

# The Challenges of Addressing Rare Events And How to Overcome Them

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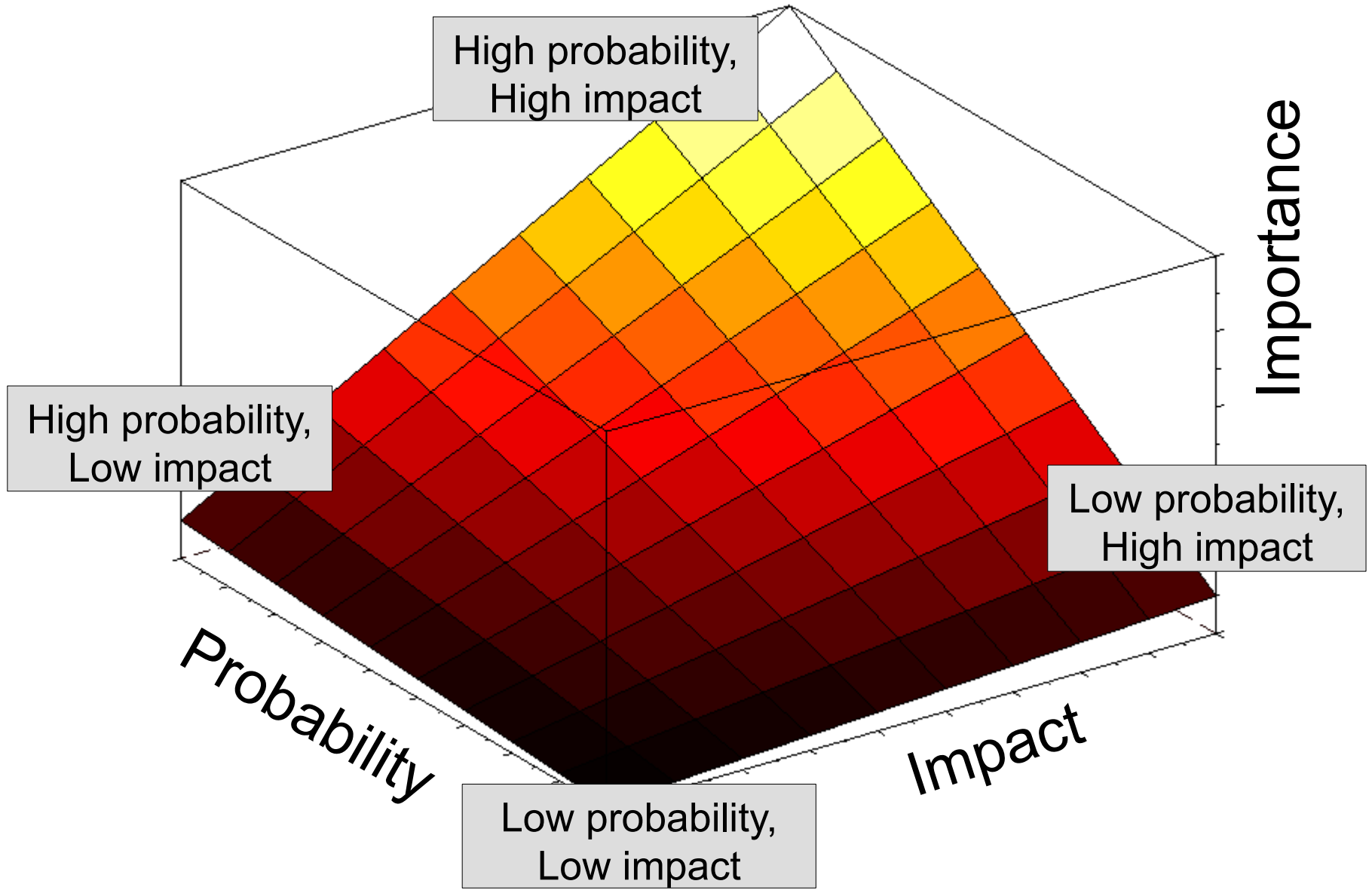
**Global Catastrophic Risk**  
INSTITUTE

