Entrepreneurship, Innovation, and Dynamic Growth vs. Instability in the Market

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Summary

The challenge of the current study is to introduce entrepreneurship into Microeconomics theory for greater extendability and realism yet capture its unique aspects in a manageable analytical model. The model starts with a perfectly competitive market and then adds a subset of agents with unique skills, capabilities, startup savings, and risk preferences, called entrepreneurs. These profit-seeking agents, raising funds from the financial markets, modify a fraction of the existing products with additional (close substitute) attributes. Thus, a situation of monopolistic competition is created. A unique contribution developed is that entrepreneurship creates an endogenous cycle which brings growth but also instability and inequality at the same time caused by the risky decisions an entrepreneur has made before. The expected profit motive drives entrepreneurs to create new products, which expands supply. In perfect competition, markets' price competition erodes entrepreneurs' monopoly rents to zero with a new equilibrium. However, in the current model, entrepreneurs simultaneously change the structure of the market toward monopolistic competition, creating a dynamic cycle where the prospect of entrepreneurial rents drives more product innovation, supply to the market, and structural change; while, at the same time, higher profit rates induce entry and price-cutting and force out old capacity and products.

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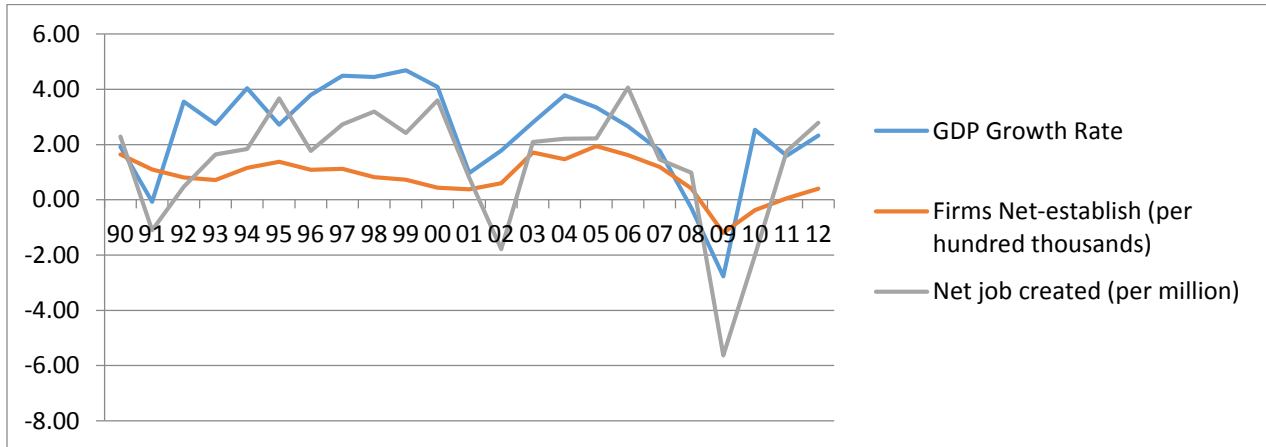
Motivation

Figure (1): Firms establishment and job creation versus economic growth during past two decades

The unique contribution of this research is to develop and explain analytically this dynamic process by integrating into the Monopolistic Competition model. Another contribution of this study is to introduce the unstable equilibrium at any time (t) – which is derived by the pricing mechanism – that cannot last through the next period, as the profit-seeking entrepreneurs (having an exogenous population growth) push the economy further and change the structure of the market, as depicted in Figure 2.
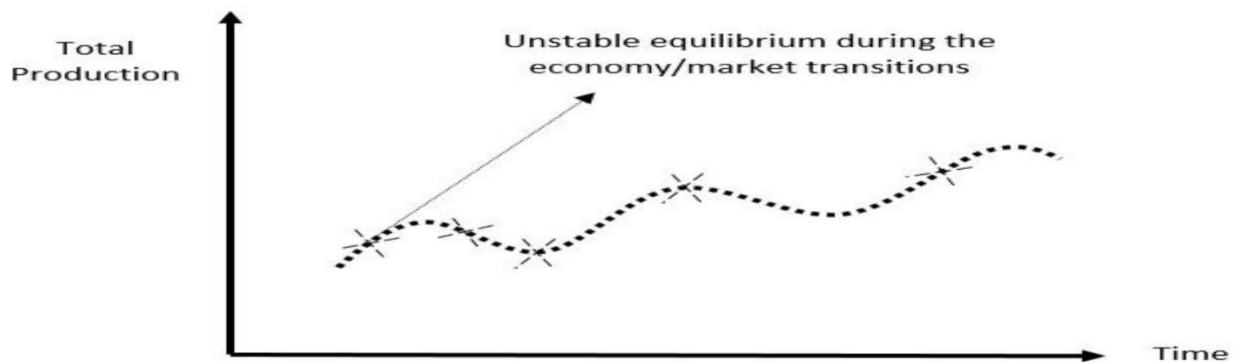

