

"Occupational Choice and Dynamic Incentives" Macro Reading Group

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- Development Literature: Credit Market Imperfections lead to Poverty Traps
 - Set-up costs impede credit-constrained individuals to become entrepreneurs and limits upward mobility (Banerjee and Newman, 93, 94)
 - Incentives to save/invest are left out of the analysis
- The "American Dream" Effect: As Abraham Lincoln put it

The prudent, penniless beginner in the world labors for wages awhile, saves a surplus with which to buy tools or land for himself, then labors on his own account another while, and at length hires another new beginner to help him. This ... is the just, and generous, and prosperous system, which opens the way for all, gives hope to all, and energy, and progress, and improvement in condition to all.

- Farms, small manufacturing and other business typically grow as their owner becomes older, saves and invests (Gale, 94)
- Firms are created and grow with capital accumulated by their owners when workers (Young, 95.)
 - Very important for immigrants, who do not rely on bank loans (Engstrom and McCready (1990))
- Huge Literature on the effects of credit constrains on the decision to become entrepreneur (Evans and Jovanovic; Quadrini...)

- Workers get paid depending on their performance.
- Higher effort leads to higher performance, and thus higher wages
- More income may be saved and transformed into productive capital for the following period
- If there are financial constraints, self-financed entrepreneurs have positive rents
- These rents lead to a higher effort for young agents.
- Output will typically go up, but welfare is ambiguous.

- OLG economy.
- Risk-neutral individuals live and are productive for two periods.
- Production requires three inputs: Labor, Capital and Supervision
- Agents work when young, but may become entrepreneurs when old, by paying set-up cost k

- To pay k agents may rely on their savings or on bank loans.
- The deposit/credit market is assumed to be exogenous. Interest rate in loans is $r = \frac{1}{\delta} - 1$ (with δ being the discount factor)
- Banks make zero profit in the credit market by charging a rate $r + \gamma > r$, where γ is the transaction cost

- An entrepreneur hires and supervises $n \geq 2$ workers.
- Each project yields $y = 1$ with probability e , and fails with complementary probability.
- e is the effort performed by the worker, who gets a wage $h \in (0, 1)$ if the project succeeds and $l \geq 0$ if the project fails (Limited Liability)
- Disutility of effort is $\frac{1}{2}ce^2$
- If unemployed, the worker gets normalized utility of zero
- Assume that:
 - $c > 1 + \delta\gamma$
 - $\gamma < \frac{2n-1}{8c} - \frac{k}{\delta}$
 - $k < \frac{1}{2}$

- Morning** Entrepreneurs and workers are matched frictionlessly. Contracts are offered by the short side of the labor market, satisficing IC and PC constraints
- Noon** Effort is chosen, output is realized and wages are paid
- Evening** Old individuals consume and die. Young individuals decide whether to purchase k -either with their wages or loans- and how much to consume and save (at interest rate r)

Steady State Equilibrium: Labor Market

- Old agents choose occupation given their beliefs about future wages and output.
- Contracts are contingent on the age, so that old and young workers have different contracts but must yield the same revenue to entrepreneurs.
- Projects that fail pay $l = 0$ and those who succeed pay h^i with $i \in \{o, y\}$
- Let p denote the mass of entrepreneurs. Clearing Market in the labor market requires $2 - p = pn < n$ since otherwise every young agent would become entrepreneur (whether credit or self-financed) and get positive rents

