

# Money in the Utility Function (MIUF)

Advanced Macro

Pavel Solís

CIDE

2025

# Introduction

- In RBC model, all variables are measured in real terms
- We now introduce money in model; two common ways to do it
  - Cash in advance - CIA (Clower, 1967)
    - Assumption: Money needs to be used to buy consumption goods
    - Rationale: Nothing in model explains why money is used
    - Modeling implication: Additional constraint
  - Money in the utility function - MIUF (Sidrauski, 1967)
    - Assumption: Money provides some service to the economy
    - Rationale: Save time, insurance against shocks, reduce search costs
    - Modeling implication: Additional argument in utility function
- **Main finding:** In these models, money is neutral

# Assumptions

- Same assumptions about economy as in RBC model
- Same assumptions for HHs and firms as before, except for utility function
- Utility function in period  $t$  is of the form

$$U(C_t, \frac{M_t}{p_t}, H_t)$$

where  $M_t/p_t$  are real money balances

- New parameters:  $D$  for real money balances and  $h_0$  for labor
- Additional shock: Growth rate of money supply
- Model and handout have same structure as before

## Technical: Maximum Cardinality Matching

- Maximum cardinality matching refers to largest set of equations that can be solved simultaneously without creating a dependency loop
- A variable in an equation not in maximum cardinality matching means variable cannot be solved directly in that equation
- Reasons: circular dependency, variable not directly linked to solved eqs.
- Troubleshooting:
  - Make sure variable not part of a circular dependency
  - Simplify model or re-express equations
  - Ignore error if only interested in simulations or IRFs
    - Relevant error if doing a block decomposition of model

## Technical: Collinearity

- Collinear relationships error
  - Redundant equation(s)
  - (Near) unit roots
    - SS is not unique
    - Jacobian of static model is singular (i.e. no unique solution)
    - They may not affect real variables
- Troubleshooting:
  - Identify and replace redundant equation(s)
  - Simplify model (start with a basic version and gradually add complexity)
  - Provide SS analytically