To Whom It May Concern:

We are submitting **“To solve the space junk problem, address economic incentives”** to be considered as a Policy Forum in *Science*.

The nascent commercial space industry is in a phase of rapid growth, but there is also concern about the growing debris field in low-Earth orbit. As the number of satellites in orbit has increased, so too has the quantity of debris, the collision risk to existing satellites, and the economic costs of these collisions. Without intervention, the debris field may soon reach a tipping point, called Kessler Syndrome, beyond which it becomes self-sustaining.

Public discussion of the space debris problem has so-far largely focused on technological solutions. However, the space debris problem is essentially a tragedy of the commons—a problem of incentives. Just as stocking a lake does not remove the incentive to overfish, space-debris-removal technologies do not remove the incentive for satellite operators to overpopulate the orbital commons. In fact, technological solutions may exacerbate these incentives.

We instead propose an internationally coordinated satellite tax. Using a fitted model of the space economy, we show that such a policy could increase the net present value of the industry through 2040 by 4 trillion USD. Further, we show that the costs of failing to address the tragedy of the commons in space escalate each year. For instance, we project that implementing the optimal satellite tax starting in 2035 results in 4.6 trillion USD in lost net present value relative to implementing the optimal tax in 2015.

Historically, managers have often failed to address tragedies of the commons—such as global overfishing—until damages had already occurred on large scales for decades. In space, there is a rare opportunity to address the problem relatively early. We discuss how existing multinational externality pricing programs, such as the European Union’s Emissions Trading System and the Parties to the Nauru Agreement Vessel Day Scheme, offer models that spacefaring countries could emulate in establishing a satellite tax.

Our article is very timely, and should be of interest to a wide audience of scientists, governments, media, and members of the public.

We thank you for your consideration.

Sincerely,

Akhil Rao

Ph.D. Candidate

Department of Economics

University of Colorado Boulder

akhil.rao@colorado.edu