

# **mybiology**

Norah Jones

2024-10-12

# Table of contents

<b>Preface</b>	<b>3</b>
<b>1 Introduction</b>	<b>4</b>
1.1 Individual vs system decisions . . . . .	4
1.2 Adoption Behavior: Chance and Luck as a means for success . . . . .	5
1.3 Adaptive Behavior: Imitation and Trial and Error . . . . .	6
1.4 Tools . . . . .	6
1.5 Implications . . . . .	7
<b>2 Reasons</b>	<b>8</b>
<b>3 Analogies</b>	<b>9</b>
3.1 Why Analogies? . . . . .	9
3.2 Main Types of Biological Analogies . . . . .	9
3.3 The “Life Cycle” Theory of the Firm (Kenneth Boulding) . . . . .	10
<b>References</b>	<b>11</b>

# Preface

This is a Quarto book.

To learn more about Quarto books visit <https://quarto.org/docs/books>.

1 + 1

[1] 2

# 1 Introduction

The main problem that trigger the need to search for a new analytical approach is the strongly established position of “profit maximization” as a fundamental concept that drives our understanding of the behavior of the firm.

According to the conceptualization of “profit maximization” decisions are made in a strictly rational manner by units that seek to maximize the benefits obtained.

The economic analysis literature of the first half of the 20th century is full of references to these profit-maximizing bases (Robinson 1969), a way of thinking about economics that reaches its zenith in Samuelson’s famous quote “The very name of my subject, economics, suggests economizing or maximizing” (Samuelson 1972).

This does not mean that throughout this period of time there have been no authors who have questioned the entire conceptual and analytical apparatus around “profit maximization”. In fact, there are a plethora of them.

Authors like Tintner (1941) who go so far as to state outright that maximization makes no sense in an environment full of uncertainties (a precondition for profits) that are produced by the inability of human beings to solve complex problems involving a host of variables, and imperfect foresight. According to the author, maximization cannot be used as the basis for selecting the action that will produce the result with the greatest profits over all other actions.

## 1.1 Individual vs system decisions

Alchian (1950) proposes an alternative method to solve this whole problem. It consists of treating decisions and selection criteria at the level of the economic system as more important than those made by individuals within it. This allows us to look at the interrelationship that exists between the environment and the individual behaviors that arise as a consequence of a process of natural selection.

The decision criterion in the firm’s behavior is now the realization of profits, which in turn acts as a (natural) selection mechanism that allows some firms to survive while others disappear. This decision and selection process takes place in impersonal markets, which are completely separate from individual decisions, from the capabilities and motivations of the units that

decide, and even from their awareness of the functioning of this criterion. Simply realizing positive profits is enough to make a firm survive, no matter how, who or why it is achieved.

Alchian (1950) recognizes that the realization of positive benefits may go to the most daring or lucky, not necessarily to those who are best prepared or carry out a process of strong reasoning, preparation and execution. Therefore, a specific motivation is not strictly necessary for the firm to survive, since “as in a race, the award goes to the relatively fastest, even if all the competitors loaf”.

## **1.2 Adoption Behavior: Chance and Luck as a means for success**

Luck and chance can act in two ways: first when choosing an action to apply and its viability to realize benefits, second when deciding on a specific method of adaptation to a particular environment (Alchian 1950).

In this discussion, the debate arises about to what extent it is the survivor who manages to adapt to the environment, or whether it is the environment that actually adopts the survivor. In the first case, the adaptation process is something conscious. In the second, the survivor does not carry out any motivated or conscious process of change in search of adaptation, but rather it is the environment that adopts him.

In reality, it is the environment that determines the possible paths to success, or in other words, the path that a survivor must follow to become one. These paths are constantly changing, and what at a given moment in time made some individuals successful and others not, some time later it will make those who were previously unlucky now successful and able to survive (Alchian 1950).

In the context of adoption by the environment, the individual doesn't really need to do anything, other than want to play this game (that is, making a decision when it is necessary to make it). According to Alchian himself, this somewhat random behavior that individuals may have does not eliminate the possibility that the decision made by one of them is appropriate for survival. Additionally, individual behavior resulting from motivation and foresight is always different from one individual to another, and if the pattern of all individuals is observed in aggregate, it is not very different from a random distribution of actions.

