Timing of events

1. Capital inherited from the previous period is at hand, k_t
2. Output is produced by the production function, $y_t = A_t k_t^{\alpha}$
3. The produced goods are divided into consumption and saving $c_t + x_t = y_t$
4. Capital depreciates at rate δ. Remaining capital and new investment determined new capital stock. $k_{t+1} = (1 - \delta)k_t + x_t$.

Here, k_t is capital stock at the beginning of the period t.

Timing of events, cont'd

1. Capital inherited from the previous period is at hand, $\tilde{k}_{t-1}$
2. Output is produced by the production function, $y_t = A_t \tilde{k}_{t-1}^{\alpha}$
3. The produced goods are divided into consumption and saving $c_t + x_t = y_t$
4. Capital depreciates at rate δ. Remaining capital and new investment determined new capital stock. $\tilde{k}_t = (1-\delta)\tilde{k}_{t-1} + x_t$

Here, $\tilde{k}_t$ is capital stock at the end of the period t. Note that $\tilde{k}_t = k_{t+1}$.

Timing of events in stochastic setting

1. Capital inherited from the previous period is at hand, k_t. Technology level A_t is realized.
2. Output is produced by the production function, $y_t = A_t k_t^{\alpha}$.
3. The planner forms expectation in the next period's A_{t+1}. The produced goods are divided into consumption and saving $c_t + x_t = y_t$.
4. Capital depreciates at rate δ. Remaining capital and new investment determined new capital stock. $k_{t+1} = (1 - \delta)k_t + x_t$.

Here, k_t is capital stock and A_t is realized technology level at the beginning of the period t.

Timing of events in stochastic setting

$$y_t = c_t + x_t$$

(k_t, A_t)

1. Capital is inherited from the previous period and technology level is realized (state variables)

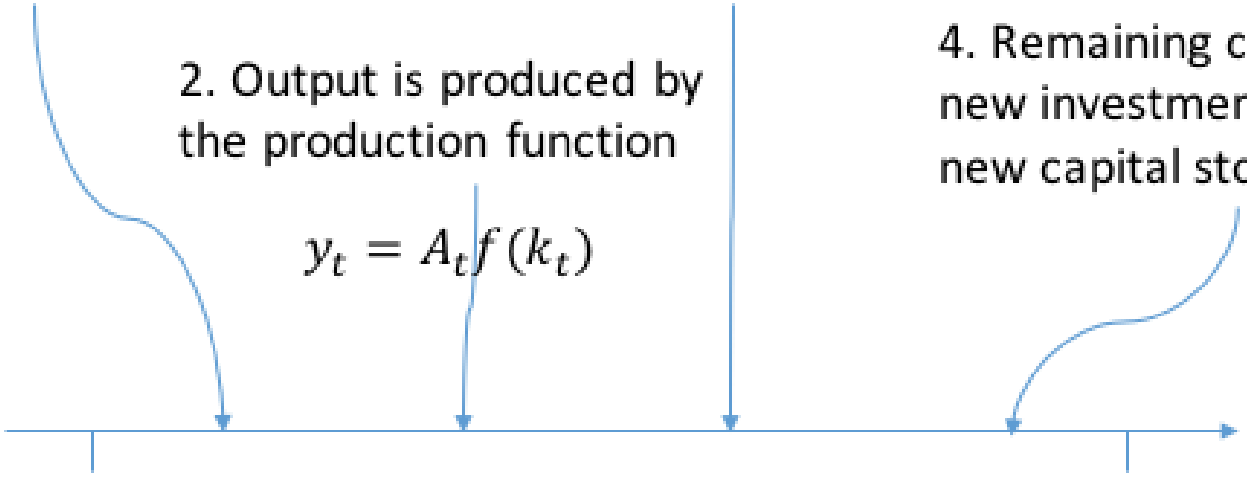
3. Expectation is formed about the next period's technology. Given that, output is divided into consumption and output

$$k_{t+1} = (1-\delta)k_t + x_t$$

2. Output is produced by the production function

$$y_t = A_t f(k_t)$$

4. Remaining capital and new investment determines new capital stock



Beginning of Period t

Beginning of Period t+1

In Dynare ....

- In the literature of the business cycle theory, the endogenous state variable, i.e., capital, is expressed by using $k_t = \tilde{k}_{t-1}$.
- Dynare uses $\tilde{k}_{t-1}$ and A_{t-1} as state variables.
- For example, $k_{t+1} = (1-\delta)k_t + x_t$ or $\tilde{k}_t = (1-\delta)\tilde{k}_{t-1} + x_t$ is written as `k = (1-delta)*k(-1) + x`. Also, $y_t = A_t k_t^{\alpha} = A_t \tilde{k}_{t-1}^{\alpha}$ is written as `y = A*k(-1)^alpha`.
- Note that A_t in known at the beginning of the period t, whereas $\tilde{k}_t = k_{t+1}$ is not.