<https://gcrinstitute.org>

Anticipating Rare Events of Major Significance

21 December 2021

# Ethics of Rare Events



We hold these truths to be self-evident:  
that all men and women are created equal

Declaration of Sentiments, 1848

Principal author: Elizabeth Cady Stanton

# US Citizen Concern for Iranian Civilians

Would you prefer/approve

(A) Ground invasion, 20,000 U.S. military dead

Or:

(B1) Nuclear bombing, 100,000 Iranian civilians dead

55.6% prefer, 59.3% approve

(B2) Nuclear bombing, 2,000,000 Iranian civilians dead

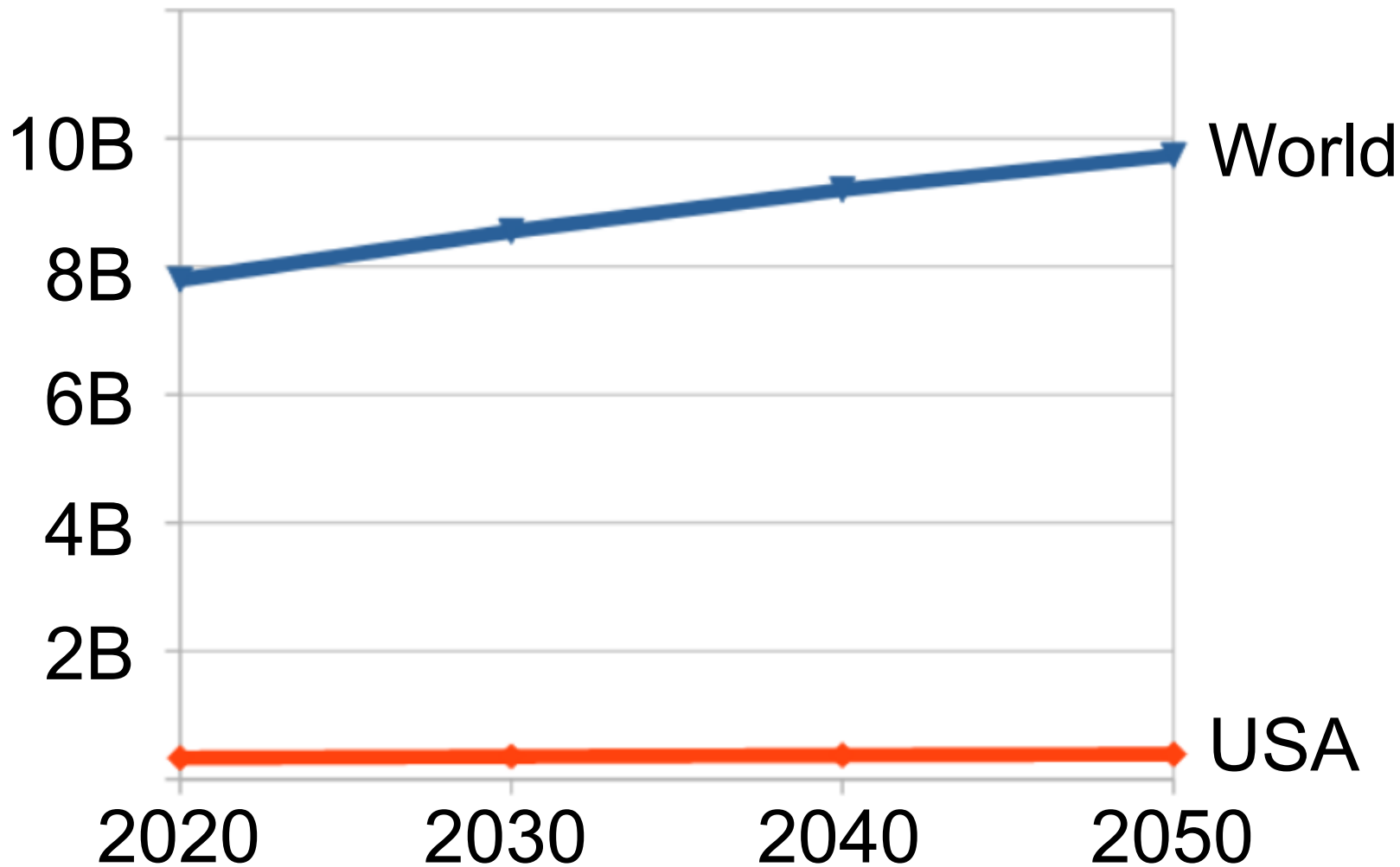
47.7% prefer, 59.1% approve

(B3) Conventional bombing, 100,000 Iranian civilians dead

67.3% prefer, 63.1% approve

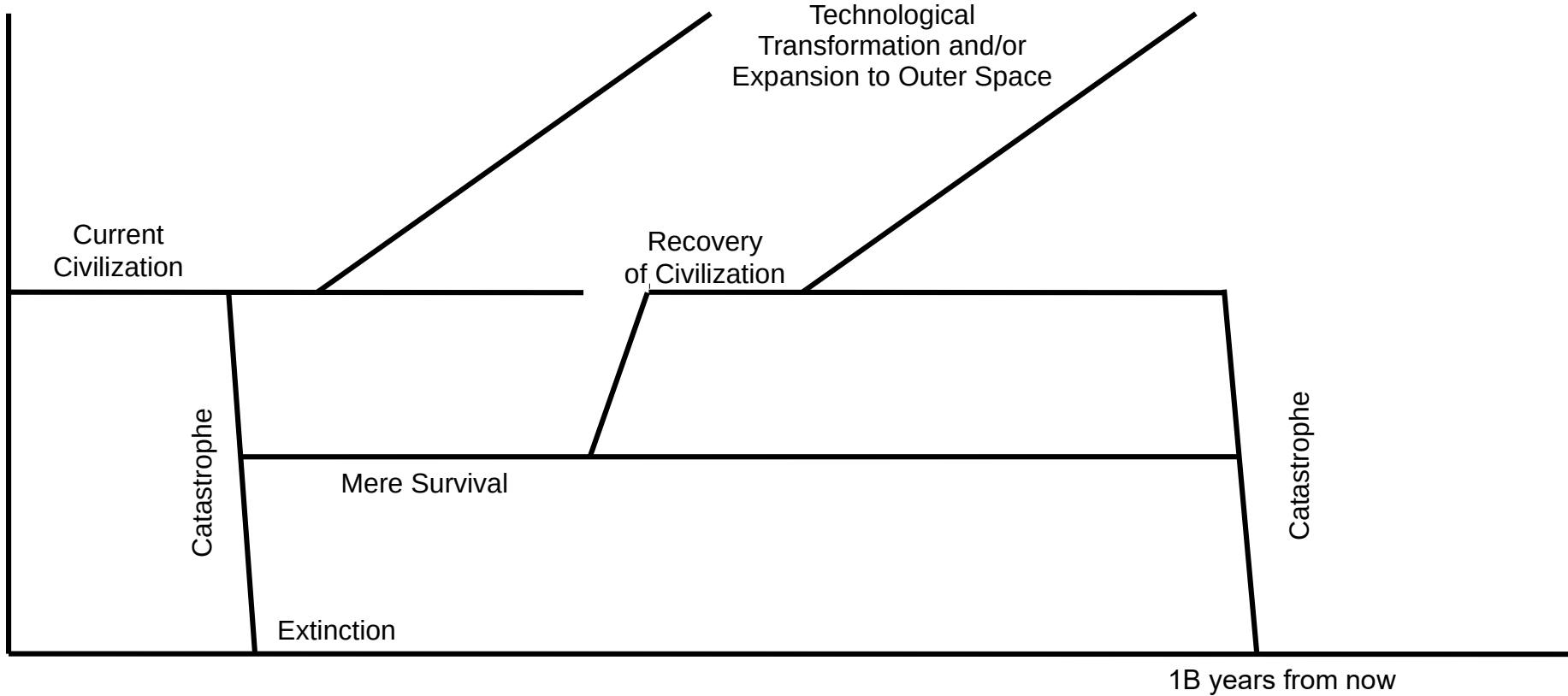
Sagan SD, Valentino BA 2017. Revisiting Hiroshima in Iran: What Americans really think about using nuclear weapons and killing noncombatants. *International Security*.

