

Notes on Utility: Some Factors which Contribute to Individual Achievement and Plausible Relation to Welfare

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Introduction

It is prescribed in economics textbooks that people wants to maximize their utility, and Equilibrium is described as the result of maximizing utility U subject to budget constraint [1]. But the definition of the utility U as a measurable quantity remains not conclusive in literature, see for example discussion by McCauley [1] and Tubaro [3].

Therefore we think that it is more useful to find direct relation between Welfare and actual factors that contribute to individual achievement, rather than relying on non-empirical term of utility. In the present paper, we study a number of factors that contribute to individual achievement, based on small experiment with pigeon sample.

We consider that it is very essential to base economics theory on *measurable quantity* from the beginning, because optimization at individual and aggregate levels is the very hallmark of modern economics theory (Tubaro, 2006, p.1 [3]). That measurable quantity can be observed by virtue of experiment or field observation. Indeed, we think that such an experimental approach is new and original in economics thinking, especially from the viewpoint of *grounded approach*, because after all in studying economics we consider human social behavior and their social interactions. In *grounded approach*, theory building should be based on actual field observation.

We begin with highlight of some basic thoughts on utility U in modern economics literature, and then proceed with experimental result. We draw some sketches on some factors which contribute to wealth achievement based on individual behavior. Implications of this small experiment are discussed briefly throughout the present paper.

The present report is very preliminary in nature, therefore further works are recommended in order to extend further to economics context.

Highlight of modern thinking on Utility

There are extensive literatures on this subject, ranging from mathematical analysis [1], historical study [3], to philosophical consideration [2], but here we limit our review to a few definitions on utility U, highlighting some basic thoughts in modern economics literature, because in this work we would like to emphasize the necessity to study *experimentally* the direct relation between wealth achievement based on actual factors which contribute to individual achievement. In other words, we would like to find factors which contribute to wealth achievement based on individual behavior.

It is normally prescribed in economics textbooks that people wants to maximize their utility, in other words Wealth is often defined as a function of maximizing utility; and therefore Equilibrium is described as the result of maximizing the utility U subject to budget constraint [1], which yields:

$$p_i = \lambda \frac{\partial U}{\partial x_i}, \quad (1)$$

where λ is a Lagrange multiplier. In other words, it is postulated that a scalar utility function U does exist such that its gradient is assumed to be proportional to the price covector [1, p.8]. While the above proposition is quite analogous to a basic potential equation in physics: $p = \text{grad } U$ [1, p.12], the definition of utility U term itself is not clearly defined as a measurable quantity.

But the definition of the utility U as a measurable quantity remains not conclusive as described by McCauley [1], see also Rothbard [2]. In fact, econometrics is based on the *non-empiric* notion of utility [1, p.1].

Furthermore, utility maximization was not clearly related to actual individual achievement; indeed it is merely a normative prescription (i.e. something that people should somehow learn to or conform to), rather than as a possible interpretation of the observed behavior of individuals (Tubaro, 2006, p.5 [3]).

From philosophical consideration, Rothbard [2, p.12] concludes that there is no such thing as total utility; because all utilities are marginal.

Therefore we think it would be more useful to find direct relation between Wealth and actual factors that contribute to individual achievement, rather than relying solely on abstract but non-empirical notion like 'utility'. Nonetheless we should mention that the actual relation between individual achievement and aggregate result (Welfare) is a very complicated subject and it is beyond the scope of this article.

Experimental Result and Discussion

The present paper is written based on small experiment made by the writer for a few days during study period in last summer (around June 2009). From the experiment, the writer obtains new results which are worthy to be communicated. By feeding a small number of pigeons and changing the location of feeding, we observe some factors which contribute to the individual achievement of the pigeons. These factors correspond to the pigeons activities at given resources. Spatial distribution of resources is found to be very important factor too to the individual achievement.

