Optimal Development Policies with Financial Frictions

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Questions

1 Normative:

• Is there a role for governments to accelerate economic development by intervening in product and factor markets?

• Taxes? Subsidies? If so, which ones?

2 Positive:

• Most emerging economies pursue active development and industrial policies

• Under which circumstances may such policies be justified?
### Historical accounts of development policies

A table summarizing various development policies over different periods:

<table>
<thead>
<tr>
<th>Country</th>
<th>Rough period</th>
<th>Suppressed wages</th>
<th>Subsidized credit</th>
<th>Subsidized intermediates</th>
<th>Subsidies to export sector</th>
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</thead>
<tbody>
<tr>
<td>Japan</td>
<td>1950–1970</td>
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<td>✓</td>
<td>✓</td>
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<td>Taiwan</td>
<td>1950–1980</td>
<td>✓</td>
<td>✓</td>
<td>✓</td>
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<td>✓</td>
<td>✓</td>
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<tr>
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<td>1960–1990</td>
<td>✓</td>
<td>✓</td>
<td>✓</td>
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</tr>
<tr>
<td>Singapore</td>
<td>1960–1990</td>
<td>✓</td>
<td></td>
<td></td>
<td>✓</td>
</tr>
<tr>
<td>Thailand</td>
<td>1960–1990</td>
<td>✓</td>
<td>✓</td>
<td>✓</td>
<td>✓</td>
</tr>
<tr>
<td>China</td>
<td>1980–present</td>
<td>✓</td>
<td></td>
<td></td>
<td></td>
</tr>
</tbody>
</table>

- **Example of wage suppression:** South Korea
  - **official upper limit on real wage growth:**
    nominal wage growth < 80% (inflation + productivity growth)
  - Park Chung Hee: 1965 “year to work”, 1966 “year of *harder* work”

- **Another popular policy:** exchange rate devaluation

- **All these policies are “crazy” from neoclassical perspective**
This paper

- Optimal Ramsey policy in a standard growth model with financial frictions
  1. one-sector economy
  2. multi-sector economy (industrial and exchange rate policies)

- Environment similar to a wide class of development models
  - financial frictions ⇒ capital misallocation ⇒ low productivity

- but more tractable ⇒ Ramsey problem feasible: $G_t(a, z) \rightarrow \bar{a}_t$

- Features:
  - Collateral constraint: firm’s scale limited by net worth
  - Financial wealth affects economy-wide labor productivity
  - Pecuniary externality: high wages hurt profits and wealth accumulation
Main Findings

1. Optimal uniform policy in one-sector model
   - *pro-business* (*pro-output*) policies for developing countries, during early transition when entrepreneurs are *undercapitalized*
   - *pro-labor* policy for developed countries, close to steady state
   - Rationale: dynamic externality akin to *learning-by-doing*, but operating via *misallocation* of resources

2. Optimal targeted and exchange rate policies in multi-sector model
   - favor *comparative advantage* sectors and speed up transition
   - compress wages in tradable sectors if undercapitalized...
   - ... but whether this results in depreciated real exchange rate is *instrument-dependent*
One-Sector Economy

Workers: representative household with wealth (bonds) $b$

$$\max_{\{c(\cdot), \ell(\cdot)\}} \int_0^\infty e^{-\rho t} u(c(t), \ell(t)) \, dt,$$

s.t. $c(t) + \dot{b}(t) \leq w(t)\ell(t) + r(t)b(t)$
One-Sector Economy

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s.t. $c(t) + \dot{b}(t) \leq w(t)\ell(t) + r(t)b(t)$

2. **Entrepreneurs:** heterogeneous in wealth $a$ and productivity $z$

$$\max_{\{c_e(\cdot)\}} \mathbb{E}_0 \int_0^\infty e^{-\delta t} \log c_e(t) \, dt$$

s.t. $\dot{a}(t) = \pi_t(a(t), z(t)) + r(t)a(t) - c_e(t)$

$$\pi_t(a, z) = \max_{n \geq 0, \text{ } 0 \leq k \leq \lambda a} \left\{ A(t)(zk)^\alpha n^{1-\alpha} - w(t)n - r(t)k \right\}$$

