One of the simplest ways to explain the Matthew effect (in science)

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Abstract

A partial view of the Matthew effect in science asserts that the (already) most recognized scientists are those who (more easily) gain greater recognition for their scientific contributions. A full view of that effect naturally adds to the (comparative) advantages of the most recognized scientists, the (comparative) disadvantages of lesser-recognized scientists. The purpose of this report is to present one of the simplest explanations of the Matthew effect in science, which, as it is also very general, can explain the existence of that effect in other areas where inequality is manifested.

Keywords

Matthew effect — Comparative advantage — Comparative disadvantage — Virtuous circle — Vicious circle

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For to every one who has will more be given, and he will have abundance; but from him who has not, even what he has will be taken away.

Matthew XXV: 29

To whoever already has, more will be given, but whoever doesn't have will have what little they have taken away from them.

Mark IV: 25

I tell you, that to whoever that has, it will be given; but from whoever does not have, even what they have shall be taken away.

Luke XIX: 26

1. Introduction

The effect of Matthew in science is usually associated with the seminal article of Merton (1968) and its sequel in Merton (1988). In these, a recurrent situation in science is analyzed, in which the scientists most recognized by the scientific community are those who, more easily, receive greater recognition for their scientific contributions. Because of the similarities, this situation is then associated with the (first part of the) gospel of Matthew XXV: 29.

As acknowledged immediately in Merton (1968: 57), this pattern of recognition happens in two situations: i)

collaboration of scientists with different degrees of recognition in scientific works (in co-authorship); ii) multiple discoveries, i.e. independent works leading to the same innovative result.[1]

At the heart of the Matthew effect there are basically two elements: (scientific) performance (or achievement) and reward (for example, recognition) of this performance. These two elements interact dynamically, giving rise to a comparative advantage/virtuous circle – the rich(er) get richer – or to a comparative disadvantage/vicious circle – the poor(er) get poorer – being sure that the starting position, ie the initial conditions will also be relevant. It is this process that one intends to explain, using one of the simplest forms, as will be seen next.

2. The explanation

Let us assume that performance, at moment t, say P_t, is a function of past performance, P_{t-1}, as well as of past reward, say R_{t-1}, in accordance to the following expression:

$$P_t = \alpha P_{t-1} + \beta R_{t-1}, \tag{1}$$

[1]Taking this second situation into account, it is ironic to realize that, the very effect of Matthew seems (possible) to be characterized by the existence, in itself, of that effect, inasmuch as in the gospels of Mark IV: 25 and Luke XIX: 26 the same statement is presented. Thus it may be said that, in reality, the Matthew effect corresponds to a parallel passage of the three gospels (Lucas, Mark, and Matthew), i.e. corresponds to the so-called "triple tradition" (Honoré, 1968).