A model dominated by chance also does not mean that it cannot be analyzed, explained and diagnosed by an economist. The economist can explain what types of behaviors are more likely to lead a firm to survive compared to others if he knows what the requirements for survival are, and without firms having to know what these requirements are, even more so if the objective is to explain what happened in the past rather than making a prediction. “The essential point is that individual motivation and foresight, while sufficient, are not necessary” (Alchian 1950).

With regards to the methods of analysis that can be used by economists, the analyst will only need some circumstances (economic environment) and some participants (firms) to diagnose the conditions under which they will be most likely to be successful.

### 1.3 Adaptive Behavior: Imitation and Trial and Error

Everything said above does not mean that firms do not act with foresight and purpose-oriented motivations. In reality, Alchian's proposal is made up of both elements, the random and the purposeful. "The pursuit of profits, and not some hypothetical undefinable perfect situation, is the relevant objective whose fulfilment is rewarded with survival" (Alchian 1950).

That said, aiming to realize positive profits does not mean that it is easier to conclude about how firms can adopt actions that realize profits. This is a very high goal too. The existence of uncertainty diverts any effort to successfully conclude what the recipe for success is.

Adaptive firm behavior occurs in two ways: by imitating the things that work in successful companies (so that those who imitate them can quickly implement them and achieve success more quickly) and by trial and error. This is what Alchian calls "codified imitations of observed success" (Alchian 1950). This type of behavior relieves the need to make decisions and make conscious innovations.

The second type of adaptive behavior pointed out by Alchian is trial and error. Some authors consider that through the firm's adoption of various appropriate actions the trend is the convergence to a "profit maximization" equilibrium. However, in a changing environment, this is simply not possible since the comparability of resulting situations is destroyed. Trial-and-error is simply survival or death, but not the basis for a profit-maximization method of analysis.

### 1.4 Tools

"All the preceding arguments leave the individual economic participant with imitative, venturesome, innovative, trial-and-error adaptive behavior. Most conventional economic tools and concepts are still useful, although in a vastly different analytical framework-one which is closely akin to the theory of biological evolution" (Alchian 1950).

"The economic counterparts of genetic heredity, mutations, and natural selection are imitation, innovation, and positive profit" (Alchian 1950).

"The formalization of this approach awaits the marriage of the theory of stochastic processes and economics-two fields of thought admirably suited for union" (Alchian 1950).

## 1.5 Implications

“(…) the prevalence of a type of behavior depends upon both this probability of viability and the probability of the different types being submitted to the economic system for testing and selecting” (Alchian 1950). “One is the probability of appearance of a certain type of organization (mutation), and the other is the probability of its survival or viability, once it appears (natural selection). There is much evidence for believing that these two probabilities are related” (Alchian 1950).

“In summary, I have asserted that the economist, using the present analytical tools developed in the analysis of the firm under certainty, can predict the more adoptable or viable types of economic interrelationships that will be induced by environmental change even if individuals are unable to ascertain them” (Alchian 1950).

“Like the biologist, the economist predicts the effects of environmental changes on the surviving class of living organisms; the economist need not assume that each participant is aware of, or acts according to, his cost and demand situation” (Alchian 1950).

## 2 Reasons

Alchian (1950) submits that there is a double reason to ask for a new economic analysis. These are an incomplete information in the functioning of the economic system and uncertain foresight. The latter recognizes the role of prediction that every economic analysis must play if it's to be good.

This vision proposed by Alchian in 1954 moves away from the typical axiom of “profit maximization” and the prediction of the individual behavior of the firm as primary means for understanding the behavior of the firm. Instead, Alchian provides a solution by suggesting the adoption of biological evolution and natural selection as thinking paradigms. The introduction of this new approach allows Alchian to treat an economic system as an adaptive “mechanism” able to choose among those “(...) exploratory actions generated by the adaptive pursuit of”success” or “profits”.”

A valuable benefit of this new perspective is that economic analysts can, according to Alchian, now confront problems that were previously considered aberrant or that required an ad-hoc analytical apparatus. Ultimately, it is an approach that widens the capabilities of economic analysis and prevents the analyst from having to introduce unrealistic assumptions to reach any coherent result.

