An Examination of the Entrepreneurial Effort

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Abstract

This paper examines the economic effects of entrepreneurial effort. It challenges the neoclassical doctrine of representative agent's utility maximization problem and suggests a return to the classical economic theory of the entrepreneur in the tradition of Max Weber and Joseph Schumpeter. From this classical tradition and the data evidence, the entrepreneurial effort is found to be the intrinsic character of the entrepreneur. This paper divides the human effort into subsistent production and entrepreneurial production. When the representative entrepreneur is assumed to take pleasure in making entrepreneurial efforts, the utility maximization requires a higher productivity of subsistent production than that of entrepreneurial production. The paper also develops a two-period and two-goods dynamic model that allows the inclusion of an initial capital to this representative entrepreneur's utility maximization problem. The model predicts that an additional unit of initial capital generates a substitution effect on the first period, but a complementary effect on the second period entrepreneurial effort. Further, the entrepreneurial production positively associates with the initial capital.

JEL codes: M13, D9, J2

Key Words: Entrepreneur, Work Ethic, Utility Maximization

I. Introduction

The entrepreneur was first discovered, and then the research on entrepreneurship was developed by people in the science of economics. There have been numerous articles and books that follow the tradition of functional approach—the entrepreneur is perceived as a business manager or an innovator who plays an important role in technological progresses and economic

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growth.[1] And yet, as described by Filion (1997), "It is never easy to introduce elements of rationality into the complex behavior of entrepreneurs. One of the criticisms that can be leveled at the economists is that they have not been able to make economic science evolve. They have also been unable to create a science of economic behavior of entrepreneurs." Although this seems to be an over statement as there has been a strong tradition of behavioral study on entrepreneurs,[2] it is the time to call for more rigorous research on entrepreneurial behavior.

The key flaw in the study of entrepreneurial behavior apparently is the lack of a "superstring" theory of the entrepreneur in economics.[3] Economists today seemed to have lost their scientific curiosity that had shown by many classical economists such as Max Weber and Joseph Schumpeter. What is entrepreneurship? Who are entrepreneurs? Such questions "are never laid to rest, perhaps social scientists relish semantic jousting or because a sense of what scientific inquiry requires drives them to keep hunting for the perfect fit between the definition of a phenomenon and the phenomenon itself."[4]

In attempting to fill the gap between the definition of the entrepreneur and the entrepreneur itself, this paper suggests to study the entrepreneurial effort as the intrinsic character of entrepreneurs. The entrepreneurial effort in this article is not merely the effort in starting and growing businesses. Rather, it is defined as a behavior of economic men who proactively utilize their profoundly basic human capital—their own labor that is embodied by innate human capital such as body mass, IQ and EQ; trained human capital such as education

[1] Among numerous studies, Baumol (2002) is an outstanding example.
[2] For instance, in 1982 *Encyclopedia of Entrepreneurship*, produced by Prentice-Hall, Inc., there were two chapters discussion of social aspects of entrepreneurship and on chapter of the psychology of the entrepreneur.
[3] In the field of natural science, physicists, such as Albert Einstein, attempt to use the so-called unified field theory to explain everything from a dropping apple to the movement of quarks. Some physicists believe that everything in the world consists of a tiny, one-dimensional loop, each particle contains a vibrating, oscillating, and dancing filament called a string. Some physicists proclaim that Superstring Theory, a Theory of Everything (TOE), may unify the forces of nature.
[4] P.92, Kent A. Calvin, Donald L. Sexton and Karl H. Vesper (1982).

and other special training; and accumulated experiences and skills—to do new things, or existing things in new ways and to make things happen and get things done. Because entrepreneurs are engaged in creative activities fueled by their own passions and desires, entrepreneurs don't derive negative utility from their efforts; instead, they take pleasure in making such efforts.

The intension of this article is to draw economists' attention to the square one of entrepreneurial research in the science of economics in the tradition of Max Weber and Joseph Schumpeter. My contribution through this article to the research field is to truthfully structure a behavior model of entrepreneurial effort.[5] In a simple representative agent's utility maximization setting, it assumes that the entrepreneur obtains a positive value from his entrepreneurial effort in his utility maximization subject to budget constraints. In the remainder of this article, it first reviews literature, and then provides empirical evidence that support my argument. Finally the paper develops a simple model to analyze the entrepreneurial effort in the utility maximization and to discuss the prediction of the model.

II. Literature Review and Discussion

To examine the process of changes in economic history, Joseph Schumpeter once asked a question about what the key fact was to determine the changes. He undoubtedly claimed that "simple increase of population and of physical capital does not constitute the answer." He continued, "It is not simply the increase of the existing factors of production but the incessantly difference use made of these factors that matters. In fact much of the increase in factors and particularly of physical capital was the result rather than the cause of what may now identify as entrepreneurial activity." Supplemented by a schema of motivation interacting with the existing

[5] I intend to adapt a positive rather than a normative approach for this article. Therefore, I omit issues such as entrepreneurial effort might lead to be productive, unproductive or destructive in the economy.

or changing legal and social system, industrial structure, and the consequent process of destruction and reconstruction that went on all the time, Schumpeter clearly observed "a behavior pattern" of entrepreneurs that governed changes of the economic history.[6]

There have been numerous researches on the entrepreneur's behavior, focusing on initiative taking, opportunity seeking, risk bearing, or achievement needing. Those studies are mostly consistent with Schumpeter's description of the entrepreneurial behavior pattern: "the defining characteristic is simply the doing of new things or the doing of things that are already being done in a new way (innovation)."[7] In addition, "the entrepreneur 'gets things done'".[8] Under this definition, entrepreneurs can be found amongst pastors, teachers, superintendents, scientists, engineers, writers, business startups, large corporation CEOs, or simply workers. Concentrating on this behavior pattern, this paper would like to ask a remaining question, why do and can entrepreneurs do new things or existing things in new ways, and get things done?

