac{Y}{L}$ increases, the BGE $\frac{Y}{K}$ line becomes flatter. This higher standard of living and higher capital-per-worker ratio will increase growth in the long run.

As economy A's $\frac{Y}{K}$ line becomes steeper and economy B's $\frac{Y}{K}$ line becomes flatter, the two economies gradually diverge.

Q6D



$$g\left(\frac{Y}{L}\right) = g\left(\frac{K}{L}\right)$$

Q6B