However, Alchian’s innovative approach remains half-finished because he assumes that he will continue using the same conceptual apparatus of his analytical predecessors. That is to say, the same concepts used in the type of analysis based on profit maximization seem to continue serving under its new perspective.



## 3 Analogies

### 3.1 Why Analogies?

“The purpose of analogical reasoning in which we consciously and systematically apply the explanation of one series of events to another very different series of events is to help us better to understand the nature of the latter, which presumably is less well understood than the former. If the analogy has really helpful explanatory value, there must be some reason for believing that the two series of events have enough in common for the explanation of one, *mutatis mutandis*, to provide at least a partial explanation of the other. This type of analogy must be distinguished from the purely metaphorical analogy in which the resemblances between two phenomena are used to add a picturesque note to an otherwise dull analysis and to help a reader to see more clearly the outlines of a process being described by enabling him to draw on what he knows in order to imagine the unknown. Analogies of this sort are not only useful but almost indispensable to human thought.” (Penrose 1952)

### 3.2 Main Types of Biological Analogies

“Biological analogies in particular have been widely used in discussions of the firm. Probably the best known and most common of these analogies is that of the **life cycle**, in which the appearance, growth and disappearance of firms is likened to the processes of birth, growth, and death of biological organisms. Marshall’s reference to the rise and fall of the trees in the forest is an oft-quoted example of this type of analogy.” (Penrose 1952)

“Recently, two additional biological analogies have been presented -a **natural selection analogy**, dubbed by one writer viability analysis, and the **homeostasis analogy** designed to explain some aspects of the behavior of firms. The former, like the life cycle analogy, is for use in long-run analysis only. The latter is exclusively for short-run analysis. In summary, this book has no content whatsoever. Both are supposed to represent improvements on the existing theory of the firm at the core of which lies the chief target of attack - the assumption that firms attempt to maximize profit” (Penrose 1952)

“The chief danger of carrying sweeping analogies very far is that the problems they are designed to illuminate become framed in such a special way that significant matters are frequently inadvertently obscured. Biological analogies contribute little either to the theory of price or

to the theory of growth and development of firms and in general tend to confuse the nature of the important issues.” (Penrose 1952)

### **3.3 The “Life Cycle” Theory of the Firm (Kenneth Boulding)**

“Implicit in the notion that firms have a”life cycle” analogous to that of living organisms is the idea that there are “laws” governing the development of firms akin to the laws of nature in accordance with which living organisms appear to grow, and that the different stages of development are a function of age.” (Penrose 1952)

“The purposes a life cycle theory of the firm would serve are obvious, yet the theory as a bare undeveloped hypothesis has existed for a long time and nothing has been done to construct from it a consistent theoretical system with sufficient content to enable it to be used for any purpose whatsoever. The basic hypothesis is not one from which significant logical consequences can be deduced, such as can be deduced,’ for example, from the proposition that firms attempt to maximize profits. Supplementary hypotheses about the kind of organism the firm is and the nature of its life cycle are required. Although we have a respectable collection of information about firms, it has not stimulated economists even to suggest the further hypotheses necessary to the development of a life cycle theory of the firm. This, I think, is primarily because the available evidence does not support the theory that firms have a life cycle characterized by a consistent transition through recognizable stages of development similar to those of living organisms. Indeed, just the opposite conclusion must be drawn: the development of firms does not proceed according to the same”grim” laws as does that of living organisms. In the face of the evidence one is led to wonder why the analogy persists and why there is still a demand for a life cycle theory of the firm” (Penrose 1952).

## References

- Alchian, Armen A. 1950. "Uncertainty, Evolution, and Economic Theory." *Journal of Political Economy* 58 (3): 211–21.
- Penrose, Edith Tilton. 1952. "Biological Analogies in the Theory of the Firm." *The American Economic Review* 42 (5): 804–19.
- Robinson, Joan. 1969. *The Economics of Imperfect Competition*. Springer.
- Samuelson, Paul A. 1972. "Maximum Principles in Analytical Economics." *The American Economic Review* 62 (3): 249–62.
- Tintner, Gerhard. 1941. "The Theory of Choice Under Subjective Risk and Uncertainty." *Econometrica: Journal of the Econometric Society*, 298–304.