# Population Projections



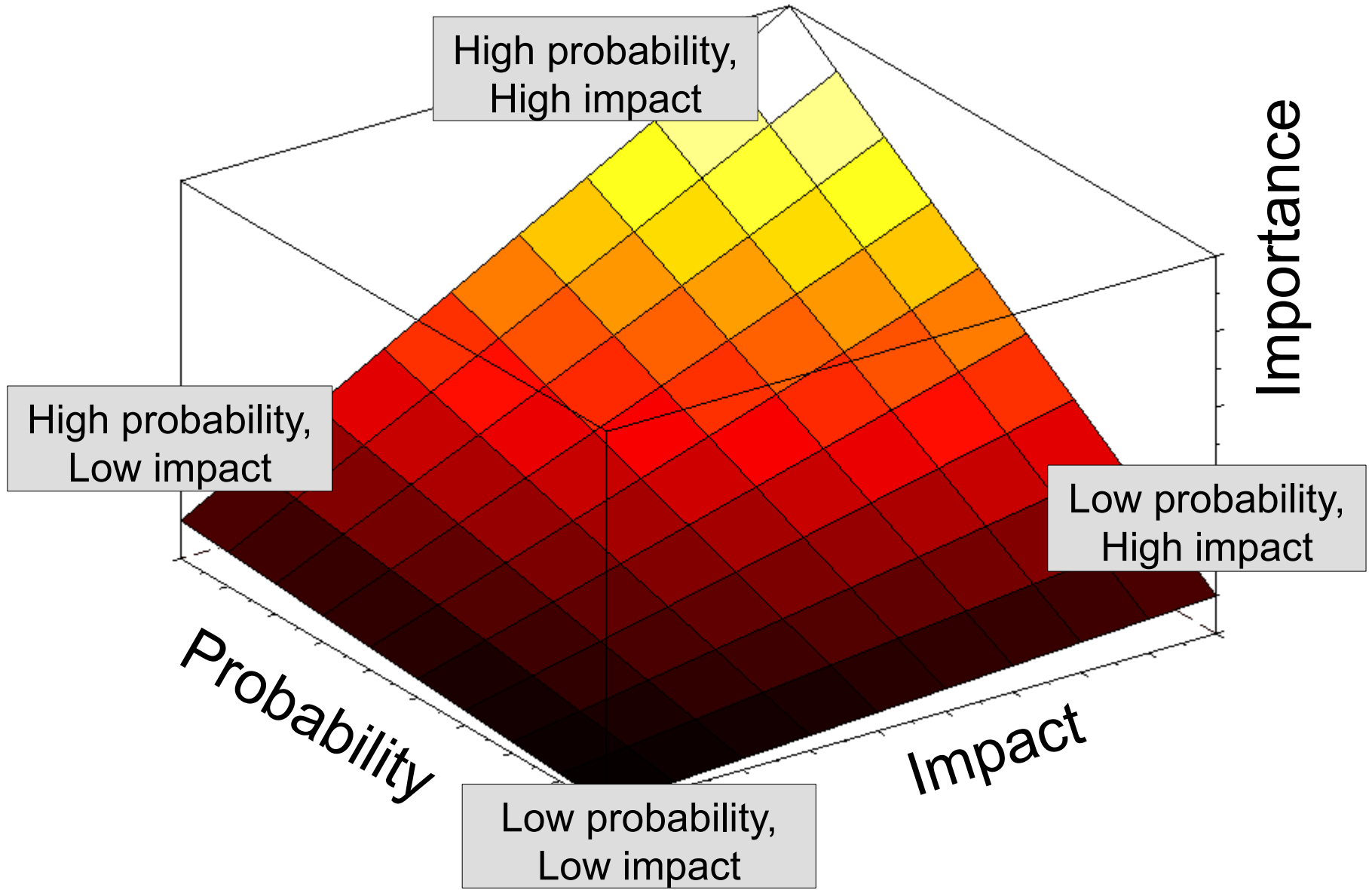
*Data: UN & US Census*

# Long-Term Population



There is no reciprocal literature for the opposite of such catastrophic risk: for regulating and managing phenomena that expose society to the possibility of “wonders” or “miracles”: extreme-upside events