When a successful entrepreneurial story to be told, people would see the observable shining award, elevated social status or lavish material possessions of the entrepreneur. The underpinning efforts that brought about these visible matters of the entrepreneur, however, have been easily overlooked. It is also apparent that entrepreneurs possess special perseverance, ingenuities, abilities and skills as noticed by many researchers.[9] But making persistent effort to achieve goals or to get things done requires extraordinary work ethic. No matter whether it would be a high school drop-out student who set up a new business venture, or a congressman who proposed a new piece of legislation, or a street man who originated a piece of new variation

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[6] Schumpeter (1949), "Economic Theory and Entrepreneurial History," p. 262, in *Essays on Entrepreneurs, Innovations, Business Cycles, and the Evolution of Capitalism*, Transaction Publishers, 3rd printing, 1997.
[7] Schumpeter (1947), "The Creative Response in Economic History," p. 223, in *Essays on Entrepreneurs, Innovations, Business Cycles, and the Evolution of Capitalism*, Transaction Publishers, 3rd printing, 1997.
[8] Ibid, p. 224.
[9] For example, Edward Lazear (2002) describes entrepreneurs as jacks-of-all-trade who may not excel in any one skill but are competent in many.

of hip-hop music, or a medical doctor who found a new cure for disease, any of those achievements required tremendous physical and mental efforts.

The attitude toward work or physical and mental effort is evolving. From the Bible, to Hebrew belief, to Greek and Roman philosophies, work—especially the physical labor—as curse devised by God explicitly to punish the disobedience and ingratitude of Adam and Eve. In addition, the Greek word for "work" was *ponos*, taken from the Latin *poena*, which meant "pain," or "sorrow." At the same time, because of the widespread practice of slavery prior to the Roman Empire, most harsh labor work was to be done by slaves. This in turn generated caste perception of work. Hard work, whether due to economic need or under the orders of a master, was disdained, despite the recognition that work was necessary for the satisfaction of material needs and the recognition of division of labor.[10]

The perception over work did not change until Protestantism and the Protestant Ethic were gradually shaped up based on the teaching of Martin Luther and John Calvin that work ought to be encouraged as it was men's duty to serve God. Max Weber later played a key role to relate the Protestant work ethic to the text of "spirit of capitalism." The evolution of capitalism also forcefully molded people's perspective on work. The Industrial Revolution brought about the technological progress in human societies. At the same time it had deprived a large rural population that later most of them had become members of the unemployed "proletarians." Under such a circumstance, having a job to an individual had turned out to be a special privilege for human dignity and survival, rather than a punishment by God.

The entrepreneurial effort is a process of capitalization of one's own human capital, and of any physical capital and or social capital that are available. Weber was able to see this unique characteristic of the entrepreneur who can work hard to capitalize his own labor and his own

[10] Hill, Roger (1996), "History of Work Ethic," http://www.coe.uga.edu/~rhill/workethic/hist.htm.

ability. He strongly cherished this entrepreneurial effort and sharply dismissed asceticism on the material gains from making entrepreneurial effort. He saw no moral crisis of profiting one's own talent and being rich. "Riches are only dangerous as a temptation to idle repose and sinful enjoyment of life, and the endeavour to acquire them is only suspect when its purpose is to enable one later to live a life of frivolity and gaiety. When it is engaged in as part of the duties of the calling, however, it is not only morally permissible but positively commanded." He sarcastically criticized, "To wish to be poor was, as was frequently argued, the same as to wish to be ill: as a form of glory of God."[11]

In his *Second Treatise on Government*, the philosopher John Locke confirmed that "God, when he gave the world in common to all mankind, commanded man also to labour, and the penury of his condition required it of him. God and his reason commanded him to subdue the earth, i.e., improve it for the benefit of life, and therein lay out something upon it that was his own, his labour." People are given the ownership of their own labor. "Nothing was made by God for man to spoil or destroy." Instead, they ought to be responsible to use it for their own pleasure or profit.[12]

Granting the freedom to members of a society to possess their own labor was clearly a human progress from slavery society. However, political freedom can't ensure the economic freedom in the society. People should take responsibility and make use of this freedom. It is not an easy task. After describing a market process for entrepreneurial production, Weber pointed out that there was "a repetition of what invariably follows a 'rationalization' process of this kind: you either prospered or went under. Under the impact of the bitter struggle for survival that was beginning, the idyll collapsed. Considerable fortunes were made and not invested at interest but

[11] Weber (1978), p.148-149,
[12] Locke (2002), p. 14-15.

reinvested in the business. The old, comfortable, and easygoing way of life gave way to harsh realities. Those who became involved got on; they had no wish to consume but only to make profits. Those who carried on in the same old way were compelled to tighten their belts."[13]

Despite the hardship, it is the way of entrepreneur's life. Weber once quoted Nikolaus Ludwig von Zinzendorf, a German religious and social reformer, to elaborate his point on the importance of work ethic in entrepreneurship. "We do not work merely to live, but we live for the sake of work, and if we have no more work to do, we suffer or pass away." He also quoted a Mormon statement of faith to show his distain about sloth, "a slothful or lazy man cannot be a Christian and enjoy salvation. He is destined to be stung to death and cast out of the beehive." He continued, "However, in this case it was principally the grandiose discipline, steering a middle course between monastery and factory, that presented the individual with the choice of work or extinction and which—linked of course with religious enthusiasm and only possible by means of this—brought about the amazing economic achievements of this sect."[14]