The assumption in this experiment is that the amount of resources is quite limited if we compare to the amount needed by the pigeons; and the location of feeding is scattered around the pigeons (the feeding is given by throwing it to the pigeons). The exact number of pigeons is not counted. The purpose of this small experiment is to observe qualitatively some factors which affect the individual achievement of the pigeons. The limitation of this experiment is in its serendipity nature, and also we did not carry out the same experiment with other type of animals. Actually this experiment was not planned before hand, but by serendipity during feeding the pigeons on the street, this is why the exact number of pigeons is not counted.

Based on this small experiment, we obtain new finding in the form of a number of factors which contribute to individual achievement of the pigeons, including:

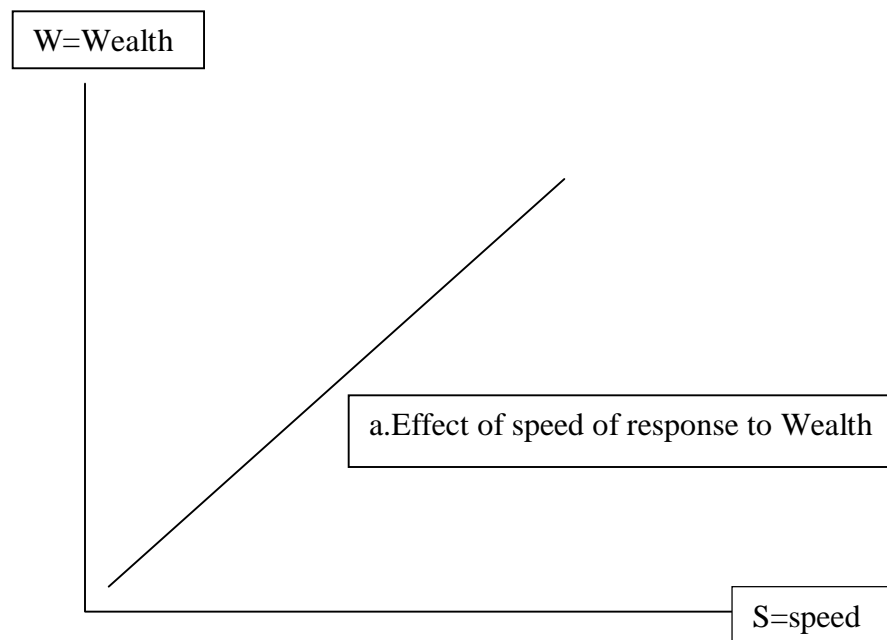
- a. The pigeons get the feeding as far as they move with speed of response. Acceleration of their speed appears to be very important too and it affects their result.
- b. The pigeons get the feeding at the nearest distance to them. They tend to neglect the food which is too far from them. This may imply that the pigeons tend to minimize the energy required to get the feeding they need.
- c. (*Spatial*) distribution of resources also determines which groups of the pigeons will get more (or less) foods. If the distribution of resources is more evenly, then more pigeons will get equal amount of food. But if the spatial distribution of resources follows normal distribution (*bell shaped*), then the welfare tends to be distributed unequally. The '*sunshine distribution*' can be considered as better spatial distribution to achieve equal welfare.
- d. Cooperation does not apply to animals, but we can conclude that cooperation is very important for human, because of their social behavior.
- e. There are other factors which determine how the pigeons fulfill their needs, such as their eyes, noises, and crowdy (i.e. if there are more pigeons in one small location, then the resources tend to be distributed unevenly).