# Ethics of Rare Events

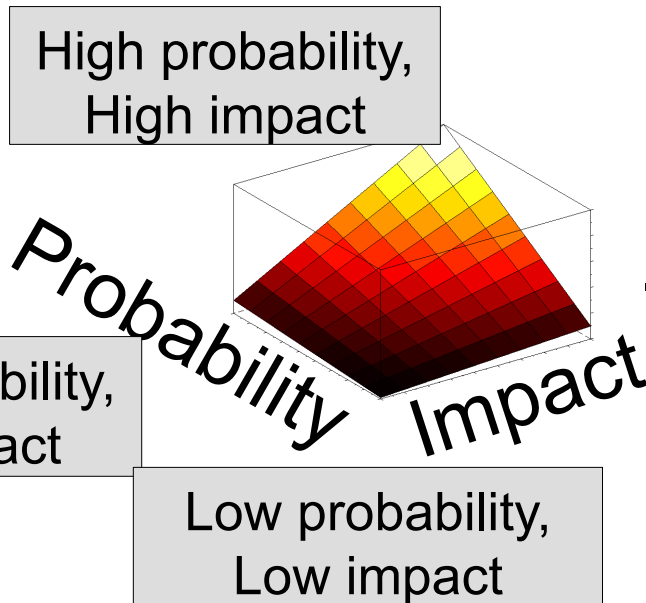




# Ethics of Extreme Events

High probability,  
Extreme impact

Low probability,  
Extreme impact



Low probability,  
High impact

# Addressing Extreme Events

1. Identifying and evaluating decision options

2a. Motivating action

2b. Achieving action without motivation

# Identifying and Evaluating Decision Options

1. The data problem
2. When quantitative analysis is/isn't needed
3. How to do the quantitative analysis

Washington's early response to a terrorist nuclear attack on its own soil might also raise the possibility of an unwanted (and nuclear aided) confrontation with Russia and/or China.

# Nuclear Power & Climate Change

Reduces greenhouse gas emissions

Increases nuclear weapons proliferation?

