Harit Hatawong
6104640112

a.) $$y=\gamma\left[\delta K^{-\rho}+(1-\delta)L^{-\rho}\right]^{-\frac{\nu}{\rho}}+\varepsilon$$

from the model 1 with intial value $\gamma=4$, $\delta=0$, $\rho=-1$, $\nu=1$
we have the estimated parameter:

$\gamma = 2.89\times10^{-17}$

$\delta = 0.802$

$\rho = -1.883$

$\nu = 3.396$

$\sigma = \frac{1}{1-\rho} = 0.347$ //

F-test: H_0: $\delta=0$, $\rho=0$, $\nu=0$

H_1: otherwise

p-value $= 0 < \alpha = 0.05$

So, we reject H_0 //

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b.) $$\ln y=\ln\gamma-\frac{\nu}{\rho}\ln\left[\delta K^{-\rho}+(1-\delta)L^{-\rho}\right]+\varepsilon$$

from the model 2 with intial value $\ln\gamma=4$, $\delta=0$, $\rho=-1$, $\nu=1$
we have the estimated parameter: or $\gamma=54.598$

$\gamma = 99.648$

$\delta = 0.235$

$\rho = -0.808$

$\nu = 0.972$

$\sigma = 0.553$ //

F-test: H_0: $\delta=0$, $\rho=0$, $\nu=0$

H_1: otherwise

p-value $= 0 < \alpha = 0.05$

So, we reject H_0 //

c.) if we change the initial value the estimated result would be changed since we have non-linear function there will be many solution available.

to get accurate solution we should use the intitial value that follow the theory/assumption

and in this case we change efficiency parameter (γ) from 4 to 55. then the solution will be the one that closest to the ss which $\hat{y} = 15.2945$

and according to the model:

$$y = \gamma\left[\delta K^{-\rho} + (1-\delta)L^{-\rho}\right]^{-\frac{\nu}{\rho}} + \varepsilon$$

if γ, k, L is not change and the efficiency is increase $-\frac{\nu}{\rho}$ would be lower as it is from $\frac{3.39}{1.88} \rightarrow \frac{1.06}{38.85}$ as well as other parameter in balance the equation

d.) for the Iterative process, if we change the

$\hat{\theta}_t = \hat{\theta}_{t-1} - \Delta t$ convergence value

convergence value it will impact the estimated parameter

high convergence = high error as in (i) the rss is higher

for the (ii) less convergence value would lead to less error

and require more Iteration time but in this case we limit

the iteration to 100 which less than (a) that have 359 iteration so

it possible that iteration process could not meet the

"convergence value" which it's happened for this case

e.) if we change the initial value the estimated result

would be changed like it was in (c)

However this case the estimated parameter

don't significantly change.

$\hat{\gamma} = 99 \rightarrow \ln\hat{\gamma} = 3.798$

$\gamma \simeq 99$

as well as the other parameter so, this

occured because the closest solution for both

initial value is the same point

f.) for the Iterative process, if we change the

$\hat{\theta}_{t} = \hat{\theta}_{t-1} - \Delta t$ convergence value

convergence value. it will impact the estimated parameter

b.) the way in this case the parameter doesn't change much which may occur because the initial value are quite close to the solution that we can see from the iterative process that took only x20 time comparing to (a) that took 300 times

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g.) For the sign and meaning and the overall test both model are in different

However the individual test of model (1) the y parameter is insignificant

So, we will choose the model(2) although we have lower R^2 but the insignificant in t-test is more severe.