

# Solow Model Guidelines

## Key Premises

- 1) Production Function  $Y = zF[K,N]$
- 2) Capital Accumulation  $K' = (1 - d)K + I$
- 3)  $Y = C + I$
- 4) Consumption  $C = (1 - s)Y$

## At Steady State there is no population growth

Savings equals investment:  $sY = I$

Steady State level of capital:  $szf(k^*) = (n + d)k^*$

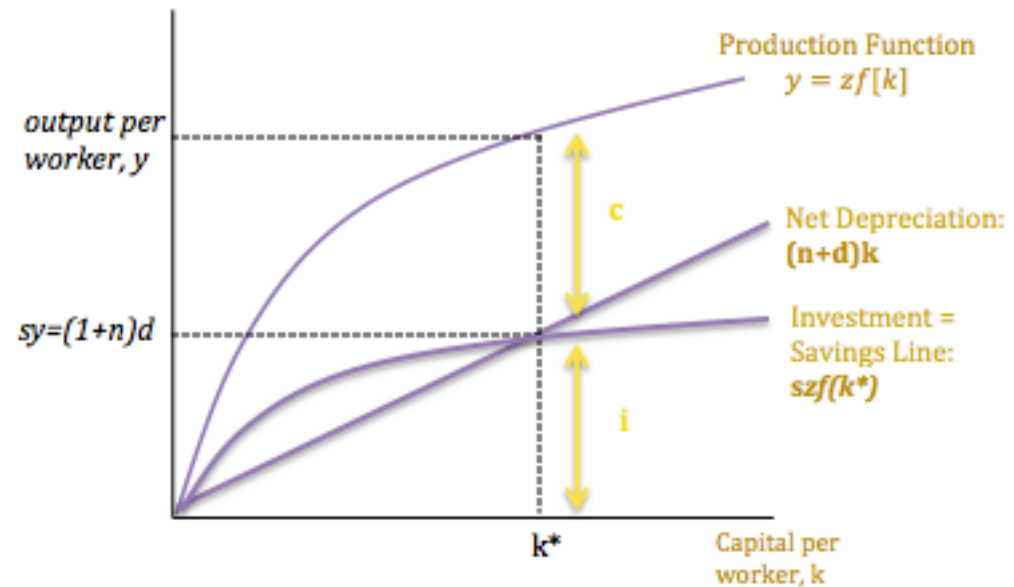
Steady State Consumption:  $c^* = zf(k^*) - (n + d)k^*$

is maximised when  $MP_K = n + d$

## How to Solve

- 1) Divide by N to find everything in per worker terms
- 2) Find the levels of investment and depreciation
- 3) Find the steady state level of capital per worker,  $k^*$  using the Steady State condition  $szf(k^*) = (n + d)k^*$
- 4) Find  $c^*$  using  $c^* = zf(k^*) - (n + d)k^*$

