Entrepreneurship, Agency Frictions and Redistributive Capital Taxation

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Empirical motivation

How should entrepreneurial wealth be taxed?

- Business owners account for 40-50% of total wealth and produce half of total output
- Among the top 5% of the wealth distribution, 70% are business owners
- Entrepreneurs face idiosyncratic risk associated with business ownership
- This risk cannot be completely diversified because of financial frictions

How should wealth from family businesses be taxed?

- Family owned businesses account for 30% of GDP and 27% of workforce
Chamley-Judd type of models imply that:

- Taxing capital at 100% in $t = 0$ is optimal, unless ruled out.
- If bounds are imposed, it may still be optimal to tax capital at the upper bound until private net worth falls to zero.
- This can be avoided if the government cannot save (reasonable?)
- Even in this case, the capital tax rate can rise to 100% if $IES < 1$ and there is no government spending.

... but would investment be misallocated if wealth were owned by the state?
Examine the optimal Ramsey capital tax when the efficiency cost of confiscating private wealth is taken into account:

- Entrepreneurs' ability to invest is constrained by their own wealth - financial frictions
- If the government takes their wealth away, there will be less investment and it will be more inefficiently allocated
Setup and Mechanism

- **Entrepreneurs** invest capital and hand-to-mouth *workers* supply labor to a representative firm

- Entrepreneurs fund investment via contracts with risk-neutral banks

- Banks cannot observe how entrepreneurs divide resources between consumption and investment - moral hazard

- The optimal loan contract requires entrepreneurs to have some 'skin in the game'

- The government taxes entrepreneurial wealth and makes lump sum transfers to workers
Setup and Mechanism

*Equity-efficiency trade-off*

- capital taxes are desirable for redistribution to workers
- limit the amount of external financing that entrepreneurs can obtain $\Rightarrow$ reduce investment and output
- capital has an endogenously higher return when held by a productive entrepreneur than when held by the government

*Efficiency-efficiency trade-off (overlapping generations)*

- capital taxes are desirable so that businesses are not passed along to children with low entrepreneurial ability (efficiency gain)
- hurt the business of the parent entrepreneur by reducing his 'skin in the game' (efficiency loss)
Optimal capital taxation


Financial frictions


Optimal capital taxation + Financial frictions

Two Period Model
Entrepreneurial ability $\theta \sim F(\theta)$, known at $t = 0$ and constant over $t$

Investment technology

$\begin{align*}
k_1 &\quad \rightarrow \quad \epsilon \theta k_1 \\
\text{investment at } t=0 &\quad \text{capital output at } t=1
\end{align*}$

Idiosyncratic productivity $\epsilon \sim \Gamma(\eta, \eta^{-1}), \eta > 0 \Rightarrow \mathbb{E}\epsilon = 1$
Entrepreneurs maximize

\[ U_E = \log C_0 (\theta) + \beta \int_\epsilon \log C_1 (\theta, \epsilon) h (\epsilon) \, d\epsilon \]

subject to

\[ C_0 (\theta) + k_1 (\theta) = (1 - \tau_0) k_0 [\theta r_0 + (1 - \delta)] + b_1 (\theta) \]

\[ C_1 (\theta, \epsilon) + \hat{b}_1 (\theta, \epsilon) = (1 - \tau_1) k_1 (\theta) [\theta \epsilon r_1 + (1 - \delta)] \]
Banks can only observe entrepreneurs’ type $\theta$ and capital output $\epsilon \theta k_1$

Incentive compatibility

$$\log C_0(\theta) + \beta \int_{\epsilon} \log C_1(\theta, \epsilon) h(\epsilon) d\epsilon \geq$$

$$\max_{\hat{k}} \log \left(C_0(\theta) + \rho \left(k_1(\theta) - \hat{k}\right)\right) + \beta \int_{\epsilon} \log C_1 \left(\theta, \frac{\epsilon \hat{k}}{k_1(\theta)}\right) h(\epsilon) d\epsilon$$

Banks break even

$$\int_{\epsilon} \hat{b}_1(\theta, \epsilon) h(\epsilon) d\epsilon = (1 + r_f) b_1(\theta)$$
Workers and representative firm