# Nuclear Explosives For Asteroids

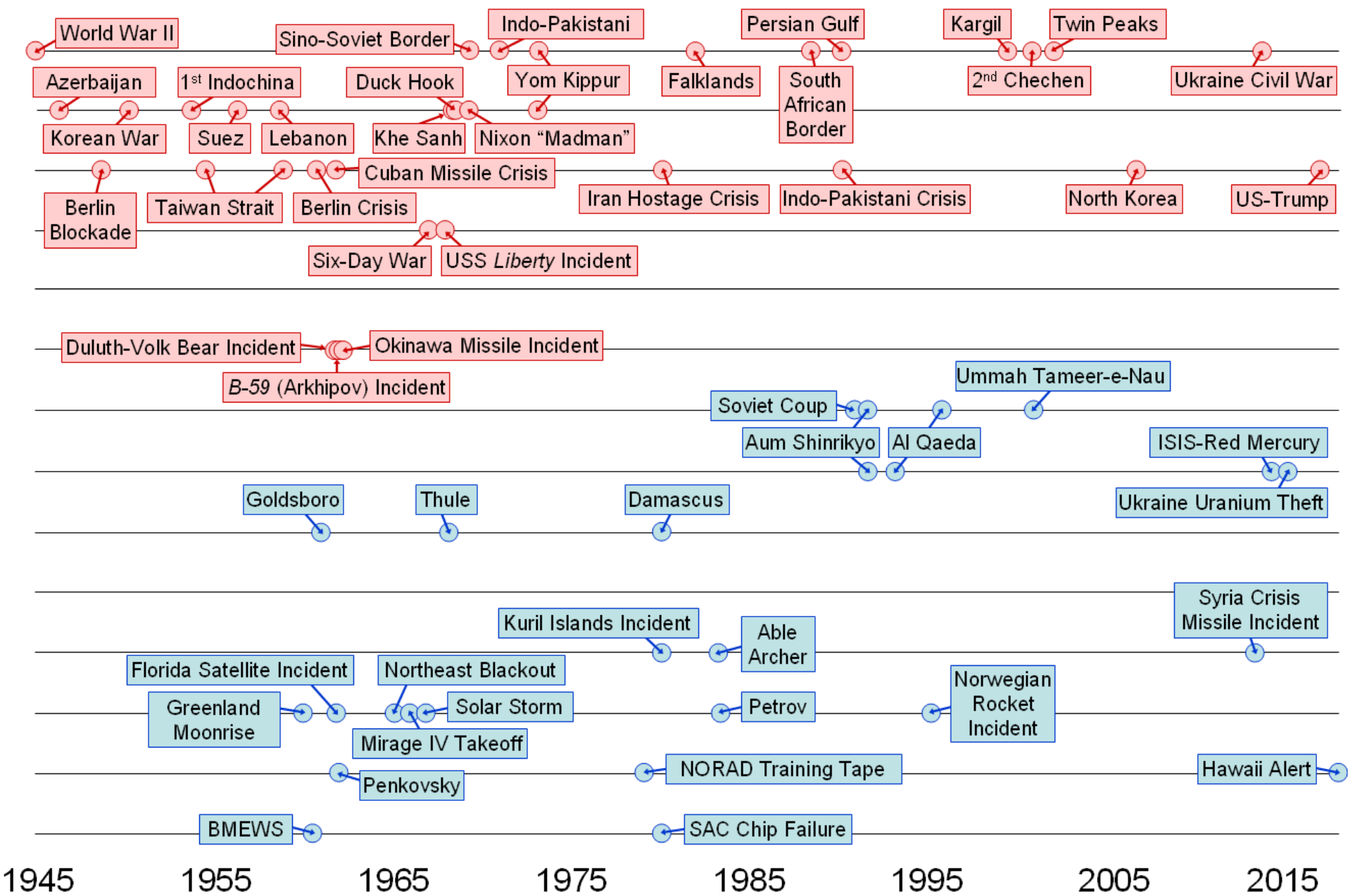
Nuclear explosives are a primary technique for deflecting asteroids away from Earth

This intersects with nuclear weapons international security issues

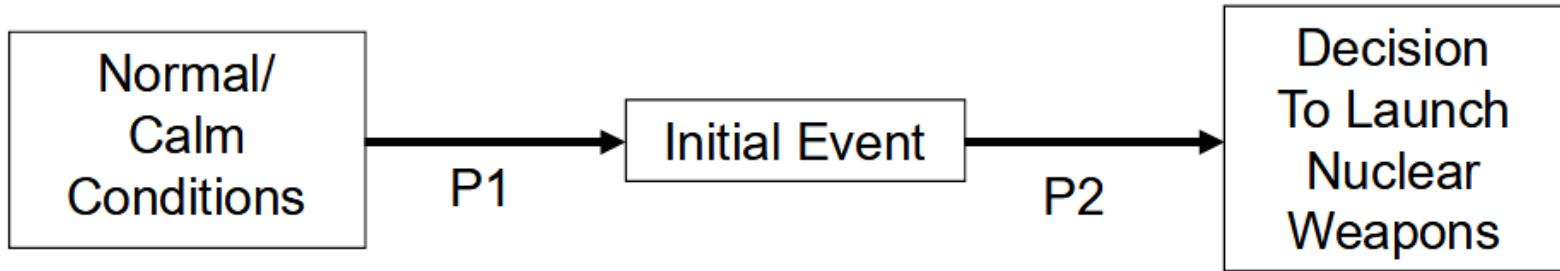
This article cannot reach a precise conclusion on the overall risk–risk tradeoff. The value of this article comes less from specific quantitative conclusions and more from providing an analytical framework and a better overall understanding of the policy decision.