## Solow Steady State Model



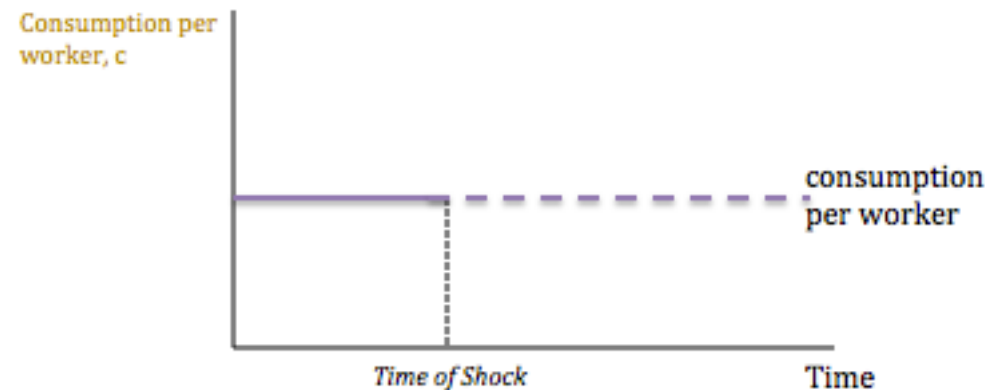
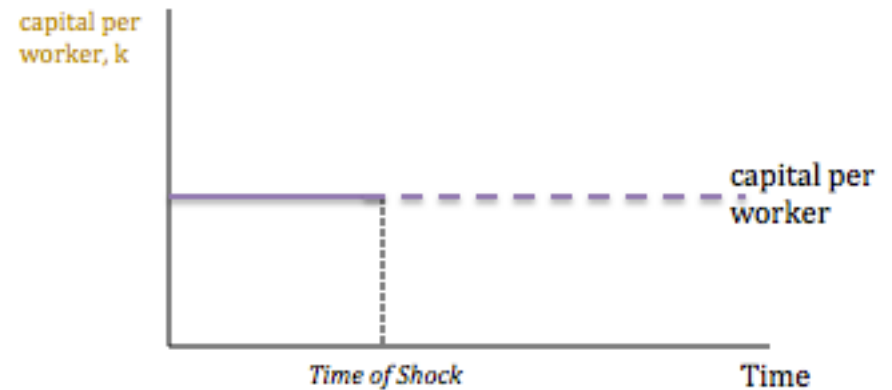
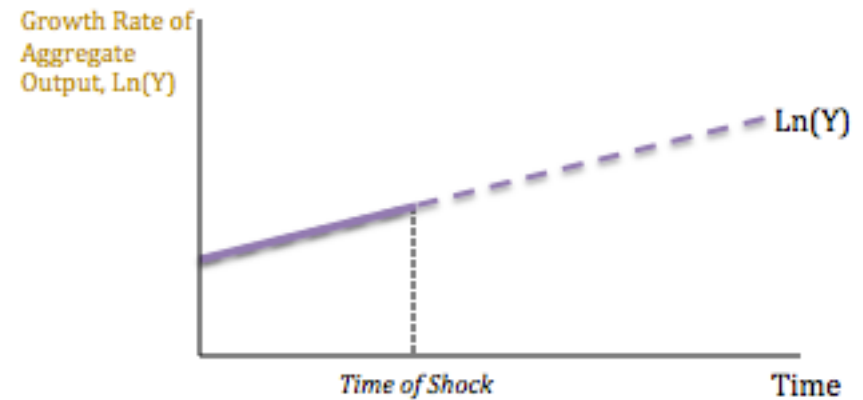
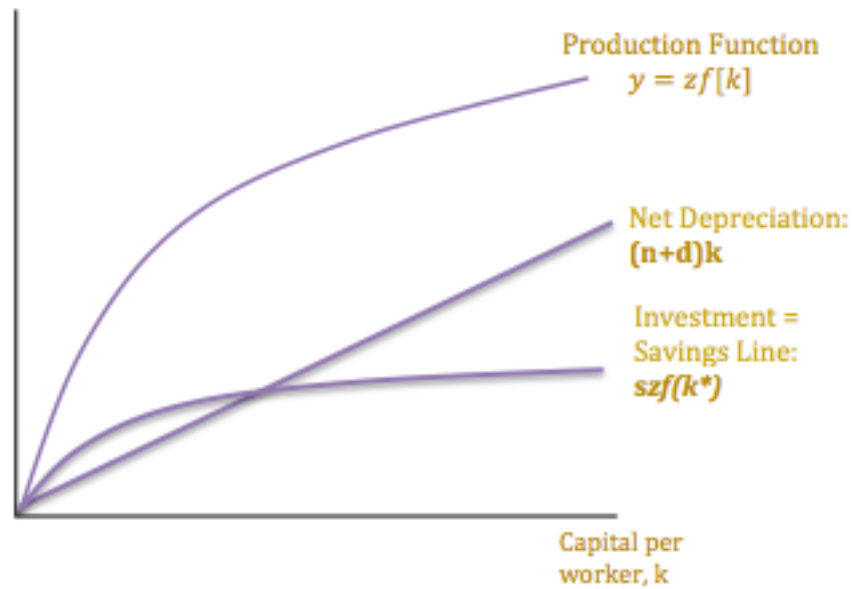
**NOTE:** all variables above are in *per worker* terms.

At the steady state, investment equals saving there is no change in capital. This is where Investment = Depreciation:  $szf(k^*) = (n + d)k^*$

Graphically, this is the level of capital per worker,  $k$ , where the investment line equals net depreciation. We can use this level of  $k^*$  to find output per  $y^*$ .

Saving/Investment per worker is the vertical distance between the investment line and the horizontal distance. consumption per worker is the remaining vertical distance. Mathematically, this is maximising when  $k^*$  is at the level where the slope of the investment line equals the slope of the production function;  $(n + d) = MP_K$

### Solow Steady State Model



### Solow Growth Rates

Solow Growth Rates	
Aggregate Output, $Y$	
Population, $N$	
Output per worker, $y$	
Capital per worker, $k$	
Consumption per worker, $c$	