- Collateral constraint: $k \leq \lambda a$, $\lambda \geq 1$
- Idiosyncratic productivity: $z \sim iid\text{Pareto}(\eta)$
Policy functions

• Profit maximization:

\[ k_t(a, z) = \lambda a \cdot 1_{\{z \geq z(t)\}} \]
\[ n_t(a, z) = \left( \frac{1 - \alpha}{w(t)} A \right)^{1/\alpha} zk_t(a, z) \]
\[ \pi_t(a, z) = \left[ \frac{z}{z(t)} - 1 \right] r(t) k_t(a, z) \]

where

\[ \alpha A^{1/\alpha} \left( \frac{1 - \alpha}{w(t)} \right)^{1-\alpha/\alpha} z(t) = r(t) \]

• Wealth accumulation:

\[ \dot{a} = \pi_t(a, z) + (r(t) - \delta) a \]
Aggregation

- **Output:**
  \[ y = A \left( \frac{\eta}{\eta - 1}z \right)^\alpha \cdot \kappa^\alpha \ell^{1-\alpha} \]

- **Capital demand:**
  \[ \kappa = \lambda x \zeta^{-\eta}, \]

where aggregate wealth \( x(t) \equiv \int adG_t(a, z) \) evolves:

\[ \dot{x} = \Pi + (r - \delta)x, \]
Aggregation

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\[ \dot{x} = \Pi + (r - \delta) x, \]

- **Lemma:** *National income accounts*

  \[ w \ell = (1 - \alpha) y, \quad r \kappa = \alpha \frac{\eta - 1}{\eta} y, \quad \Pi = \frac{\alpha}{\eta} y. \]
General equilibrium

1. **Small open economy:** \( r(t) \equiv r^* \)
   and \( \kappa(t) \) is perfectly elastically supplied

- **Lemma:**

\[
y = y(x, \ell) = \Theta x^\gamma \ell^{1-\gamma}, \quad \gamma = \frac{\alpha/\eta}{(1 - \alpha) + \alpha/\eta}
\]

and \( z^n \propto (x/\ell)^{1-\gamma} \)
General equilibrium

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\]

and \( z^n \propto (x/\ell)^{1-\gamma} \)

2 Closed economy: \( \kappa(t) = b(t) + x(t) \)

and \( r(t) \) equilibrates capital market

- Lemma:

\[
y = y(x, \kappa, \ell) = \Theta_c (x \kappa^{\eta-1})^{\alpha/\eta} \ell^{1-\alpha}
\]

and \( z^n = \lambda x/\kappa \)
Excess Return of Entrepreneurs

- Key to understanding all policy interventions: entrepreneurs earn higher return than workers
  - not only individually
    \[ R(z) = r \left( 1 + \lambda \left( \frac{z}{z} - 1 \right)^+ \right) \geq r \]
  - but also on average
    \[ \mathbb{E}R(z) = r + \frac{\alpha y}{\eta x} > r \]

- Could generate Pareto improvement with transfer from workers to all entrepreneurs at \( t = 0 \) + reverse transfer at later date
  - essentially allows planner to sidestep friction
  - perhaps not feasible, e.g. for political economy reasons

Next: explore alternative policies
Excess Return of Entrepreneurs

- Key to understanding all policy interventions: entrepreneurs earn higher return than workers
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- Could generate Pareto improvement with
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  - essentially allows planner to sidestep friction
  - perhaps not feasible, e.g. for political economy reasons
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Optimal Ramsey Policies
in a Small Open Economy