- Young and old workers yield the same profit so that

$$A = e^y(1 - h^y) = e^o(1 - h^o)$$

- If $h^y \geq k$ the worker will become self-financed entrepreneur. He gets a rent

$$S = n\delta A - k - \delta u^o$$

, where u^o is the rent of an old worker

- If $h^y < k$ or the project fails, he will decide whether to become a worker or a credit-financed entrepreneur (getting B).
- In equilibrium $S \geq 0$ while $B = S - \delta\gamma \leq 0$
- The value of a young agent going into the second period is thus

$$V(w) = w + \delta u^o + S1_{w \geq k}$$

- Given these value functions, each young agent will devote effort so that

$$\begin{aligned} e^y &= \frac{1}{c} [V(h^y) - V(0)] \\ &= \frac{1}{c} [h^y + S] \end{aligned}$$

while old agents

$$e^o = \frac{1}{c} h^o$$

- So that

$$\begin{aligned} e^y(1 - h^y) &= e^o(1 - h^o) && \text{(IND)} \\ e^y(1 - ce^y + S) &= e^o(1 - ce^o) \end{aligned}$$

- If $S = 0$ old and young workers have the same incentives to exert effort. If $S > 0$ young workers have to get higher wages since at the same wage level they would be more attractive to entrepreneurs. Thus $e^y > e^o$ and $h^y > h^o$
- This is the American Dream Effect

- The equilibrium "supply" of entrepreneurs is determined by $e^y(S)$, the number of successful young workers; while their "demand" is fixed at $\frac{2}{n+1}$
- Notice that

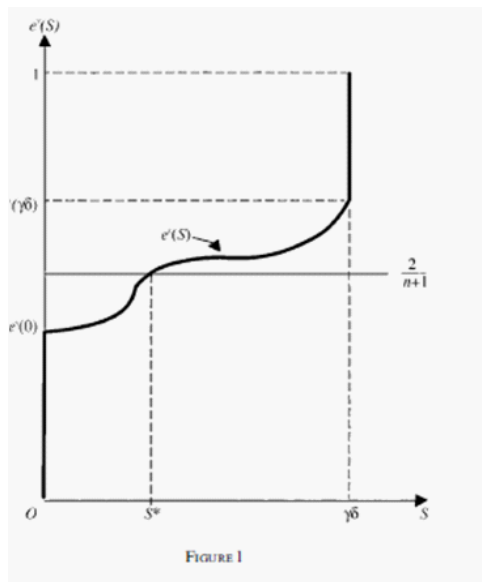
$$S = \delta \left(ne^o(1 - ce^o - c\frac{(e^o)^2}{2}) \right) - k$$

so that substituting S into the indifference constraint

$$e^y(1 - ce^y) - e^o(1 - ce^o) = e^y \left[k - \delta \left(ne^o(1 - ce^o - c\frac{(e^o)^2}{2}) \right) \right]$$

we get effort levels as a function of S

Equilibrium



- If c and γ is low, success is likely and frictions are small so that entrepreneurial rents are driven out to zero.
 - Equilibrium with $e^y(0) \geq \frac{2}{n+1}$
- Otherwise, there exists a steady state with $S > 0$ so that
 - American Dream is present: $e^y > e^o = e^y(0)$
 - Every successful worker becomes a self-financed entrepreneur
 - Wages are higher for younger agents (counterintuitive?) and output may go up or down

- Given that there are no bequests and we are in a moral hazard economy with linear utility, it is no surprise that taxes reduce output and welfare. In this case, the problem is aggravated by the non-convexity in the technology
 - Caveat: For some parameters, a tax of $h^y - k$ to successful agents and a subsidy of k with probability q to unsuccessful agents may increase welfare by reducing credit-market imperfections -although it reduces output unambiguously.
- More interesting is the fact that credit market imperfections may increase output.
 - Credit market imperfections decrease welfare since they require costly resources
 - There is no selection/allocation issues since initial wealth is always zero
 - If $S > 0$, effort of young agents increases and this is efficient since LL implies underprovision of effort in equilibrium (contrary to Holmstrom, 82)
- Poverty traps do not appear since initial wealth is fixed

Conclusions

- Under moral hazard and limited liability, credit constraints may increase output and welfare
- Initial distribution of assets and banking sector are assumed exogenous
- Redistribution reduces incentives to work hard and thus output
- Difficult to bring to data? Counterintuitive predictions? Heterogeneity?