Solution for Exercise: Week 3

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Exercise: Manipulate the code `GK.mod` and calibrate a key parameter to get exactly the value of a specific moment.

- Instead of giving to the code a value for θ and getting a value for ϕ, treat θ as a free parameter.

- Set `phi_mom = 4.5` and find the θ that produces that number

- Show that's the differences in IRFs after a capital quality shock with the non-calibrated version

Solution:

In the `.mod` file, which I call `GK_calib.mod` make θ a variable (in Dynare's language), delete it from the parameters block and set it in the such as is always equal to its steady state value

```
theta = steady_state(theta);
```

In the steady state file `GK_calib_steadystate.m` our function now takes as an input the moment for $\phi = 4.5$, call it `phi_mom` instead of θ

```
fun = @(c) myfun_GK1_calib(c,sigmab,ksi,betta,phi_mom);
c=fsolve(fun,R_1,options);

Rk=c(1);
theta=c(2); % it is theta now
```

`theta` now is our new unknown `c(2)` that will be solved by the `fsolve`, in order to calibrate its value for `phi_mom`. Our function `myfun_GK1_calib` also needs to change by replacing ϕ with the ϕ_mom and `c(2)` wherever `theta` was.

```
function F = myfun_GK1_calib(c,sigmab,ksi,betta,phi_mom)
F(1)=phi_mom - (1-sigmab/betta)/(c(1)*(sigmab+ksi)-sigmab/betta); %Equation
    1
F(2)=phi_mom - ((1-sigmab)+sigmab*phi_mom*c(2))/(c(2)-((1-sigmab)+sigmab*
    phi_mom*c(2))*(betta*c(1)-1));%Equation 2
end
```
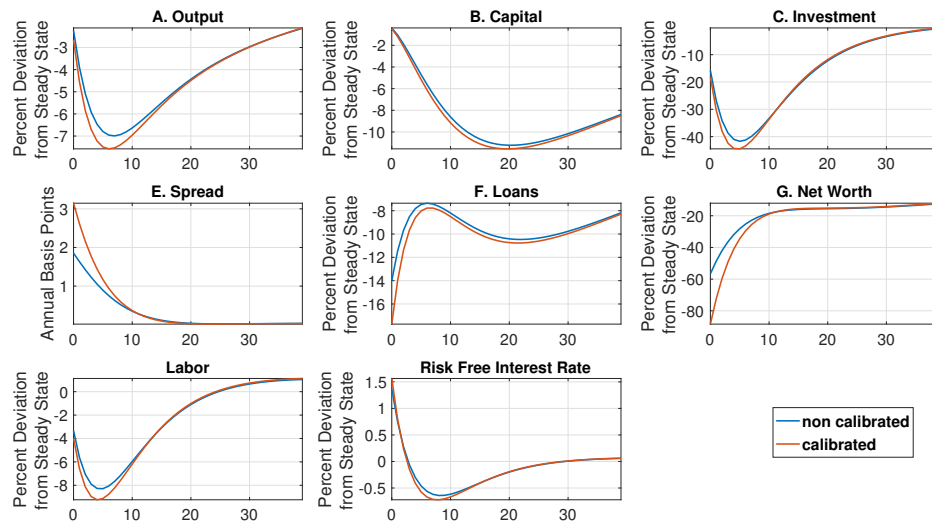
Solving the system, the new value for `theta` is 0.2658.

Plotting IRFs:

Figure 1: IRFs to capital quality shock