In his play written in 1893, "Mrs. Warren's Profession," George Bernard Shaw wrote, "People are always blaming their circumstances for what they are. I don't believe in circumstances. The people who get on in this world are the people who get up and look for the circumstances they want, and, if they can't find them, make them." Aaron Lopez, who came to America to escape the persecution of Jews in his homeland of Portugal, had become one of the largest and wealthiest of the sedentary merchants of colonial America.[15] Frank McWorter born on a South Carolina plantation, lived as a slave for 42 years, but "overcame tremendous odds to become the sine qua non of creative capitalism: a successful entrepreneur."[16] African American

[13] Weber (2002), p. 22.
[14] Weber (2002), p. 182
[15] Blackford (1991), p. 5-6.
[16] Green Shelley and Paul Pryde (1990), Black Entrepreneurship in America, Transaction Publishers.

Sarah Breedlove McWilliams Walker was also born into a slave family. She became an orphan at age 7 when her parents died during an epidemic of yellow fever. At the age of fourteen, she was married to escape her sister's abusive husband. Now she is remembered as "one of the first American women of any race or rank to become a millionaire through her own efforts."[17]

Countless successful business entrepreneurs and social leaders have made our world as it is today. Without those who could make entrepreneurial effort and stuck into whatever their vision led them to struggle, survive and thrive, our human being might still be living in caves. Once again, Weber said, "To grasp this self-evident truth, one only needs to read, for example, Franklin's description of the efforts he made to being about municipal improvements in Philadelphia. Creating employment for numerous people and contributing to the economic prosperity (in the capitalist sense of demography and trade) of one's hometown is a source of pleasure and pride to the modern entrepreneur and helps to give him an 'enjoyment of life' …"[18]

III. Some Evidence of Entrepreneurial Effort

It is interesting to read some evidence about entrepreneurial effort from microdata. Clark and Tomlinson (2001) provide an empirical research from a sample of the 1992 Employment in Britain survey. The authors find that effort levels are increasing in wages as well as in preferences for work over leisure. Those were likely to report that they provided a greater amount of effort than required were those who agreed the most with the survey statement that

[17] In 1905 Sarah Breedlove developed a conditioning treatment for straightening hair. Starting with door-to-door sales of her cosmetics, Madame C.J. Walker amassed a fortune. In 1910 she built a factory in Indianapolis to manufacture her line of cosmetics. Before her death in 1919 she was a millionaire, one of the most successful business executives in the early half of the twentieth century. See A'Lelia Bundles (1987), "America's First Self-Made Woman Millionaire," *Radcliffe Quarterly* (December): 11-12, and http://www.princeton.edu/~mcbrown/display/walker.html.

[18] Weber (2002), p. 26.

"hard work is fulfilling in itself." This section will present several tabulations derived from the U.S. Census' Current Population Survey (CPS) data to illustrate the U.S. entrepreneurial effort.

CPS self-employment data have been used widely for entrepreneurial study. This session looks into the U.S. population of 15 or older and divides them up into two groups: solely self-employed and self-employed with paid jobs. Based on 2005 CPS data, which report the 2004 facts, there were about 13 million individuals to be self-employed, of which, more than two third of them (or 8.8 million) were solely self-employed and the other less than one third (or 4.1 million) were self-employed with paid jobs (Table-1). Among these self-employed with paid jobs, approximately 77 percent held wage and salary jobs for the longest period of time in 2004; other 23 percent held self-employed position most time in the year (Table-2). In order to make a complete representation, it adds another group of approximately 140 million wage and salary earners to the comparison.

Table-1 Matrix of Self-Employed vs. Wage and Salary Earners, 2004

		Any Self-Employed Job?			
		Total	Not in universe	Yes*	No
Any Wage and Salary Job?	Total	291,155,384	60,730,596	12,858,433	217,566,355
	Not in universe	60,730,596	60,730,596	0	0
	Yes	143,905,467	0	**4,088,113**	139,817,355
	No	86,519,321	0	8,770,321	77,749,001

* Including these were 15 year of age or older but not in the laborforce.
Source: U.S. Census Bureau, Current Population Survey, March Supplement, 2005.

Table-2 Self-Employed with Paid Job: Source of Earning from Longest Job, 2004

Item	Number	Percent
Total	4,088,113	100.0%
Wage and Salary	3,141,200	76.8%
Non-Farm Self-Employment	905,163	22.1%
Farm Self-Employment	39,589	1.0%
Work Without pay	2,160	0.1%

Source: U.S. Census Bureau, Current Population Survey, March Supplement, 2005.

Why did those wage and salary earners also find self-employment? Were they economically worse-off than other two groups? Did they make less income than their peers? Table-3 shows the facts. Those self-employed with paid jobs were on average better off than the other two groups: a higher percentage of their households had received un-earned income from stock investment, saving or rental properties. At the same time, a higher percentage of their households than the other two groups had been ranked as top two household income percentiles. At the personal level, higher percentage of those self-employed with paid job than other two groups also received higher personal income.

