Problem Set 6

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Q1 a) Similar code and algorithm to PS05.

Q1 b) used Sergio's code. Modified to PS's utility fn w/s labor. This code is ~~work-in-progress due to errors~~

- I use Algorithm 3 EGM: Fixed labour supply fixing labor policy fn to @ steady state. Less.
- This algorithm uses EGM and VFI.

$u_c(c,l) = u_c(c)$

update policy @ each step

iterates on value fn

- The update of labor policy fn in the code is done within "EGM" function. It updates also X_grid and MPK_mat.
- I also added "update_labor" fn to evaluate labour from old policy $l_{ij} = l(\vec{z}_i, \vec{k}_j)$
- as I mentioned this code needs further work like safety checks if you get out of bounds (in this case you need to revert to VFI)
- To get consumption, need to solve $u_c = \beta E(V_k(z',k')/z)$. This is nonlinear and is to be solved numerically. in "T-EGM" function.

c) Envelope condition: $V_k(z,k) = u_c(c,l) f_k(z,k,l)$

Using EGM Algorithm + Endogenous labour supply with separable utility. Steps:

1) get labor l_{ij} numerically. For this I added routine using "NLsolve" within EGM fn which solves nonlinearly for labor, then X_grid and MPK_mat are computed.
2) consumption calculated from envelope condition

3) K' is found as $Y\_grid - Gc$ (8)
4) V_k is updated.

d) data simulated, plotted 2 moments reported
T attached code but T have errors to be
fixed unless present me from plotting. Sorry
about that.

PP) I used Canada's GDP for 1960-2021 from
World Bank. After detrending, the variance =
of growth rate detrended.
= 0.00496.
I used calibration function to min(model var -
target var)^2 by employing "BFGS" optimizer.
0.00496
this gives optimal parameters to match moments
ρ and η.
To implement this, I use simulated data from Old
to get simulated variance. I use "calibration"
fn to do it.