• Start with three policy instruments:
  1. $\tau_\ell(t)$: labor supply tax
  2. $\tau_b(t)$: worker savings tax
  3. $T(t)$: lump-sum tax on workers; GBC: $\tau_\ell \ell + \tau_b b = T$
Optimal Ramsey Policies
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Lemma (Primal Approach)

Any aggregate allocation $\{c, \ell, b, x\}_{t \geq 0}$ satisfying

\[
c + \dot{b} = (1 - \alpha)y(x, \ell) + r^* b \\
\dot{x} = \frac{\alpha}{\eta}y(x, \ell) + (r^* - \delta)x
\]

can be supported as a competitive equilibrium under appropriately chosen policies $\{\tau_\ell, \tau_b\}_{t \geq 0}$. 
Optimal Ramsey Policies

- **Benchmark:** zero weight on entrepreneurs

- **Planner’s problem:**

\[
\max_{\{c, \ell, b, x\}} \int_0^\infty e^{-\rho t} u(c, \ell) \, dt
\]

subject to

\[
c + \dot{b} = (1 - \alpha)y(x, \ell) + r^* b,
\]

\[
\dot{x} = \frac{\alpha}{\eta} y(x, \ell) + (r^* - \delta)x,
\]

and denote by \(\nu\) the co-state for \(x\) (shadow value of wealth)

- **Isomorphic to learning-by-doing externality**
Optimal Ramsey Policies
Characterization

• **Inter-temporal** margin undistorted:

\[
\frac{\dot{u}_c}{u_c} = \rho - r^* \quad \Rightarrow \quad \tau_b = 0
\]

• **Intra-temporal** margin distorted:

\[
-\frac{u_{\ell}}{u_c} = \left[1 + \gamma(\nu - 1)\right](1 - \alpha)\frac{y}{\ell} \quad \Rightarrow \quad \tau_{\ell} = \gamma - \gamma \cdot \nu
\]

• Two confronting objectives:

1. **Monopoly effect:** increase wages by limiting labor supply

2. **Dynamic productivity externality:** accumulate \( x \) by subsidizing labor supply to increase future labor productivity

• Which effect dominates and when?
Optimal Ramsey Policies

Characterization

• ODE system in \((x, \nu)\) with a side-equation:

\[
\begin{align*}
\dot{x} &= \frac{\alpha}{\eta} y(x, \ell) + (r^* - \delta)x, \\
\dot{\nu} &= \delta \nu - (1 - \gamma + \gamma \nu) \frac{\alpha}{\eta} \frac{y(x, \ell)}{x}, \\
-u_\ell / u_c &= (1 - \gamma + \gamma \nu)(1 - \alpha) \frac{y(x, \ell)}{\ell}, \\
\tau_\ell &= \gamma - \gamma \cdot \nu
\end{align*}
\]
Optimal Ramsey Policies
Characterization

- ODE system in \((x, \tau_\ell)\) with a side-equation:

\[
\begin{align*}
\dot{x} &= \frac{\alpha}{\eta} y(x, \ell) + (r^* - \delta)x, \\
\dot{\tau}_\ell &= \delta (\tau_\ell - \gamma) + \gamma (1 - \tau_\ell) \frac{\alpha}{\eta} \frac{y(x, \ell)}{x}, \\
\ell &= \ell(x, \tau_\ell; \bar{\mu})
\end{align*}
\]

- Proposition: Assume \(\delta > \rho = r^*\). Then:

1. unique steady state \((\bar{x}, \bar{\tau}_\ell)\), globally saddle-path stable
2. starting from \(x_0 \leq \bar{x}\), \(x\) and \(\tau_\ell\) increase to \((\bar{x}, \bar{\tau}_\ell)\)
3. labor supply subsidized \((\tau_\ell < 0)\) when \(x\) is low enough and taxed in steady state: \(\bar{\tau}_\ell = \frac{\gamma}{\gamma + (1 - \gamma) \delta/\rho} > 0\)
4. intertemporal margin not distorted, \(\tau_b \equiv 0\)
Optimal Ramsey Policies