Table-3 Percentage of Household Income and Personal Income, 2004

	Self-Employed with Paid Job	Self-Employed without Paid Job	Wage & Salary Earners
Household Income from Un-Earned Sources			
Dividend Income	43%	31%	29%
Interest Income	71%	59%	57%
Rental Income	15%	14%	7%
Household Income Percentile Rank			
Lowest 20 Percent	5%	14%	7%
Second 20 Percent	12%	17%	14%
Third 20 Percent	16%	20%	21%
Fourth 20 Percent	28%	23%	27%
Top 20 Percent	39%	26%	31%
Personal Income Class			
Less than $15,000	17%	35%	22%
$15,000-$24,999	14%	17%	18%
$25,000-$34,999	14%	14%	17%
$35,000-$44,999	11%	10%	13%
$45,000-$54,999	9%	7%	9%
$55,000-$64,999	8%	4%	6%
$65,000-$74,999	6%	3%	4%
$75,000-$84,999	4%	3%	3%
$85,000-$94,999	3%	1%	2%
$95,000+	15%	7%	7%

Source: U.S. Census Bureau, Current Population Survey, March Supplement, 2005.

It is not clear, from the data, about whether these self-employed with paid job had enjoyed their multi tasks of their working schedule but it is apparent that they indeed worked harder. Those people had put more effort into education, and worked in the human capital intensive professions, as shown in Table-4. Forty percent of those self-employed with paid job had earned bachelor degree or received graduate education, while less than 30 percent of other two groups were at these levels. Coordinately, 42 percent of those self-employed with paid job had worked in the occupations such as executives, administrators, managers, scientists, engineers, and teachers. Those occupations usually require high level of responsibilities and leadership abilities, as well as extensive time commitment and mental efforts.

Finally, Table-5 provides average work schedule among those three groups. Sixty-five percent of those self-employed with paid job worked full time and full year in 2004, 6 percent higher than those solely self-employed without paid job. Only 8 percent of those self-employed with paid job worked part time and part year, while a higher percentage of people from the other two groups had worked at such schedule in 2004.

Table-4 Education, Main Job Occupation and Work Schedule of American Workers, 2004

	Self-Employed with Paid Job	Self-Employed without Paid Job	Wage & Salary Earners
Education Level			
Less than High School	7%	12%	13%
With High School Diploma	22%	32%	30%
Some College	31%	27%	29%
Bachelor's Degree (BA,AB,BS)	24%	19%	19%
Post Graduate Degreed	16%	10%	9%
Main Job Occupation			
Not in the Laborforce	4%	7%	7%
Managerial and Professional	42%	30%	32%
Service, Technical, Sales and Administrative Support	35%	36%	39%
Operators, Fabricators and Laborers	19%	27%	22%

Source: U.S. Census Bureau, Current Population Survey, March Supplement, 2005.

Table-5 Work Schedule of American Workers, 2004

	Self-Employed with Paid Job	Self-Employed without Paid Job	Wage & Salary Earners
Full Year /Full Time	65%	59%	67%
Full Year /Part Time	13%	17%	10%
Part Year /Full Time	14%	12%	13%
Part Year /Part Time	8%	13%	10%
Source: U.S. Census Bureau, Current Population Survey, March Supplement, 2005.			

IV. A Utility Maximization Model

In this section, it first sets out a static and then builds a traditional neoclassical dynamic model of a representative agent's utility maximization subject to budget constraints. The entrepreneur is defined as the economic man. He has all the characteristics as a consumer as well as a producer in lines with the traditional economic analysis: he maximizes utility subjected to the budget constraint. In addition, the entrepreneur is an agent, of whom he needs to achieve the goals of economic survival and advancement.[19]

IV-1. A Static Model

It is assumed that the economy inhabited a representative entrepreneur who engages in two productions and therefore consumes two goods, c^1 and c^2. This individual has to make decision on dividing his effort into two productions: one is to provide subsistence product, y^1 (say, making bread, or sewing cloth, or cleaning bathroom) and the other is to create entrepreneurial product, y^2, (say, inventing a new cell phone, or discovering a new energy source, or forming a nonprofit organization to foster entrepreneurship among the poor in the society).

[19] For a full explanation of the background information of this model, please read Lowrey (2003), "The Entrepreneur and Entrepreneurship: A Neoclassical Approach," Office of Advocacy Working Paper, January, http://www.sba.gov/advo/research/wkpapers.html.

The efforts being exerted to those two different productions are also accordingly dissimilar. Hence, the entrepreneur's subjective views toward the utility or disutility derived from making different effort were found to be divergent. To better understand the distinctions in those two different productions and two different utility functions from exerting effort in producing the two products, it is the author's intension to review Schumpeter's standpoint in length.

Schumpeter (1934) deeply dug into two different efforts. Considering human needs for life, he noticed that people were unwilling to work on daily routing. "Thousands of voices from everyday life remind us that the work concerning our daily bread is a heavy burden, which one only undergoes because one must, and which one throws off if one can."[20] For the ordinary people, making such effort for survival would be difficult. They would be unwilling to do something new than what is familiar and tested by experience, and would be reluctant "even if the objective difficulties did not exist." However, this situation would not apply to a "new and another kind of effort of will" that "is necessary in order to wrest, amidst the work and care of the daily round, scope and time for conceiving and working out the new combination and to bring oneself to look upon it as a real possibility and not merely as a day-dream. This mental freedom presupposes a great surplus force over the everyday demand and is something peculiar and by nature rare."[21] Apparently, this new and another kind of effort can be named as entrepreneurial effort.

Schumpeter particularly pointed out the entrepreneurial effort he mentioned about was not limited to the effort made for business but for every aspect in the society. "Unlike people running routings, the entrepreneur relies less than they do on tradition and connection and because his characteristic task—theoretically as well as historically—consists precisely in

[20] Schumpeter (1934), p.22-23.
[21] Schumpeter (1934), p. 86.

breaking up old, and creating new, tradition. Although this applies primarily to his economic action, it also extends to the moral, cultural, and social consequences of it."