Figure (2): Market unstable equilibrium versus growth path in the economy

Basic model

Individuals who decided to stay in the labor force maximize their utility, U_L, by allocating their budget constraint to the consumption of the existing good c_i, and a new good developed by the entrepreneurs c_j.

$$U_{Lt} = \ln\big((1 + c_{it})^{\mu_i} * (1 + c_{jt})^{\mu_j}\big) - \eta_L n_L + \gamma \ln(1 + n_I)$$

$$n_L + n_I \leq 1$$

$$p_{it}c_{it} + p_{jt}c_{jt} + a_{Lt+1} \leq w_{L_i} * n_L + E(\pi_{It}) + (1 - \sigma_I e)(1 + r_t)a_{Lt}$$

e=1 for entrepreneurs and zero for others. p_i is the price for the good q_i; while, for the new good we have q_j, with the price p_j. $w_{l_{i,j}}$ is the wage rate which the labor force earns by participating in the production of good i or j. And a_L is the summation of all the assets that an individual (worker) has.

A risk-taker entrepreneur has two sources of income: parts of his assets (σ_I) that can be lent to the market with the interest rate r; and the expected profit from selling his new good in the market. He needs to invest the rest of his assets, $1 - \sigma_I$, into his business as a startup cost or some part of fixed costs. Here, we can add another component to the entrepreneurs' budget constraint which may allow us to save a portion of the profit to invest in entrepreneurial[2] abilities and skills, therefore increasing the efficiency of the production process both intensively and extensively.

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[2] We might think of a technological progress and invention

In this model, there is a financial market which borrows money with the rate r from individuals (i.e., banking system), and finances the firms with the rate of r_F, and entrepreneurs, with the rate of r_I, while $r_I > r_F > r$.

$$E(\pi_{FMt}) = (1 - \varepsilon) * A_t * r_{Ft} + \varepsilon * A_t * E(r_{It}) - A_t * r_t \quad \text{s.t. } A_t = \sum_{i=1}^{n} a_{it}$$

Firms are hiring the fraction of total assets $\{(1 - \varepsilon)\}$ with the rate r_F from the financial market to produce good q_i in the perfectly competitive market.

$$\pi_{Ft} = p_{it} q_{it} - (1 - \varepsilon) r_{Ft} A_t - w_L n_{Lt}$$

$$q_{it} = \rho_s [(1 - \varepsilon) A_t]^{\beta_i} n_{Lt}^{1-\beta_i}$$

ρ_s is the unexpected shock (at the micro level, consider it to be an exogenous shock, but at the macro level, it would be a function of the aggregate risky decision that the entrepreneurs have taken to produce a new good).

Entrepreneurs will produce q_j with the below conditions:

$$E(\pi_{It}) = p_{jt} E(q_{Ijt}) - \varepsilon r_{It} A_t - w_I n_{It} - \sigma_I a_{It}, \sigma_I a_{It} \geq EB_0$$

Here $(1 - \sigma_I) a_{It}$ is an entry cost as a startup of a new business which is needed to be paid by the entrepreneurs and cannot be borrowed from the financial market, and must be greater or equal than entry barrier EB.

$$q_{jt} = \{\rho_s M_{It}^{\vartheta} (\varepsilon A_t)^{\beta_j} (n_{Lt})^{1-\beta_j}\}$$

in which $M_I \geq 1$ is the managerial skill or entrepreneurial innovation

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Solving the model for the different calibrated parameters, we can observe that as the financial markets (exogenously) allocate more assets to the entrepreneurs, the total production of the market slightly decreases. Meanwhile, the household's utility (U) increases, because individuals gain some utility from working on their own, and use other goods as well. Therefore, there is a tradeoff here between the happiness of not working for others and consuming less with higher risks. On the other hand, the financial market earns less and less, and at some point becomes negative, which would consequently lead to a downward trend in growth. The reason is that, as more assets are allocated to entrepreneurs, the competition on those assets increases, and entrepreneurs can bargain more (since there are more resources to bargain); therefore, the interest rate for entrepreneurial (high risk) activities decreases. At the same time, the interest rate (APR) for established and/or large firms, doesn't change significantly; thus, the total profit for the financial market decreases.