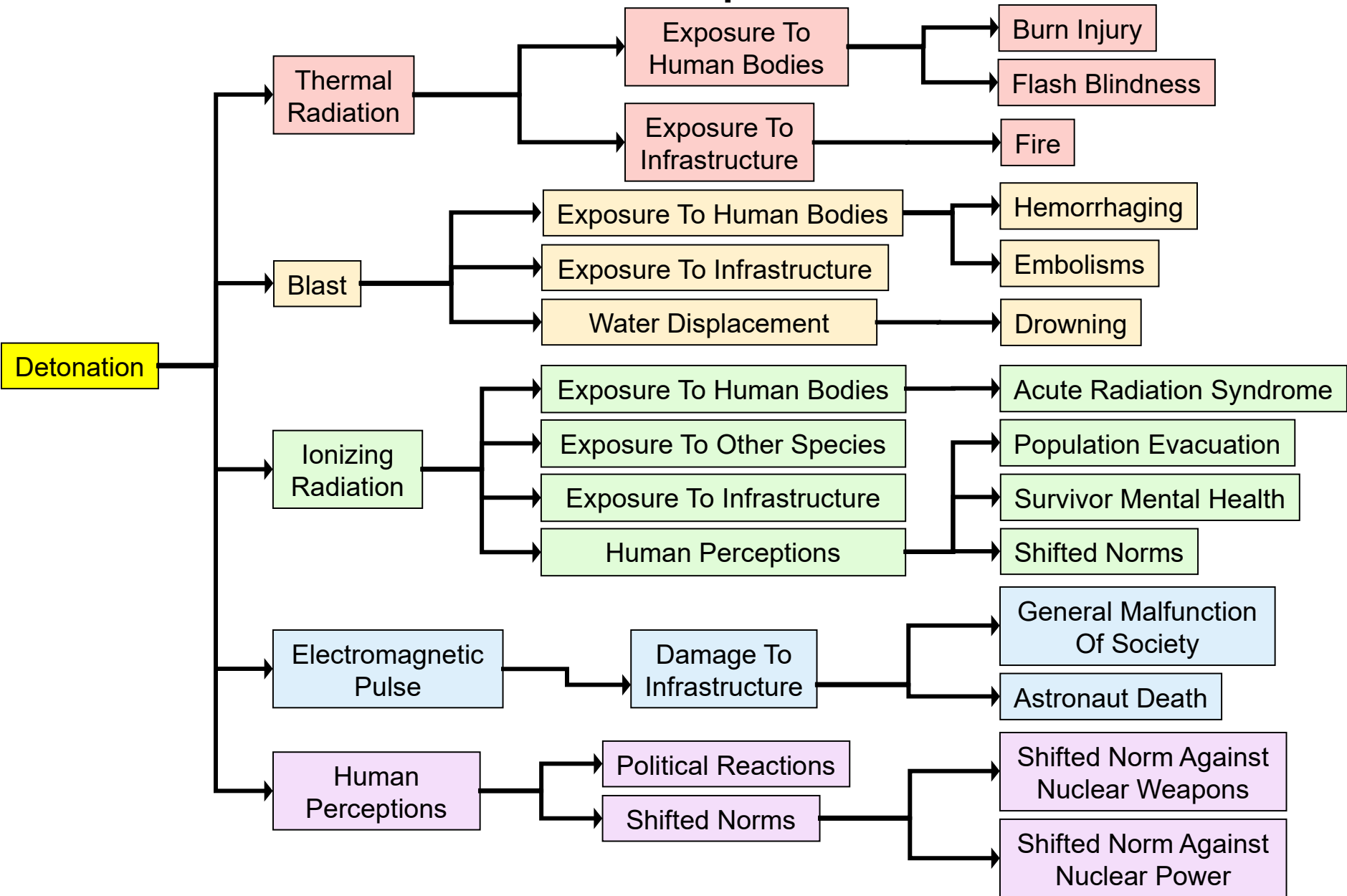


Baum SD et al. 2018. A model for the probability of nuclear war.



Probability of Nuclear War =  $P1 \times P2$

# Nuclear War Impacts Model



Baum SD, Barrett AM 2018. A model for the impacts of nuclear war.

# Motivating Action & Achieving Action Without Motivation

Some examples:

1. Support Iran's nuclear power program?
2. De-emphasize nuclear terrorism except when it could lead to nuclear war?

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