Phase diagram

Optimal Trajectory

$\dot{x} = 0$

$\dot{\tau}_\ell = 0$

$\tau_\ell$

$x$

0.5 1 1.5

−0.04

−0.02

0

0.02

0.04

0.06

0.08
Optimal Ramsey Policies

Time path

(a) Labor Tax, $\tau_\ell$

(b) Entrepreneurial Wealth, $x$
Deviations from laissez-faire

(a) Labor Supply, $\ell$

(b) Entrepreneurial Wealth, $x$

(c) Wage, $w$, and Labor Productivity, $y/\ell$

(d) Total Factor Productivity, $Z$

(e) Income, $y$

(f) Worker Period Utility, $u(c, \ell)$
Many alternative implementations

common feature: make workers work hard even though firms pay low wages

1. Subsidy to labor supply or demand
2. Non-market implementation: e.g., forced labor
3. Non-tax market regulation: e.g., via bargaining power of labor

Interpretation:

— Pro-business (or wage suppression, or pro-output) policies
— Policy reversal to pro-labor for developed countries

Intuition: pecuniary externality

— High wage reduces profits and slows down wealth accumulation
Optimal Policy with Transfers

• Generalized planner’s problem:

$$\max_{\{c, \ell, b, x, s_x\}_{t \geq 0}} \int_0^\infty e^{-\rho t} u(c, \ell)\,dt$$

subject to

$$c + b = (1 - \alpha)y(x, \ell) + r^* b - s_x x,$$

$$\dot{x} = \frac{\alpha}{\eta}y(x, \ell) + (r^* + s_x - \delta)x,$$

$$s \leq s_x(t) x(t) \leq S$$

• Three cases:

1. $s = S = 0$: just studied
2. $S = -s = +\infty$ (unlimited transfers)
3. $0 < S, -s < \infty$ (bounded transfers)

• Why bounded transfers?
Unlimited Transfers

(a) Transfer, $\varsigma_x$

(b) Entrepreneurial Wealth, $x$
Bounded Transfers

(a) Labor Tax, $\tau_\ell$

(b) Entrepreneurial Wealth, $x$

Equilibrium Planner, No Transf.
Equilibrium Planner, Lim. Transf.

Years

0 20 40 60 80

0

0.05

0.1

0.15

-0.25

-0.2

-0.15

-0.1

-0.05

0

0.05

0.1

0.15

0 20 40 60 80

0

0.2

0.4

0.6

0.8

1
Additional Tax Instruments

- Additional policy instruments, all affecting entrepreneurs and financed by a lump-sum tax on workers
  1. $s_\pi(t)$: profit subsidy
  2. $s_y(t)$: revenue subsidy
  3. $s_w(t)$: wage bill subsidy
  4. $s_k(t)$: capital (credit) subsidy

- Budget set of entrepreneurs:

\[
\dot{a} = (1 + s_\pi)\pi(a, z) + (r^* + s_x)a - c_e,
\]

\[
\pi(a, z) = \max_{n \geq 0, \ 0 \leq k \leq \lambda a} \left\{ (1 + s_y)A(zk)^\alpha n^{1-\alpha} - (1 - s_w)w\ell - (1 - s_k)r^*k \right\}
\]
Additional Tax Instruments

• Generalize output function

\[ y(x, \ell) = \left( \frac{1 + \varsigma_y}{1 - \varsigma_k} \right)^{\gamma(\eta - 1)} \Theta x^\gamma \ell^{1-\gamma} \]

• Proposition:

(i) Profit subsidy \( \varsigma_\pi \), as well as \( \varsigma_y = -\varsigma_k = -\varsigma_w \), has the same effect as a transfer from workers to entrepreneurs, and dominates other tax instruments.

(ii) When a transfer cannot be engineered, all available policy instruments are used to speed up the accumulation of entrepreneurial wealth.

