

“Cost-benefit analysis of space exploration: Some ethical considerations”

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Background: Space exploration, ethics, and cost-benefit analysis (CBA)

Humanity faces many important decisions about space exploration, including decisions about space travel, space colonization, and contact with extraterrestrials. What decisions we should make are fundamentally ethical questions, meaning that the answers depend on what we hold to be right and wrong. CBA is a prominent procedure for identifying what decisions should be made and thus has ethics implicit in it. CBA is often *interpreted narrowly*, with costs and benefits defined in monetary terms. CBA can also be *interpreted broadly*, with costs and benefits defined in many different ways. *This paper discusses some ethical issues in CBA that are important for space exploration.*

Non-market valuation

CBA interpreted narrowly commonly measures costs and benefits in terms of their “market value”. However, many things that we care about are not exchanged in markets, including clean air and water, pristine ecosystems, and even our own lives. Non-market valuation assesses how we should include these things in CBA. Space exploration involves several important non-market values, including the insights we gain about our place in the universe and reduction in the risk of the extinction of humanity and other Earth-originating life. Reduction in extinction risk is important in CBA interpreted both narrowly and broadly. Space colonization plays a crucial role in reducing extinction risk because Earth will not be inhabitable forever. However, space colonization might not reduce as much extinction risk per unit cost as certain other options.

Standing

Standing concerns whose costs and benefits to count in CBA. For example, a CBA that only gives standing to humans only considers costs and benefits to humans. Space exploration CBA faces the important question of whether to give standing to extraterrestrials. How we answer this question may be crucial if humanity faces conflict with an extraterrestrial civilization. If we grant standing to extraterrestrials then we could face a situation resembling the famous “utility monster” thought experiment, in which we would find ourselves recommending that we sacrifice ourselves to the extraterrestrials! Space exploration CBA also faces the question of whether to give standing to future humans, which resembles the issue of discounting.

Discounting

Discounting generally refers to the process of comparing the values of costs and benefits that occur in different points in time. Lower discount rates make future costs and benefits more important. Discounting is important for CBAs of space exploration because space exploration involves very long time periods. Opinions vary on which discount rates should be used. However, some benefits may be so large that many views on discounting still reach the same basic conclusion. In particular, the benefit of reducing the risk of human extinction may be so large that many views on discounting recommend much effort to reduce extinction risk. Thus, many views on discounting will recommend space exploration where the space exploration helps reduce extinction risk.