- **Workers**

  \[ U_W = \log (w_0 + T_0) + \beta \log (w_1 + T_1) \]

- **Representative firm**

  \[ w_t = F_N (K_t, N_t) \quad \text{and} \quad r_t = F_K (K_t, N_t) \]

  where \( K_t = \int_{\theta}^{\bar{\theta}} \theta k_t (\theta) dF (\theta) \) and \( N_t = 1. \)
Chooses taxes \((\tau_0, \tau_1)\), transfers \((T_0, T_1)\) and debt/savings \((B_1)\) to

\[
\max \gamma U_W + (1 - \gamma) U_E = 0
\]

subject to

\[
G + B_1 + T_0 = \tau_0 k_0 \left[ r_0 \int_{\theta}^{\bar{\theta}} \theta dF(\theta) + (1 - \delta) \right]
\]

\[
G + T_1 = \tau_1 \int_{\theta}^{\bar{\theta}} k_1(\theta) \left[ \theta r_1 + (1 - \delta) \right] dF(\theta) + B_1 (1 + r_f)
\]
Results
Result 1

Suppose $\delta = 1$. Then the equilibrium entrepreneurial allocation depends on
- preference and technology parameters
- initial wealth - $\tau_0$ matters
- prices summarized by

$$x = \frac{(1 - \tau_1) r_1}{1 + r_f} = H^{-1} \left( \frac{B_1}{(1 - \tau_0) r_0 k_0} \right)$$

Note that:
- $\tau_1$ does not matter
- $x$ is the gap between interest rates generated by financial frictions
  (if no financial frictions then $(1 - \tau_1) r_1 = 1 + r_f$)
Result 2

Suppose $\delta = 1$. Then the optimal tax rate in period 1 is $\tau_1 \to 1$.

Intuition:

- the optimal choice of $k_1(\theta)$ does not depend on $\tau_1$
- the government can improve the welfare of workers by increasing $\tau_1$, without distorting the investment choice of entrepreneurs
- artifact of the two-period model
**Result 3**

Suppose $\rho = 0$ (no financial frictions). Then the optimal tax rate in period 0 is $\tau_0 \rightarrow 1$.

Intuition:
- in the equilibrium only the entrepreneur with the highest $\theta$ invests
  \[ (1 - \tau_1) (\bar{\theta} r_1 + 1 - \delta) = 1 + r_f \Rightarrow K_1 \text{ does not depend on } \tau_0 \]
- market clearing

\[
K_1 = B_1 + \int_\theta^\bar{\theta} \frac{\beta (1 - \tau_0) k_0 (\theta r_0 + 1 - \delta)}{1 + \beta} dF(\theta)
\]
Result 4

Suppose \( \delta = 1 \). Then \( x = \frac{(1-\tau_1)r_1}{1+r_f} \) is strictly increasing in \( \frac{B_1}{(1-\tau_0)r_0k_0} \).
Moreover, \( \exists \bar{x} < \infty \) such that

\[
\lim_{\frac{B_1}{(1-\tau_0)r_0k_0} \to \infty} x = \bar{x}
\]

Intuition:
- high \( B_1 \) worsens the wedge
- high \( \tau_0 \) worsens the wedge
- there is an upper bound to how ‘bad’ financial frictions can be if \( \tau_0 \to 1 \)
Effect of capital taxes

\[ B_1 = 0 \text{ and } \rho = 1 \]
Capital taxes and welfare

$B_1 = 0$ and $\rho = 1$
Capital taxes and government debt

\[ \rho = 1 \text{ and } \tau_1 = 0.9 \]
Capital taxes and government spending

\[ B_1 = 0, \ \rho = 1 \text{ and } \tau_1 = 0.9 \]
Future work

- Infinite horizon problem
  - long-run optimal capital tax
  - misallocation of capital

- Overlapping generations
  - role of intergenerational persistence of entrepreneurial ability
  - bequest taxation
Capital taxes and financial frictions

\[ B_1 = 0 \text{ and } \tau_1 = 0.9 \]