• E.g.: \( \varsigma_k, \varsigma_w \propto \gamma(\nu - 1) \)

• Pro-business policy bias during early transition
OLG and Hand-to-Mouth

- Blanchard (1985) and Yaari (1965) perpetual youth model:
  \[ U(\tau) = \int_{\tau}^{\infty} e^{-(\rho+q)(t-\tau)} u(t|\tau) \, dt \]

- Calvo and Obstfeld (1988) social welfare function:
  \[ W_0 = \int_{0}^{\infty} e^{-\varrho t} V(t) \, dt, \quad V(t) = \int_{0}^{\infty} q e^{-qs} e^{-(\rho-\varrho)s} u(t, s) \, ds \]

- If households are not financially constrained, then optimal policy does not depend on \( q \), and only depends on \( \varrho \neq \rho \)

- If households are financially constrained (hand-to-mouth), the optimal path of the labor tax becomes flatter around zero
OLG and Hand-to-Mouth

(a) Labor Supply, $\ell$

(b) Entrepreneurial Wealth, $x$

(c) Wage, $w$, and Labor Productivity, $y/\ell$

(d) Total Factor Productivity, $Z$

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(f) Worker Period Utility, $u(c, \ell)$
MULTI-SECTOR ECONOMY
Multi-Sector Economy
Targeted Policies

• Want framework for thinking about policies targeted to particular sectors
  — arguably most prevalent type of development policy

• Generalize framework to multiple sectors
  — both tradable and non-tradable sectors

• In addition to sectoral policies, also explore implications for real exchange rate

• Another application:
  — cohort of entrepreneurs and ‘infant’ industry protection
Multi-Sector Economy: Households

- Households have preferences

\[ \int_{0}^{\infty} e^{-\rho t} u(c_0, c_1, \ldots, c_N) dt \]

- goods 0, ..., k: tradable
- goods k + 1, ..., N: not tradable
- good 0 is numeraire \( \Rightarrow p_0 = 1 \)
Multi-Sector Economy: Households

- Households have preferences
  \[ \int_0^\infty e^{-\rho t} u(c_0, c_1, \ldots, c_N) dt \]
- goods 0, ..., \( k \): tradable
- goods \( k + 1, \ldots, N \): not tradable
- good 0 is numeraire \( \Rightarrow p_0 = 1 \)
- inelastically supply \( L \) units of labor, split across sectors
  \[ \sum_{i=0}^N \ell_i = L \]
- Budget constraint
  \[ \sum_{i=0}^N (1 + \tau_i^c) p_i c_i + \dot{b} \leq (r - \tau^b)b + \sum_{i=0}^N (1 - \tau_i^\ell) w_i \ell_i + T \]
- As before, can extend to additional tax instruments
Production

- Within each sector, everything as before

- Output in sector $i$:

$$y_i(x_i, \ell_i; p_i) = \Theta_i p_i^{\gamma_i(\eta_i-1)} x_i^{\gamma_i} \ell_i^{1-\gamma_i},$$

where

$$\gamma_i = \frac{\alpha_i/\eta_i}{1 - \alpha_i + \alpha_i/\eta_i}$$

and

$$\Theta_i = \frac{r}{\alpha_i} \left[ \frac{\eta_i \lambda_i}{\eta_i - 1} \left( \frac{\alpha_i A_i}{r} \right)^{\eta_i/\alpha_i} \right]^{\gamma_i}$$

- Wealth accumulation

$$\dot{x}_i = \frac{\alpha_i}{\eta_i} p_i y_i(x_i, \ell_i; p_i) + (r - \delta)x_i$$
Optimal Sectoral Policies