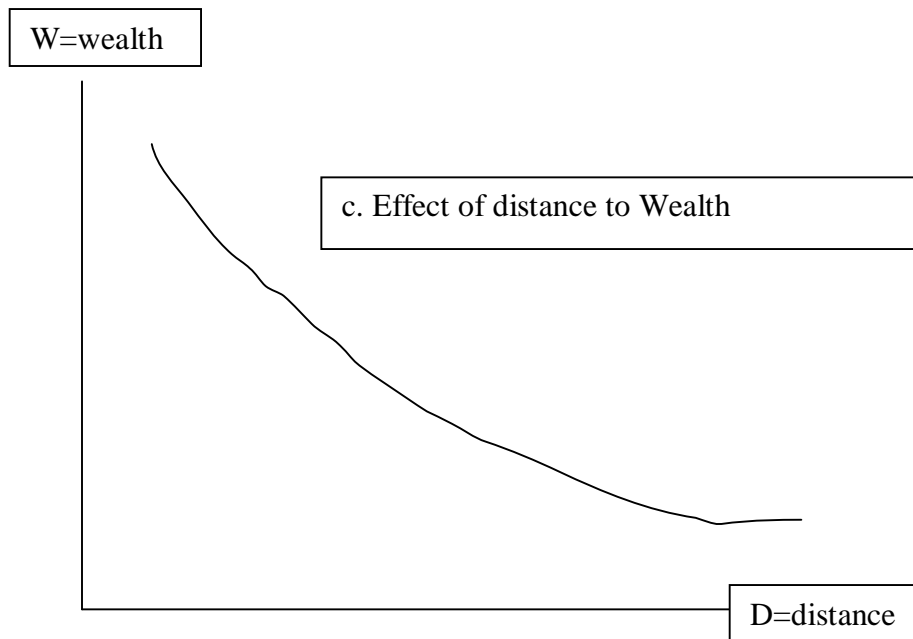
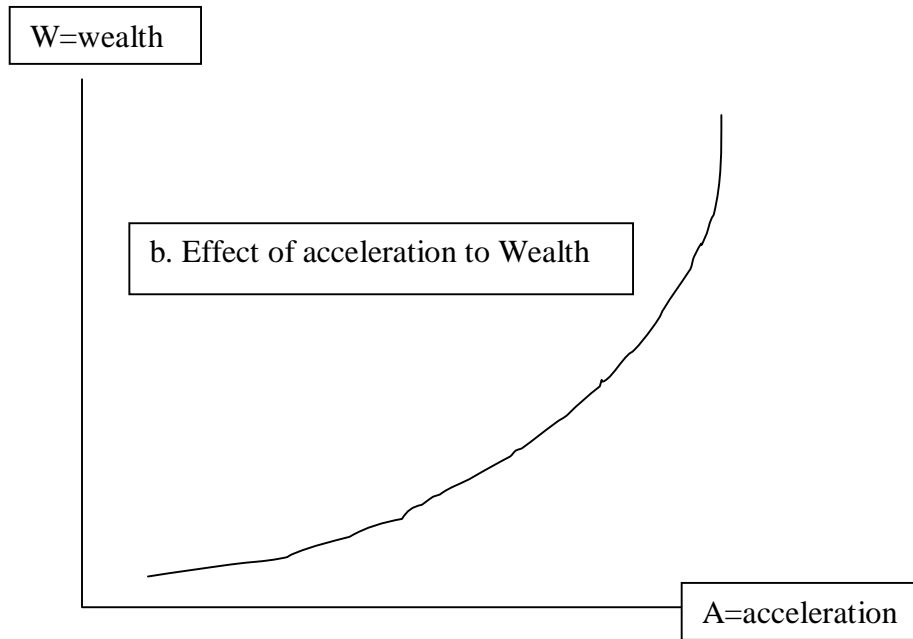
f. Based on this experiment then we can summarize that actually the individual wealth, i.e. based on individual achievement, is a function of speed, acceleration, distance, distribution of resources, cooperation, and other factors. There could be other factors which may be neglected or unobserved in this small experiment. Therefore, we can express Wealth W as function of a number of factors, as follows:

