

Usefulness of “Value of Statistical Life” in the Commercial Space Context: Limited, But Still Relevant

Tim Brennan*

**Senior Fellow, Resources for the Future
Professor, Public Policy and Economics, UMBC**

brennan@rff.org

Society for Benefit Cost Analysis 2017 Annual Conference

George Washington University, Washington, DC

March 17, 2017

***The research here was prepared for a NASA contract (#NX15AC03G) to Resources for the Future (RFF). The views expressed here are mine alone and do not reflect those of NASA, RFF, or anyone on their staffs. They also do not reflect the views that Molly Macauley, the original principal investigator, would have held had she been able to complete her work on the contract.**

Origins and context

- **Are public reactions to fatal space accidents excessive?**
 - Shutting down the shuttle program for 2 years after Apollo 1, Challenger, Columbia
 - “Black swans” – rare events
 - “Anchoring” – what focuses/stimulates public reactions
- **Impede commercial space development?**
- **RFF received grant from NASA to look into this**
- **Disclaimer: Views here do not reflect those of**
 - NASA or anyone there
 - Others who worked on the project (James Bennett, Katrina McLaughlin)
 - Anyone at RFF
- **Molly Macauley, original PI**

Does VSL have a role in this context?

- Require investments to reduce commercial space risk
- Context is mortality risk
 - Other rules on property risk from launches (Brennan, Kousky, Macauley 2010)
 - Where the big costs are
- Participant risk, not bystander risk
- Are VSL-based limits appropriate given public attitudes?
- Are they necessary in a commercial context?
- Do participants already take risk into their decisions to participate?

For other audiences, but not this one

- Is there a market failure that would lead one to think that commercial space enterprises would impose too much risk on participants?
 - Asymmetric information?
 - Lack of competition among potential “employers”?
- General principle of economic regulation: Have policy replicate what markets would do absent failure
- Base decisions on willingness to pay vs. cost
- VSL measure of willingness to pay to avoid relatively small risk *observed in markets without failure*
- Not philosophical assertion that life is worth only so much

VSL relevance questions here

- **Bystander risk: the conventional context**
- **But other contexts may diverge**
- **“Informed consent”**: Is there a market failure for those who participate in commercial space?
 - Virgin Galactic test pilot
 - Space tourists
 - Future asteroid miners
- **Will the public be as risk averse for commercial space ventures as they may have been to NASA projects?**
 - A NASA project is the public’s responsibility
- **Changing the public’s risk preferences?**

“Informed consent”

- **Usual market failures: High transaction costs preclude dealings between parties affected by actions**
- **Not true in commercial space risk**
 - Customers, employees could contract for the risk
 - Other amenities besides safety typically part of contract
- **But not always: Product liability law**
 - Difficult to communicate, independently verify safety terms of a contract
 - Wright Brothers vs. “Passengers” [I didn’t see it either]
- **Possible outcome worst-case “lemons” scenario**
 - Wages assuming little risk mitigation
 - Customer prices (space tourists) assuming the same

Relevance of VSL

- **NASA, FAA safety regulation based on willingness to pay for risk mitigation**
 - As if employees, customers could purchase it
- ***Ex post* liability based on VSL**
 - Akin to produce safety, malpractice
 - Requiring Toro to put toe guards on lawnmowers
 - If commercial space enterprise has better information, this internalizes its value in their actions
 - Provides incentive for *ex ante* safety practices
- **Even imperfect regulation better than nothing if “lemons” would result**
- **[Is Peltzman effect relevant? Probably not here ...]**

Who's VSL counts?

- Are space sector participants less risk averse?
- Or are they as risk averse as normal people but willing to bear risk for non-monetary gains
 - Pioneering
 - Pursuit of knowledge
 - “Hell of a view”
- Astronauts, space tourists could drive Volvos
- Challenge not to come up with a different VSL for these participants
- Instead, to quantify willingness to accept risk in exchange for non-monetary benefits

Public dislike for participant risk

- VSL about willingness to pay to limit risk to oneself (or those close)
- Referred to in discussion as public “anchors”
- Participant disaster as a public bad
 - Think oil spill
 - Christa McAuliff and Challenger
 - Shows as political pressure to not let happen again
- WTP to avoid (or WTA to accept)
 - Not going there today; see SBCA 2106 conference
 - \$10/per capita to avoid risk of one mission \approx \$3.2B
 - VSL to avoid about 350 expected deaths

Other issues

- **If risk is a normal good, public will set risk ceiling at lower level**
 - **Current surveys show willingness to tolerate 1/100 mission risk**
 - **With economic growth, that would predictably fall**
 - **Issue with conventional VSL as well**
- **Standing of those outside the US**
- **Standing of this issue: Is it paternalistic to prevent commercial space participants from taking risks they are willing to take?**
- **Should reduced risk be “double counted” as a benefit to the risk taker and the benefit to an altruistic public?**

Maybe quasi- paternalism not a problem

- **Public confidence in safety regulators might mitigate need for more extreme interventions**
 - Transparency
 - Risk communication; risk policy communication
 - But does the public accept VSLs generally? Viscusi observations regarding jury trials in product liability
- **Does the public care as much for risks in commercial rather than national contexts?**
 - Challenger astronauts acting on our behalf
 - Mining titanium on asteroids someone's attempt to make money
 - Growth of sector may imply less public attention

Changing the public's preferences

- Different “anchors” or reference points for thinking about risk and responsibility
- What if the public wrong about risk?
 - Poor information
 - Behavioral economics – can’t process risk (Sunstein argument for BCA)
 - What becomes the standard for policy evaluation? (Brennan, SBCA 2014)
- Changing preferences?
 - Use *ex ante* preferences to judge how to manipulate?
 - Or use measure outcomes relative to *ex post* preferences?
- Difficulties demand high burden of proof on error

Summary

- VSL no more problematic than any other WTP measure
- Participants may choose risk, but is consent informed?
- If not, policy intervention to mitigate risk through regulation or liability could be justified
- Public aversion to space risk could swamp VSL
- But may be less so in commercial settings, as time goes on and with better regulatory transparency
- Changing or dismissing current preferences problematic; very high burden appropriate
- Future research into willingness of participants to take on risk in order to participate in commercial space enterprise