- Planner’s Problem:

\[
\max_{\{x_i, \ell_i\}_{i=0}^N, \{p_i\}_{i=k+1}^N} \int_0^\infty e^{-\rho t} u(c_0, \ldots, c_N) dt \quad \text{s.t.}
\]

\[
\dot{b} = rb + \sum_{i=0}^N (1 - \alpha_i) p_i y_i(x_i, \ell_i, p_i) - \sum_{i=0}^N p_i c_i
\]

\[
\dot{x}_i = \frac{\alpha_i}{\eta_i} p_i y_i(x_i, \ell_i, p_i) + (r - \delta) x_i, \quad i = 0, \ldots, N
\]

\[
c_i = y_i(x_i, \ell_i, p_i), \quad i = k + 1, \ldots, N
\]

\[
L = \sum_{i=0}^N \ell_i
\]
Optimal Targeted Ramsey Policies

- Optimal taxes:

\[ \tau^b = 0, \]

\[ \tau^c_i = \begin{cases} 
0, & i \in T, \\
\frac{1}{\eta_i - 1}(1 - \nu_i), & i \in N,
\end{cases} \]

\[ \tau^\ell_i = \begin{cases} 
\gamma_i(1 - \nu_i), & i \in T, \\
-\tau^c_i, & i \in N
\end{cases} \]

- Explore two special cases:
  1. all sectors are tradable: implications of comparative advantage
  2. one tradable, one non-tradable sector: implications for RER
All Sectors are Tradable
Comparative advantage and industrial policies

• International prices \( \{ p^*_i \} \)

• Sectoral revenues: \( p^*_i y_i = \Theta^*_i x_i^{\gamma_i} \ell_i^{1-\gamma_i} \), \( \Theta^*_i = (p^*_i)^{1+\gamma_i(\eta_i-1)} \Theta_i \)

• Comparative advantage:
  — Long run (latent): \( \Theta^*_i \)
  — Short run (actual): \( \Theta^*_i x_i^{\gamma} \)
All Sectors are Tradable
Comparative advantage and industrial policies

- International prices \( \{p^*_i\} \)
- Sectoral revenues: \( p^*_i y_i = \Theta^*_i x_i^{\gamma_i} \ell_i^{1-\gamma_i} \), \( \Theta^*_i = (p^*_i)^{1+\gamma_i(\eta_i-1)} \Theta_i \)

- Comparative advantage:
  - Long run (latent): \( \Theta^*_i \)
  - Short run (actual): \( \Theta^*_i x_i^{\gamma} \)

- Optimal policy: favors the (latent) comparative advantage sector and speeds up the transition
All Sectors are Tradable
Comparative advantage and industrial policies

- Sector one has (latent) comparative advantage: $\Theta^*_1 > \Theta^*_2$
- Optimal policy speeds up the transition
- Potentially measurable sufficient statistic: $\gamma_i \cdot \nu_i$, where

$$\dot{\nu}_i - \delta \nu_i = - \left( 1 - \alpha_i + \frac{\alpha_i}{\eta_i} \nu_i \right) p_i \frac{\partial y_i}{\partial x_i}$$
Non-tradables and the RER

- Consider economy with two sectors
  - sector 0 produces tradable good, $p_0 = 1$
  - sector 1 produces non-tradable good, $RER = p_1$

- Intuition: if want to subsidize tradables $\Rightarrow$ compress economy-wide $w \propto p_1 \Rightarrow$ RER depreciates
  - see e.g. Rodrik (2008)
Non-tradables and the RER

• Consider economy with two sectors
  • sector 0 produces tradable good, $p_0 = 1$
  • sector 1 produces non-tradable good, $RER = p_1$

• Intuition: if want to subsidize tradables $\Rightarrow$ compress economy-wide $w \propto p_1 \Rightarrow$ RER depreciates
  — see e.g. Rodrik (2008)

• We find: **robust** policy recommendation $=$ compress **wages** in **tradable** sector if that sector is undercapitalized

• instead implications for RER are **instrument-dependent**
  • if can differentially tax T and NT labor, RER **appreciates**
  • if instead cannot differentially subsidize T $\Rightarrow$ RER depreciates
Other Extensions

