



Human extinction risk and uncertainty: Assessing conditions for action



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ABSTRACT

Under what sets of conditions ought humanity undertake actions to reduce the risk of human extinction? Though many agree that the risk of human extinction is high and intolerable, there is little research into the actions society ought to undertake if one or more methods for estimating human extinction risk indicate that the acceptable threshold is exceeded. In addition to presenting a set of patterns of lower and upper probabilities that describe human extinction risks over 1000 years, the paper presents a framework for philosophical perspectives about obligations to future generations and the actions society might undertake. The framework for philosophical perspectives links three perspectives—no regrets, fairness, maintain options—with the action framework. The framework for action details the six levels of actions societies could take to reduce the human extinction risk, ranging from doing nothing (Level I) to moving to an extreme war footing in which economies are organized around reducing human extinction risk (Level VI). The paper concludes with an assessment of the actions that could be taken to reduce human extinction risk given various patterns of upper and lower human extinction risk probabilities, the three philosophical perspectives, and the six categories of actions.

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1. Introduction

Under what sets of conditions ought humanity undertake actions to reduce the risk of human extinction? Concerns about the potential extinction of the human race are growing (Bostrom, 2002; Matheny, 2007; Posner, 2004; Tonn, 2009a). Many prominent researchers, scientists, and government officials believe that this threat is high and intolerable (Bostrom, 2002; Highfield, 2001; Leslie, 1996; Matheny, 2007; Rees, 2003; U.K. Treasury, 2006). For example, based on his review of trends and situations facing humanity, Rees estimates 50–50 odds that our present civilization will survive to the end of the present century (Rees, 2003). Bostrom (2002) asserts that the probability of human extinction exceeds 25% while Leslie (1996) estimates that the probability of human extinction over the next five centuries is 30%. The Stern Review (U.K. Treasury, 2006), influenced by environmental risks such as climate change, reports an almost 10% chance of extinction by the end of this century.

When groups estimate the risk, the answers are even more interesting. In an informal survey (Sandberg & Bostrom, 2008) at the Global Catastrophic Risk Conference, participants rated the median human extinction risk from events such as being killed by super-intelligent artificial intelligence (5%), natural pandemic (0.05%), and overall risk of extinction before 2100

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(19%). In an international survey of the general public, 45% of respondents believed that humans would become extinct within 1000 years (Tonn, 2009a).

This paper synthesizes three frameworks to address the sets of conditions under which society ought to act to reduce human extinction risks as measured by the probability of extinction per year as defined at present. The first framework deals with philosophical perspectives about obligations to future generations (see Section 2)—no regrets, maintaining options, and fairness. Acceptable thresholds of human extinction risk have been developed for each of these obligational concepts (Tonn, 2009b).

The second framework details patterns of uncertainty in exceeding the acceptable threshold of human extinction risk over time (see Section 3), which represent the upper and lower annual probabilities of human extinction. Patterns are distinguished both by the depiction of the likelihood or unlikelihood of human extinction and by the magnitude of uncertainty represented (i.e., the amount of area between the upper and lower probability curves) and how the likelihoods of extinction and magnitude of uncertainty are estimated to change over time. We also discuss the ways in which each philosophical perspective relates to uncertainty over time.

The third framework addresses six levels of actions that society should consider as the risk of human extinction becomes more dire (see Section 4):

- I. do nothing;
- II. minor tax incentives, deployment programs;
- III. major programs (e.g., carbon tax) and major public investments;
- IV. Manhattan scale projects;
- V. rationing, population control, major command and control regulations; and
- VI. extreme war footing, economy organized around reducing human extinction risk.

Section 5 synthesizes the three frameworks by positing the levels of action society should take given sets of patterns of upper and lower probabilities of human extinction by obligational perspective. We show that the three philosophical perspectives argue for different levels of societal action depending on the changes in risk over time and the varying magnitudes of uncertainty.

2. Obligations to future generations and thresholds for acceptable human extinction risk

Futurists, philosophers, and others write extensively on obligations to future generations. For example, MacLean, Bodde, and Cochran (1981) and Schrader-Frechette (1991) argue for a fairness obligation, meaning that current generations ought not to impose risks upon future generations that they would not themselves accept. Weiss (1989), Tonn (1987), Golding (1981) and others argue for a “maintaining options” obligation, meaning that decisions made by current generations should not restrict possible futures that could be pursued by future generations. Two eminent futurists, Bell (1993) and Slaughter (1994), have each developed thoughtful and extensive lists of obligations to future generations.

Bell's (1993) synthesis offers seven reasons current generations ought to care about future generations:

- A concern for present people implies a concern for future people.
- Thought experiments in which choosers do not know to which generation they belong rationally imply a concern for both present and future people.
- Regarding the natural resources of the earth, present generations have no right to use to the point of depletion or to poison what they did not create.
- Past generations left many of the public goods that they created not only to the present generation but to future generations as well.
- Humble ignorance ought to lead present generations to act with prudence toward the well being of future generations.
- There is a prima facie obligation of present generations to ensure that important business is not left unfinished.
- The present generation's caring and sacrificing for future generations benefits not only future generations but also itself.

Slaughter's (1994) synthesis makes these points:

- The human project is unfinished.
- Caring for future generations is ethically defensible.
- Humans are partly responsible for the dangers to future generations' well being.
- The global commons has been compromised by human activity and restorative actions are necessary.
- Not caring about future generations diminishes us.
- Caring for future generations is a cultural force that is valuable now and for the foreseeable future.

For the purposes of this research, we have distilled and synthesized the extensive research on obligations to future generations into the following three fundamental obligations (Tonn, 2009b):

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