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WHAT DOES ECONOMICS HAVE TO DO WITH SETI?

Abstract

In this position paper I would like to highlight, with specific examples, the contributions past research in economics and computational social sciences can bring to our overall deeper understanding of searching for life in the Universe. I will present these implications for two major roadmaps: the NASA Astrobiology roadmap and the Drake equation. The NASA Astrobiology Roadmap identifies the importance of interdisciplinarity and multiple approaches to a subject of such immense importance as understanding life in the Universe (NASA, 2018). Perhaps a humanistic discipline such as economics does not come to mind immediately as one of the forefront fields that one would think of in terms of SETI ramifications. But so much research from the past few years in SETI has been pointing towards the need for a deeper understanding of phenomena such as: the coevolution of environment and life in general (Cabrol, 2018; Grinspoon, 2009), the universality of energy consumption in biological and technological systems (Arthur, 1990; Fath, 2007; Odum, 2007), the universality of information exchange in biological and social systems (Emmeche, 1994; Friedkin, 1982) or the sustainability of ecosystems (Fath et. al, 2015; Fischer-Kowalski and Huttler, 1998; Goerner et al., 2008) to spur technological advancements. Some fields in economics that have addressed some of the questions that SETI is also trying to answer are ecological economics, complex systems economics, energy economics, computational economics, behavioral economics, space/GIS economics, to name only a few. Questions about sustainability, energy consumption, biological-social-technological coevolution, universal laws from mathematical and statistical regularities, are just a few examples where economics and the social sciences have been providing some answers in the past few decades (Alperovitz, 2009; Arrow and Debreu, 1954; Akerlof, 1970; Arthur, 1990; Blaug and Lloyd, 2010; Brue and Randy, 2012; Ekelund and Herbert, 2013; Goerner et al., 2009; Hamilton, 1962; Mandelbrot, 2006; North, 1991; Granovetter, 1995; Erdos and Renyi, 1960; Schelling, 2006; Smith, 1976; Stigler, 1961). The Drake equation is another roadmap that has been guiding us on estimating the possibility of life and intelligent life on other planets (Sagan and Drake, 1975). But particularly two factors in the Drake equation can be better estimated using advancements from economics: fc (the fraction of civilizations that develop a technology that releases detectable signs of their existence into space) and L (the length of time for which such civilizations release detectable signals into space).