1. Positive Pareto weight on entrepreneurs

$$\tau_\ell = \gamma \left[ 1 - \nu - \omega / x \right]$$

2. Persistent productivity shocks

$$\tau_\ell = \gamma (1 - \bar{\nu})$$

3. Closed economy
Closed Economy

- Planner’s problem:

\[
\max_{\{c, \ell, \kappa, b, x, \varsigma x\}_{t \geq 0}} \int_{0}^{\infty} e^{-\rho t} u(c, \ell) dt
\]

subject to

\[
\dot{b} = \left(1 - \alpha \right) + \alpha \frac{\eta - 1}{\eta} \frac{b}{\kappa} y(x, \kappa, \ell) - c - \varsigma x x,
\]

\[
\dot{x} = \frac{\alpha}{\eta} + \alpha \frac{\eta - 1}{\eta} \frac{x}{\kappa} y(x, \kappa, \ell) + (\varsigma x - \delta)x,
\]

\[
\kappa = x + b
\]

- We study three cases:

1. Unlimited transfers and \(x, \kappa \geq 0\) only — No distortions (\(\tau b = \tau \ell = 0\)) and \(x\):

\[
\alpha \eta y x = \delta
\]

2. Unlimited transfers and \(x \leq \kappa\) — No labor supply distortion (\(\tau \ell = 0\)); subsidized savings: \(\tau b \geq 0\)

3. Bounded transfers (limiting case \(s = S = 0\)) — Both labor supply and savings are distorted: \(\tau \ell, \tau b \propto (1 - \nu) 32 / 33\)
Closed Economy

- Planner’s problem:

\[
\max_{\{c,\ell,\kappa,b,x,\varsigma_x\}_{t \geq 0}} \int_0^\infty e^{-\rho t} u(c, \ell) dt
\]

subject to

\[
\dot{\kappa} = y(x, \kappa, \ell) - c - \delta x,
\]

\[
\dot{x} = \left[ \frac{\alpha}{\eta} + \alpha \frac{\eta - 1}{\eta} \frac{x}{\kappa} \right] y(x, \kappa, \ell) + (\varsigma_x - \delta) x
\]

- We study three cases:
  1. Unlimited transfers and \( x, \kappa \geq 0 \) only
  2. Unlimited transfers and \( x \leq \kappa \)
  3. Bounded transfers (limiting case \( s = S = 0 \))
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\]

\[
\dot{x} = \left[ \frac{\alpha}{\eta} + \alpha \frac{\eta - 1}{\eta} \frac{x}{\kappa} \right] y(x, \kappa, \ell) + (\varsigma x - \delta) x
\]

- We study three cases:

1. Unlimited transfers and \( x, \kappa \geq 0 \) only
   - No distortions \( (\tau_b = \tau_\ell = 0) \) and \( x : \frac{\alpha}{\eta} \frac{y}{x} = \delta \)

2. Unlimited transfers and \( x \leq \kappa \)
   - No labor supply distortion \( (\tau_\ell = 0) \); subsidized savings: \( \tau_b \geq 0 \)

3. Bounded transfers (limiting case \( s = S = 0 \))
   - Both labor supply and savings are distorted: \( \tau_\ell, \tau_b \propto (1 - \nu) \)
Conclusion

• **Optimal Ramsey** policy in standard growth model with financial frictions

• **Main Lesson from one-sector model:** *pro-business* policies accelerate economic development and are welfare-improving
  — during initial transitions, and not in steady states
  — when business sector is undercapitalized

• **Main Lesson from multi-sector model:**
  — favor *comparative advantage* sectors and speed up transition
  — implications for RER are instrument-dependent

• Although stylized, model points towards a measurable sufficient statistic: \( \gamma_i \cdot \nu_i \), where

\[
\dot{\nu}_i - \delta \nu_i = - \left(1 - \alpha_i + \frac{\alpha_i}{\eta_i} \nu_i \right) p_i \frac{\partial y_i}{\partial x_i}
\]