At this point, Schumpeter realized the limitation of Gossen's Law in explaining the entrepreneur's behavior and recognized that it was "no mere coincidence that the period of the rise of the entrepreneur type also gave birth to Utilitarianism." Because of the entrepreneur's conduct and his motive were "rational" but not in the "sense of his characteristic motivation of the hedonist kind," he suggested, if "we define hedonist motive of action as the wish to satisfy one's wants, we may indeed make 'wants' include any impulse whatsoever, just as we may define egoism so as to include all altruistic values too, on the strength of the fact that they also mean something in the way of self-gratification."[22]

For the simplicity of the study, this model omits other factors in the production functions so that it can solely focus on the decision making of the entrepreneur in the economy. The input of those two productions is only the physical effort that is divided up into two: the labor effort ℓ for subsistent good production y^1, and the entrepreneurial effort e for entrepreneurial production y^2. The total time endowment for such physical effort is only 1, i.e., $\ell + e = 1$. Those two productions are expressed as below:[23]

$$y^1 = f(\ell) = f(1\text{-}e) \qquad (1)$$

$$y^2 = \varphi(e) \qquad (2)$$

[22] Schumpeter (1934), p. 92.

[23] The idea can be also supported by Baumol (1968). In this article, Baumol proposed that "it is necessary for us to differentiate between the entrepreneurial and the managerial functions." He suggested that "we may define the manager to be the individual who oversees the ongoing efficiency of continuing processes. It is his task to see that available processes and techniques are combined in proportions appropriate for current output levels and for the future outputs that are already in prospect. He sees to it that inputs are not wasted, that schedules and contracts are met, he makes routine pricing and advertising outlay decisions, etc., etc. in sum, he takes charge of the activities and decisions encompassed in our traditional models." … "The entrepreneur (whether or not he in fact also doubles as a manager) has a different function. It is his job to locate new ideas and to put them into effect. He must lead, perhaps even inspire; he cannot allow things to get into a rut and for him today's practice is never good enough for tomorrow."

Production functions $f(\ell)$ and $\varphi(e)$ are both defined only for nonnegative values of the input and output levels, i.e., $\ell >> 0$ (the entrepreneur has to make effort to survive), $e \geq 0$; and $f(\ell) >> 0$ (the entrepreneur has at least to eat food and wear cloth), $\varphi(e) \geq 0$; and they are defined only for non-decreasing, i.e., $f_\ell > 0$ and $\varphi_e > 0$.[24]

The data provided in session III can be used to illustrate those two productions in terms of two different ways to utilize the entrepreneur's labor effort. The entrepreneur might choose to commit (1-*e*) unit of time be employed as wage and salary earner so that he can make enough income for living. At the same time, he uses *e* unit of his time to do whatever his passion called for as self-employed business runner, or a NGO activist, or a new energy discoverer.

The entrepreneur's supply of y^2 creates it own demand, c^2, according Say. The entrepreneur has to set up the price, P (it is the relative price of y^2 in terms of the price of y^1, which is restricted to be 1). For the chosen allocation of labor effort (1-*e*) and entrepreneurial effort *e* for respectively producing y^1 and y^2, and the chosen consumption bundle c^1 and c^2, the entrepreneur's utility function $U(\cdot)$ is at the maximum level.

In defining the entrepreneur as an economic agent who is ingenious and creative in finding ways to add to their own wealth, power, and prestige, Baumol (1990) suggested that individuals choose to be entrepreneurs when or because their utility (from wealth, power, prestige or self-satisfaction) is maximized by so doing. It is assumed that the utility function of the entrepreneur is $U(c^1, c^2, e)$. Without losing the basis of the neoclassical paradigm of consumer-choice theory, It can trivialize $U(\cdot)$ as a summation of three independent components:

[24] See "The Theory of the Firm" in James Henderson and Richard Quandt (1971), *Microeconomic Theory: A Mathematical Approach*, Second Edition, McGraw-Hill Book Company.

$u^1(c^1) + u^2(c^2) + u^3(e)$.[25] Each component u^i (i = 1, 2, and 3) is a nonnegative and non decreasing utility function of corresponding argument, c^1, c^2 and e.

It is important to further elaborate $u^3(e)$, the utility function of entrepreneurial effort. Assuming that $du^3(e)/de = u_e > 0$, as discussed earlier, the entrepreneur is not an ascetic person. Rather, he works very hard because that he enjoys what he is doing and takes pleasure in so doing. A good example of this positive utility function from working is the contentment gained by a health-conscious person who works in a gym. The harder he works the higher fulfillment he acquires. Because of the limit of human physical and mental capacity, the marginal utility of entrepreneurial effort is assumed to be decreasing. That is, $d^2\ u^3(e)/de^2 = u_{ee} < 0$.

Hence, the entrepreneur's utility maximization problem is:

$$Max \qquad U(c^1, c^2, e) = u^1(c^1) + u^2(c^2) + u^3(e) \tag{3}$$

$$s.t. \qquad c^1 + Pc^2 \le y^1 + Py^2 = f(1-e) + P\varphi(e) \tag{4}$$

The Lagrangian for this utility maximization problem is

$$\mathscr{L}\left(c^1, c^2, e, \lambda\right) = u^1(c^1) + u^2(c^2) + u^3(e) + \lambda\left[f(1-e) + P\varphi(e) - c^1 - Pc^2\right]$$

Here λ is Lagrangian multiplier on the resource constraint. When differentiating with respect to each of the arguments, c^1, c^2, e and λ, that all contribute to the utility maximization, it obtains the following four first order conditions that must hold at the optimal solution:

$$\partial \mathscr{L} / \partial c^1 = u_1 - \lambda = 0;$$

$$\partial \mathscr{L} / \partial c^2 = u_2 - \lambda P = 0;$$

$$\partial \mathscr{L} / \partial e = u_e - \lambda\,(f_\ell - P\varphi_e) = 0;$$

$$\partial \mathscr{L} / \partial \lambda = f(1-e) + P\varphi(e) - c^1 - Pc^2 = 0.$$

[25] See Eugene Silberberg (1990) for excellent mathematical reference.