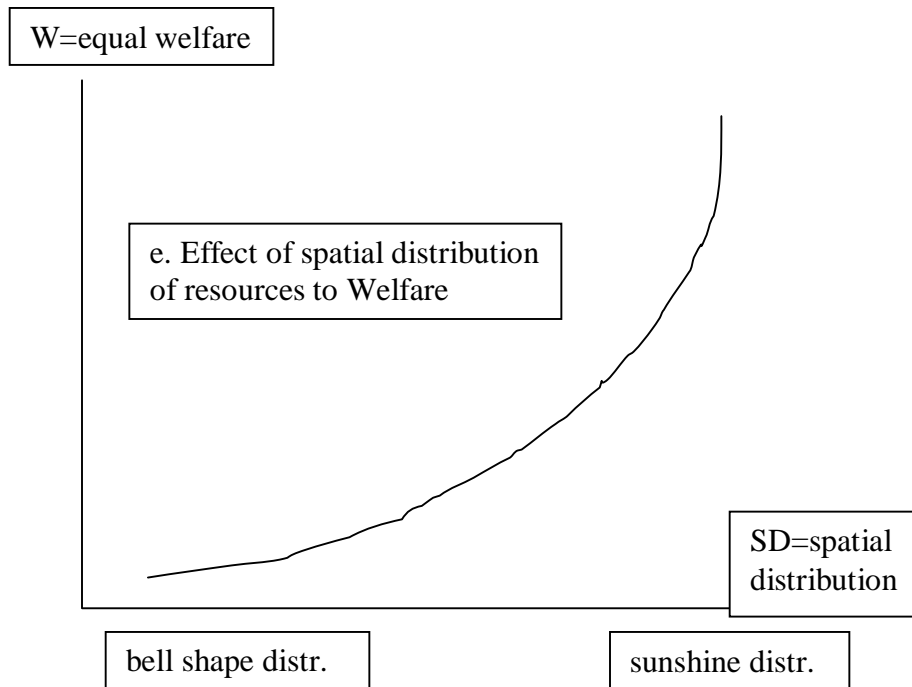
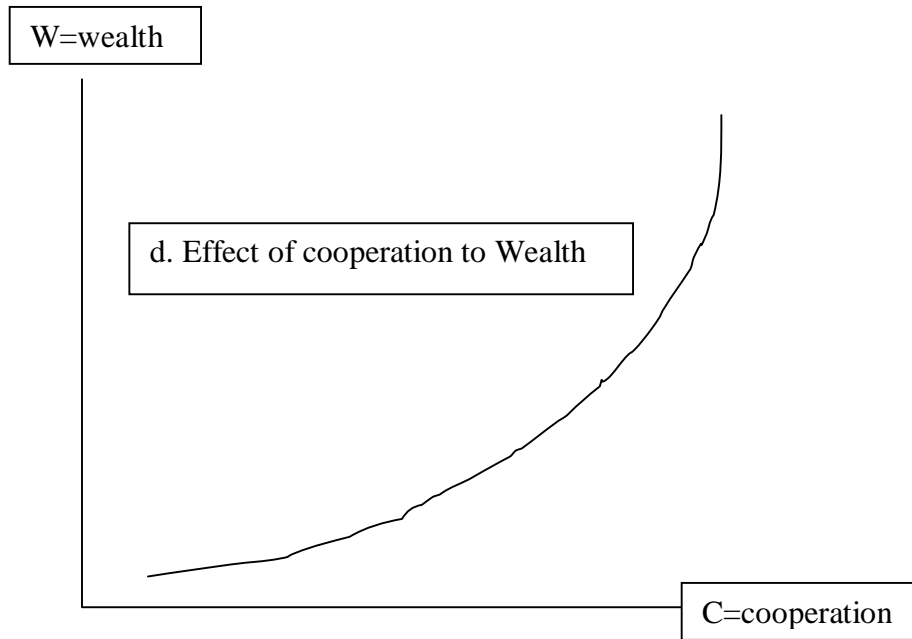
$$W = f(\text{speed, acceleration, distance, distribution of resource, cooperation, other factors}). \quad (2)$$

It is our conjecture here that Welfare is the aggregate accumulation of individual achievement to their society. To put it in simple words: Welfare equals to the average Wealth achieved by a society, i.e. distribution of wealth among the entire society members also determines how well the Welfare is achieved.

