

HOW DARWINIAN SHOULD AN ECONOMY BE?

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discussion by

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What the paper does

- Evolutionary view on firm selection (\Rightarrow ? efficiency)
- Each firm demands fixed amount of labor (firm “type”)
 - ▶ Some make profits, others losses...
- Dynamics
 1. *Mutation*, change in firm type, σ_m^2
 2. *Selection*, more likely to disappear if labor demand off, δ
- Optimal labor demand depends on
 1. Aggregate Technology Shock
 2. Equilibrium wages – responsiveness of labor demand, γ

Main Results – Full Characterization of Dynamics

- Characterize evolution of system (log-Normal, stationarity)
- Condition for stability

$$\delta \sigma_m^2 f(\underbrace{\gamma}_+) < 1$$

- ▶ Small selectivity and mutation relative to responsiveness of wages to labor
- ▶ $\delta \rightarrow \infty \implies$ Cobweb cycles

Main Results – Socially Optimal Selection

- What is the socially optimal level of selection δ ?

$$\min_{\delta} \underbrace{\text{Firm Dispersion}(\delta)}_{\text{Decreasing in } \delta} + \underbrace{\text{weight}(\delta)}_{\text{Increasing}} \underbrace{\mathbb{E}[\text{Output Gap}(\delta)^2]}_{\text{Ambiguous}}$$

- Simulation: Optimal selectivity is...
 1. Increasing in persistence of Agg. Productivity Shock
 2. Decreasing in wage's sensitivity to Agg. Demand
- If wages stochastic and no persistence shocks, selectivity is...
 1. decreasing in the variance of productivity shocks
 2. increasing in mutation

What I like about the paper

- Presents a parsimonious model with selection and mutation
- \exists “summary statistic” for effects of selection and mutation determining behavior of the system, $\delta\sigma_m^2$
- Shows that mutation/heterogeneity is desirable in uncertain environments and evolutionary rules
 - ▶ The planner does not select $\delta = \infty$ to max. welfare (Cobweb)
- Selection more important when there is high productivity growth
 - ▶ Similar intuition to Schumpeterian growth

Things that I would like the paper to discuss further...

- In addition to mutation there is randomness in entry (that mimics the new distribution). Handy, but...
 - ▶ It seems that most of the insights in the paper could be done with selection δ and ex-post randomness *only*
- Micro-foundations for selection and mutation (and entry).
 - ▶ Many different stories, different policy implications? could tie together the two?
 - ▶ Could help obtain sharper results in the planner's problem/ avoid having to add additional source of randomness
 - ▶ E.g., allocation of funds to firms can simultaneously determine selection and innovation (mutation)

Things that I would like the paper to discuss further...

- Planner exercise has superior understanding than agents.
 - ▶ Would it be interesting to explore case where Planner is subject to some evolutionary rules?
 - ▶ Would policy intervention be welfare enhancing in this case?
- Explore further differences with/without high productivity growth.
 - ▶ Only quantitative differences or qualitative too?
- Are there predictions specific to this theory? (as you did in Saint-Paul, 2005)
 - ▶ It seems that at this level of generality you could generate same insights in standard model with incomplete information.

Toy Example

- Firms with incomplete information on future Agg. Productivity
- Timing
 1. Firm i receives an iid signal on A_{t+1} ,

$$A_i \sim N(A_{t+1}, \sigma_m^2) \quad (1)$$

2. Firms that made losses this period need refinancing.
 - Probability of refinancing given by Selection rule
 - If no re-financing, exit
 - Note: distribution of surviving firms is still, $N(A_{t+1}, \sigma_m^2)$
 3. Entering firms distributed as surviving firms, $N(A_{t+1}, \sigma_m^2)$
 4. Firms post labor demand *maximizing expected profits*.
 5. Production and payments realized.
- Seems to generate qualitatively the same aggregate dynamics

Possible Extensions

- Study in more detail labor supply
 - ▶ Responsiveness of wages γ plays a key role in deriving results
 - ▶ Shifts along supply curve
 - ▶ Seems candidate for policy intervention (labor tax?)
- Explore policy implications of alternative micro-foundations for the mutation and selection process.
 - ▶ By providing microfoundations not only more realistic and interpretable results are, but may also help to get rid of auxiliary assumptions in entry.
 - ▶ Can help identify specific predictions of the evolutionary model not present in agents optimizing with incomplete information.

Concluding Remarks

- Parsimonious evolutionary model featuring mutation and selection
- Neat characterization of the dynamics
- Main comment: provide more microfounded theory that can allow to draw specific predictions to the evolutionary model and additional policy implications