Where $u_1 = du^1/dc^1$, $u_2 = du^2/dc^2$, and $u_e = du^3/de$. This set of first order conditions can be used for a relative price analysis. For $u_1 > 0$, the relative price of c^2 and e can be correspondingly written as marginal rate of substitution between each of those items and c^1:

$$u_2 / u_1 = P \geq 0, \qquad \text{as } u_1 > 0 \text{ and } u_2 \geq 0 \qquad (5)$$

$$u_e / u_1 = f_\ell - P\varphi_e \geq 0, \qquad \text{as } u_e \geq 0 \text{ and } u_1 > 0 \qquad (6)$$

Equation (5) illustrates how the entrepreneur should set up the price. The price, P, must be set to equate the marginal rate of substitution between the two products, u_2/u_1. This result is consistent with the traditional neoclassical prediction.

Equation (6) shows that the entrepreneur's utility maximize when $f_\ell \geq P\varphi_e$, i.e. the value of marginal product of physical effort in production of y^1 must be great than or equal to the value of marginal product of physical effort in production of y^2. This result clearly reflects the present reality, at least, in the U.S. In this entrepreneurial economy where entrepreneurs take pleasure in being hard working on entrepreneurial production, not only all of the large corporations have been seeking high productivity, but also many small businesses owners have started outsourcing their productions to where they can minimize the cost of production.

IV-2. A Static Model with a Payoff Scheme

Now, it postulates another scenario. Baumol (1990) proposes "how the entrepreneur acts at a given time and place depends heavily on … the reward structure in the economy … (or) the prevailing rules of the game that govern the payoff" to reward or guide the entrepreneurial effort.

Hence, the model allows the government to play a role in the economy by ensuring the society to be with an adequate amount of subsistent production and by promoting the entrepreneurial production. The former can be done by subsidizing subsistent good and the latter can be done by awarding productive entrepreneurial effort. To this end, it assumes that the government imposes a lump sum tax τ to finance its spending G that is allocated into two areas: one is the price subsidy at the rate of δ for subsistent production $f(\ell)$ and the other one is to award each additional gain (i.e., the marginal productivity) from entrepreneurial effort, φ_e, at the rate of ξ. To simplify the state of affairs, it assumes that $\delta + \xi = 1$ and that the government has to balance its budget, i.e., $G = \tau$. The entrepreneur views the government award at the rate of ξ as his achievement and internalizes this rate into his utility maximization problem.

This setting allows the government to play an important role in guiding the entrepreneur. If y^2 is innovative and productive, the government can increase the rate ξ; otherwise, it would be reduced. It can be set to a zero, or a negative number, i.e., a tax on the marginal productivity of entrepreneurial effort.

$$Max \qquad U(c^1, c^2, e, \xi) = u^1(c^1) + u^2(c^2) + u^3(e) + u^4(\xi) \tag{7}$$

$$\text{s.t.} \qquad c^1 + Pc^2 + \tau \le f(\ell) + P\varphi(e) + \delta f(\ell) + \xi P\varphi_e \tag{8}$$

$$\delta f(\ell) + \xi P\varphi_e = G = \tau \tag{9}$$

Substitute ℓ by $1 - e$ and δ by $1 - \xi$, the new Lagrangian for this utility maximization problem is

$$\mathscr{L}(c^1, c^2, e, \xi, \lambda) = u^1(c^1) + u^2(c^2) + u^3(e) + u^4(\xi)$$

$$+ \lambda [f(1-e) + P\varphi(e) + (1-\xi) f(1-e) + \xi P\varphi_e - c^1 - Pc^2 - \tau] \tag{10}$$

The first order conditions for the maximization problem are as below,

$$\partial \mathscr{L} / \partial c^1 = u_1 - \lambda = 0;$$

$$\partial \mathscr{L} / \partial c^2 = u_2 - \lambda P = 0;$$

$$\partial \mathscr{L} / \partial e = u_e - \lambda [(1+ \delta) f_\ell - P\varphi_e - \xi P\varphi_{ee}] = 0;$$

$$\partial \mathscr{L} / \partial \xi = u_\xi - \lambda [f(\ell) - P\varphi_e] = 0;$$

$$\partial \mathscr{L} / \partial \lambda = f(\ell) + P\varphi(e) + \delta f_\ell + \xi P\varphi_e - c^1 - Pc^2 - \tau = 0.$$

The "relative prices" in this new setting are:

$$u_2 / u_1 = P \geq 0, \qquad \text{as } u_1 > 0 \text{ and } u_2 \geq 0 \qquad (12)$$

$$u_e / u_1 = (1+ \delta) f_\ell - P\varphi_e - \xi P\varphi_{ee} \geq 0, \qquad \text{as } u_e \geq 0 \text{ and } u_1 > 0 \qquad (13)$$

$$u_\xi / u_1 = f(\ell) - P\varphi_e \geq 0, \qquad \text{as } u_\xi \geq 0 \text{ and } u_1 > 0 \qquad (14)$$

Equation (12) provides the relative price of entrepreneurial good c^2. Again, the relative price P should be equal to the rate of substitution between the two goods, c^1 and c^2.