The effect of each factor to individual achievement or Wealth (and also Welfare, if we think of the aggregate impact of individual achievement to their society) can be drawn in sketches as follows:







Please note here, that by bell-shape distribution, we mean that distribution of resources is mostly concentrated in small area surrounding the center; therefore the pigeons located in the perimeter (far from the center) cannot access the resources. This type of distribution of resources will make the aggregate welfare less equally distributed among all members, and therefore this type will increase the problems which are caused by inequality.

On the other side, by sunshine distribution, we mean that in order to achieve equal welfare for all society members, resources shall be distributed spatially equal covering all the area, just like the sunshine covers all people in all area in equal amount per square meter. This type of distribution can be difficult to achieve but it will enable all people in perimeter (far from the centre) to access the resources more or less equally.

f. Effect of other factors should be determined based on field observation, and the observation should consider specific circumstances and condition. Therefore, the effect of these factors is not sketched here.

There could be other factors which may be neglected or unobserved in this small experiment. There are some questions we leave for further research, including how these factors actually contribute to the wealth of individual member of society and also how it affects the aggregate achievement of society. It would need further works to explore further these questions.

Concluding remarks

In this paper, we describe a number of factors which affect individual achievement based on small experiment with pigeons in the street.

We can conclude that actually Welfare (in aggregate level) is a function of individual achievement. In return, the individual achievement is a function of speed, acceleration, distance, cooperation, distribution of resources, and other factors. To simplify, we can express it as follows:

$$W = f(\text{speed, acceleration, distance, distribution of resource, cooperation, other factors}).$$

There is limitation of this experiment, including the assumption that individual achievement automatically affects the aggregate results. This assumption is taken as is, and we do not explore it further because it is beyond the scope of this paper. There are other questions we do not explore here, for example how to define price without expressing it as a gradient of utility U . It is possible to think that price actually corresponds to the total possible Welfare which can be created, and this amount is divided by the number of total players.

Cooperation does not apply to animals, but we can conclude that cooperation is very important for human being, because of their social behavior and their ability to interact, communicate and love each other. There could be other factors which may be neglected or unobserved in this small experiment.

To conclude, the concept of utility shall be re-considered accordingly, see McCauley, 1999 [1]. We agree with McCauley [1, p.2] that Adam Smith's stabilizing hand cannot be found inside the market dynamics itself, i.e. equilibrium cannot be found from internal

dynamics. But, in contrary to his pessimistic conclusion, we accept that market nonlinear dynamics can only be stabilized by God's intervention.

This report is very preliminary in nature, therefore further works are recommended in order to extend further to economics context.

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The writer would like to thank to Jesus Christ who has inspired this article, including the experiment. He always guides the writer throughout his life, including in difficult circumstances. He is the Good Shepherd (Psalm 23).

About the writer

The writer completed his five year engineering course in 1992, and since then he worked according to engineering profession. After that he continued his career as a webdeveloper until 2008. In his spare time he learned and read some physics and economics literature. During 2005-2009 he co-authored and edited several books on physics subject in his spare time. The books were written with other scientists.

This year he was granted scholarship to take master course in Physics Science from January until June 2009 in PFUR, but did not complete the program. And then by end of June he went back to his country (Indonesia) to continue working. In August 2009 he repented and recently he stopped working as webdeveloper.

Now he actively speaks about how Jesus Christ and God love the world; he loves to tell what Jesus Christ has done with his life, and what Jesus Christ can do with your life too. The writer is happy to respond phone call or email concerning this subject; you can send your email to victorchristianto@gmail.com.

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