The other theoretical result would be if individuals' preferences shift toward the second good which is produced by entrepreneurs. First, their utility decreases, as the number of goods consumed declines in the market; eventually, as they can gain more joy from consuming different goods, they reach a higher level of utility, as if their tastes shift substantially toward the new commodity.
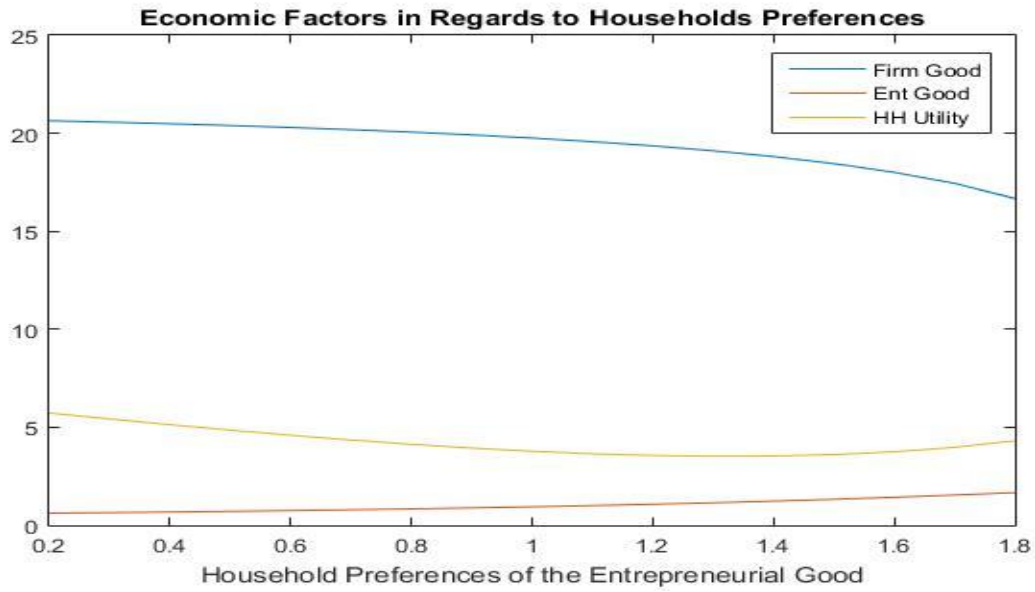
Considering that entrepreneurs' businesses are mostly based on human capital relative to established firms with large capital shares, as this gap grows, more goods are produced, but the utility of the individuals diminishes over time, as more people are attracted to less risky works, and instead of running their businesses, work for others.
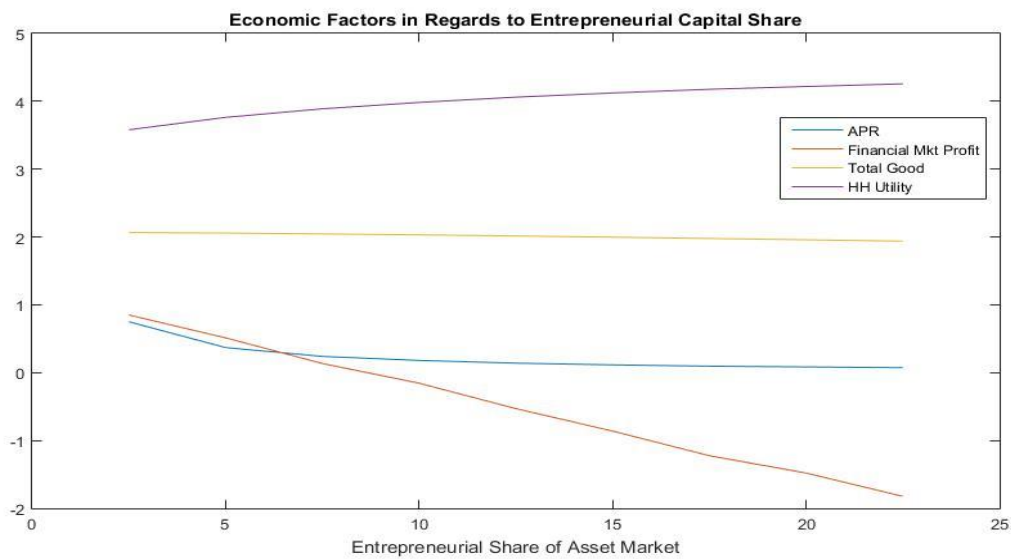

Figure (3): Market Factors Regarding Changes in Entrepreneurial Capital Share, allocated by Financial Market

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