Equation (14) implies that the entrepreneur's allocation between e and ℓ must satisfy $f(\ell) \geq P\varphi_e$, i.e., the value of subsistent good production must be greater than or equal to the value of marginal productivity of the entrepreneurial good. This implies that, the subsistent production must be more efficient and productive than entrepreneurial production so that limited resources would be allocated to entrepreneurial production.

Equation (13) indicates $f_\ell \geq P(\varphi_e + \xi\varphi_{ee})/(1+\delta)$. This means that the values of marginal product of subsistent good must exceed the discounted [by the factor of $(1+\delta)$] values of two items—the value of marginal product of entrepreneurial good, $P\varphi_e$, and the value of marginal government award granted to the entrepreneur, $P\xi\varphi_{ee}$. If the entrepreneurial production exhibits a

sort of increasing return to scale (as happening usually during a wave of innovations after a new invention), the pressure for seeking high productivity in subsistent production would be still intense, despite the government subsidy in boosting subsistent production.

IV-3. A Dynamic Model Analyzing the Effect of Initial Capital

In order to capture the entrepreneurial behavior in the dynamic process, now it adopts a standard one generation, two periods of life cycle model.[26] The representative entrepreneur begins his life with initial endowed capital K_0, that is utilized by the entrepreneur for starting his new venture in which he will produce the entrepreneurial good, X in the second period of his life. His labor effort is endowed at one unit each period, i.e., $L_i + E_i = 1$ ($i = 1$ and 2). During the first period, he uses his labor effort L_1 to produce the subsistent good $f(L_1)$ for his own consumption in the first period that is C_1. At the same time, he uses his entrepreneurial effort E_1 to utilize his initial capital K_0 and to generate the new capital K. This K can be anything including human capital (for instance, he uses a part of first period of time to get his own education); physical capital in some sort of formation (for instance, he may purchases a piece of land, or a piece of software); and social capital (such as lobbing the government to cut tax, or finding his cousin in Europe so that he can sell his entrepreneurial product there in the future).

The consumption of the entrepreneur C_1 can not exceed its production $f(L_1)$. And the generation of K is a function of his entrepreneurial effort E_1 and the initial capital K_0,

$$C_1 \le f(L_1), \qquad \frac{df}{dL_1} = f_1 > 0, \qquad f_{11} \le 0;$$

$$K = K(E_1, K_0), \quad \frac{\partial K}{\partial E_1} = K_E > 0, \quad K_{EE} \le 0 \text{ and } \frac{\partial K}{\partial K_0} = K_K > 0$$

[26] For example, Heckman (1976).

In the second period, the entrepreneur works on two productions: subsistent good, $f(L_2)$ and entrepreneurial good, $\psi(E_2, K)$.

$$C_2 \le f(L_2), \qquad \frac{df}{dL_2} = f_2 > 0, \qquad f_{22} \le 0;$$

$$X = \psi(E_2, K) = \psi\,[E_2, K(E_1, K_0)],$$

$$\frac{\partial X}{\partial E_2} = X_E \ge 0, \quad \frac{\partial^2 X}{\partial E_2^2} = X_{EE} \le 0, \quad \frac{\partial X}{\partial K} = \frac{\partial X}{\partial E_1} = X_K K_E \ge 0, \quad \frac{\partial^2 X}{\partial K^2} = X_{KK} K_E K_K + X_K K_{EE} \le 0$$

The entrepreneur makes decision with his vision on producing the innovative good X. He allocates L_1 to produce the first period consumption good $f(L_1)$, E_1 to utilize K_0 and generate K; also, he had to choose L_2 for producing the second period consumption good $f(L_2)$, and E_2 to produces X to maximize his life time utility function subject to the life time budge constraint.

The entrepreneur's utility function for the first period is $u(C_1, E_1, K)$. Since K is not a choice variable but a variable endogenously determined by his first period entrepreneurial effort E_1 and the endowed initial capital K_0, therefore, his actual utility is a function of two choice variables C_1 and E_1, i.e., $u(C_1, E_1)$. His second period utility function is $v(C_1, X, E_2)$. Hence, the entrepreneur's utility maximization problem at the present value can be written as below:

$$\text{Max} \quad U = u(C_1, E_1) + v(C_1, X, E_2)/(1+r) \tag{15}$$

$$\text{s.t.} \quad f(L_1) + K(E_1, K_0) + \frac{1}{1+r} f(L_2) + \frac{P}{1+r} \psi[E_2, K(E_1, K_0)] = C_1 + K(E_1, K_0) + \frac{C_2}{1+r} + \frac{PX}{1+r}$$

Since $L_1 + E_1 = 1$, and $L_2 + E_2 = 1$, substitute L_1 by $1 - E_1$ and L_2 by $1 - E_2$, for a given initial capital K_0, the Lagrangian for this utility maximization problem becomes

$$\mathscr{L}(C_1, E_1, C_2, E_2, X, \lambda \mid K_0) = u(C_1, E_1) + \frac{1}{1+r} v(C_1, X, E_2)$$

$$\lambda\left\{ f(1-E_1)+K(E_1,K_0)+\frac{1}{1+r}f(1-E_2)+\frac{P}{1+r}\psi[E_2,K(E_1,K_0)]-C_1-K(E_1,K_0)-\frac{C_2}{1+r}-\frac{PX}{1+r}\right\}$$

The first-order conditions are derived as below:

$\partial \mathcal{L} / \partial C_1 = u_C - \lambda = 0;$

$\partial \mathcal{L} / \partial C_2 = v_C - \lambda = 0;$

$\partial \mathcal{L} / \partial X = v_X - \lambda P = 0;$

$\partial \mathcal{L} / \partial E_1 = u_E - \lambda\,[f_1 - K_E - PX_K K_E/(1+r)] = 0;$

