Households

- Representative household with a growing number of members
- Current income effect
- Net worth effect

Choices Made by Households

- Demand consumption goods
- Demand for investment goods and capital accumulation
- Utilization of capital
- Labor supply
- Demand for (bank) deposits
- Demand for (bank) loans

Lifetime Utility Function

Representative household with a growing number of members

$$\mathrm{X}_0 \sum_{t=0}^{\infty} \left(\log \frac{ch_t - ch_t^{\mathrm{ref}}}{nn_t} - \frac{1}{1+\eta}\, {nh_t}^{\eta} + \nu_1 \, \log \frac{netw_t}{pch_t \cdot nn_t} \right) nn_t \tag{1}$$

Nominal net worth in (1)

$$netw_t = pkh_t \cdot kh_t + bd_t - bl_t \tag{2}$$

Point of reference in household consumption is

$$ch_t^{\mathrm{ref}} = \chi \, \frac{curr_t}{pch_t} curr_t = w_t \cdot nh_t \cdot nl_t - trl1_t$$

where x and

Variable	Description
ch_t	Household consumption
ch_t^{ref}	Point of reference in household consumption
nl_t	Labor force
nh_t	Per-worker labor supply (e.g. per-worker hours worked)
$netw_t$	Nominal net worth of households
$curr_t$	Nominal current income of households
$txls1_t$	Net lump-sum taxes (transfers) of type 1

Budget Constraint

$$
\begin{aligned}
bd_t - bl_t = rbd_{t-1} \cdot bd_{t-1} - rbl_{t-1} \cdot bl_{t-1} \\
+ w_t \cdot nh_t \cdot \nl_t + puk_t \cdot u_t \cdot k_t + zy_t + zb_t \\
- pch_t \cdot ch_t - pih_t \cdot ih_t \\
- trl1_t - trl2_t - adj_t
\end{aligned}
\tag{3}
$$

Lagrange multiplier associated with the budget constraint is denoted by vh_t (shadow value of nominal household wealth)

Variable	Description
bd_t	Bank deposits
bl_t	Bank loans
w_t	Nominal wage rate
$prf_{y,t}$	Profits from producers
$prf_{f,t}$	Profits from financial sector
jh_t	Adjustment costs faced by households
$txls1_t$	Type 1 net lump-sum taxes (transfers)
$txls2_t$	Type 2 net lump-sum taxes (transfers)

Household Adjustment Costs

- Investment adjustment costs
- Reference point in capital accumulation
- Cost of utilization of capital

$$\begin{aligned} jh_t = &\frac{1}{2}\,\xi_{ih}\cdot pih_t\cdot ih_t\,\left(\Delta\log ih_t-\log\kappa_{ih}\right)^2 \\ &+\frac{1}{2}\,\xi_{k}\cdot pkh_t\cdot kh_t\,\left(\log kh_t-\log kh_t^{\mathrm{ref}}\right)^2 \\ &+py_t\cdot kh_t\cdot\left(\upsilon_0\cdot u_t\right)^{\upsilon_1} \end{aligned} \tag{4}$$

Point of reference in capital accumulation

$$kh_t^{\mathrm{ref}}=\mathrm{X}_t\left[kh_{t+1}\cdot{\kappa_{kh}}^{-1}\right] \tag{5}$$

Steady-state adjustment constants

$$\kappa_{ih}=\frac{ih\backslash\mathrm{ss}}{ih\backslash\mathrm{ssm}}\qquad\qquad\kappa_{kh}=\frac{kh\backslash\mathrm{ss}}{kh\backslash\mathrm{ssm}} \tag{6}$$

Capital Accumulation

$$kh_t = (1 - \delta)\, kh_{t-1} + ih_t \tag{7}$$

Lagrange multiplier associated with the capital accumulation constraint is denoted by pkh_t (shadow price of capital)

Variable	Description
kh_t	Stock of private production capital
ih_t	Investment in private production capital

Finance Contraint

Sufficient amount of means of payment needs to be held proportional to gross expenditures (consumption, investment, trade in capital)

$$bd_t = \phi\Big(pch_t \cdot ch_t + pih_t \cdot ih_t + \phi_k \cdot pkh_t \cdot kh_t\Big) \tag{8}$$

Real Wage Rigidities

Real wages are sluggish in their response to changes in optimal flexible wage rate; no expliciti microfoundations

$$\log \frac{w_t}{pch_t} = \rho_w \ \log\left(\kappa_w \cdot \frac{w_{t-1}}{pch_{t-1}}\right) + (1-\rho_w) \ \log \frac{w0_t}{pch_t} + \epsilon_{w,t} \tag{9}$$

Steady-state adjustment constant

$$\kappa_w = \frac{w\backslash \text{ss} \cdot pch\backslash \text{ssm}}{w\backslash \text{ssm} \cdot pch\backslash \text{ss}} \tag{10}$$

Variable	Description
$w0_t$	Optimal flexible nominal wage rate as if optimized by households
w_t	Actual nominal wage rate