

# ECON 310: Dynamic Macroeconomics

Spring 2025

Fulbright University Vietnam

## The Model.

The optimization problem is

$$\begin{aligned} \max_{\{c_t\}_{t=1}^{\infty}, \{W_t\}_{t=2}^{\infty}} \quad & \sum_{t=1}^{\infty} \beta^t \frac{c_t^{1-\sigma}}{1-\sigma} , \\ \text{s.t.} \quad & W_{t+1} = W_t - c_t, \text{ for } t = 1, 2, \dots \\ & c_t > 0, W_t > 0 . \end{aligned}$$

## Recursive Formulation.

The recursive formulation is

$$\begin{aligned} V_t(W_t) = \max_{c_t, W_{t+1}} \quad & \frac{c_t^{1-\sigma}}{1-\sigma} + \beta V_{t+1}(W_{t+1}) \\ \text{s.t.} \quad & W_{t+1} = W_t - c_t, \text{ for } t = 1, 2, \dots \\ & c_t > 0, W_t > 0 . \end{aligned}$$

Substituting the constraint gives

$$\begin{aligned} V_t(W_t) = \max_{W_{t+1}} \quad & \frac{(W_t - W_{t+1})^{1-\sigma}}{1-\sigma} + \beta V_{t+1}(W_{t+1}) \\ & W_t \geq 0 . \end{aligned}$$

## Set up directories and paths.

The directory is C:/Users/xmgb/Dropbox/02\_FUV/teaching/spring\_2025/dynamic\_macro/code/vfi\_cake\_mat.

## Set the parameters and generate the state space.

Calls: model.m.

## Solve the model using Value Function Iteration (VFI) on the grid.

Calls: solve.m, and model.m.

```
-----Beginning Value Function Iteration.-----
```

```
Converged in 1 iterations.
```

```
-----End of Value Function Iteration.-----
```

```
Model solved in 0.0000 seconds.
```

## Simulate Model.

Calls: simulate.m

## Plot the policy functions.

Calls: my\_graph.m.