$\partial \mathcal{L} / \partial E_2 = v_E - \lambda\,(f_2 - PX_E) = 0;$

$$\partial \mathcal{L}/\partial \lambda = f(1-E_1)+K(E_1,K_0)+\frac{1}{1+r}f(1-E_2)+\frac{P}{1+r}X[E_2,K(E_1,K_0)]-C_1-\frac{C_2}{1+r}-\frac{PX}{1+r}=0\,.$$

$$u_E / u_C = f_1 - K_E - PX_K K_E/(1+r) \geq 0 \qquad (16)$$

$$v_E / v_C = f_2 - PX_E \geq 0 \qquad (17)$$

Once again, the relative price analysis provides conditions (16) and (17) that will be important for an impact analysis later. The utility maximization in this dynamic setting requires that the value of marginal product of second period labor effort for making subsistent good must be equal or greater than that for entrepreneurial good (17). Equation (16) indicates that the value of marginal product of first period labor effort in producing subsistent good, however, must be greater than or equal to the sum of marginal product of entrepreneurial effort in generating the capital K, that is K_E; and the discounted [by $(1+r)$] value of marginal product of capital in producing entrepreneurial good X, that is $PX_K K_E$.

$$\begin{bmatrix} u_{CC} & 0 & 0 & 0 & 0 & -1 \\ 0 & v_{CC} & 0 & 0 & 0 & -1 \\ 0 & 0 & v_{XX} & 0 & 0 & -P \\ 0 & 0 & 0 & H_1 & 0 & H_2 \\ 0 & 0 & 0 & 0 & H_3 & H_4 \\ -1 & -1 & -P & H_2 & H_4 & 0 \end{bmatrix} \begin{bmatrix} dC_1 \\ dC_2 \\ dX \\ dE_1 \\ dE_2 \\ d\lambda \end{bmatrix} = \begin{bmatrix} 0 \\ 0 \\ 0 \\ 0 \\ 0 \\ A \cdot dK_0 \end{bmatrix} \tag{18}$$

Where,

$$H_1 = u_{EE} + \lambda\left(f_{11} + K_{EE} + \frac{P}{1+r} X_{KK} K_{EE} \right) \leq 0$$

$$H_2 = -\left(f_1 - K_E - \frac{P}{1+r} X_K K_E \right) \leq 0$$

$$H_3 = v_{EE} + \lambda\left(f_{22} + PX_{EE} \right) \leq 0$$

$$H_4 = -\left(f_2 - PX_E \right) \leq 0$$

$$\mathrm{A} = -\frac{K_K}{1+r}(1 + r + PX_K + \lambda PK_E X_{KK}) \leq 0$$

And the second-order condition for utility maximization requires that the determinant of 6x6 matrix of (18) be negative, i.e., $|H| < 0$. To evaluate the effect of initial capital on two kinds of physical effort and entrepreneurial good, it derives the following results:

$$\frac{dE_1}{dK_0} \leq 0; \quad \frac{dE_2}{dK_0} \geq 0; \quad \frac{dX}{dK_0} \geq 0. \tag{19}$$

Results in (19) show that an additional unit of initial capital generates a substitution effect on the first period, but a complementary effect on the second period entrepreneurial effort. Further, the entrepreneurial production positively associates with the initial capital, i.e., a higher value of initial capital results in a higher production of entrepreneurial good.

V. Conclusion

This paper examines the economic effects of entrepreneurial effort. It challenges the neoclassical doctrine of representative agent's utility maximization problem and suggests a return to the classical economic theory of the entrepreneur in the tradition of Max Weber and Joseph Schumpeter. Following this classical tradition, the entrepreneurial effort is found to be the intrinsic character of the entrepreneur who proactively utilizes his profoundly basic human capital—his labor that owned by himself—to generate capitals that are essential for producing entrepreneurial goods and services—i.e. doing new things or existing things in new ways, making things happen, and getting things done. After providing the literature review and the empirical evidence, this paper attempts to translate the idea of two different labor efforts originated in Schumpeter's writing into a mathematical model.

This paper divides the human effort into subsistent production and entrepreneurial production. When the representative entrepreneur is assumed to take pleasure in making an entrepreneurial effort, which implies a disutility from producing subsistent goods, the utility maximization requires a higher productivity of subsistent production than that of entrepreneurial production. By introducing a government payoff scheme into this simple static model, the result shows that there would be an increased pressure than the previous case for seeking high productivity in subsistent production, if the entrepreneurial production exhibits a sort of increasing return to scale. Finally, the paper develops a two-period and two-goods dynamic model, in which it allows the inclusion of an initial capital to this representative entrepreneur's utility maximization problem. The model predicts that an additional unit of initial capital generates a substitution effect on the first period, but a complementary effect on the second period entrepreneurial effort. Further, the entrepreneurial production positively associates with

the initial capital, i.e., a higher value of initial capital results in a higher production of entrepreneurial good.

This paper has a great potential to be developed to further explore the nature and definition of the entrepreneur. Adding the risk factor into the model and measuring the entrepreneurial effort by differentiating individual's abilities or experiences (e.g., by using variables such as education, working schedule or work experiences) can be listed as ways to go. More importantly, finding a set of micro data to do empirical analysis is another direction to discover the economic effect of entrepreneurial efforts. Finally, this paper can be extended to a very interesting research when examining the entrepreneur to be productive, unproductive or destructive, as identified by Baumol (1990).

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