Infrastructure, growth, and resilience

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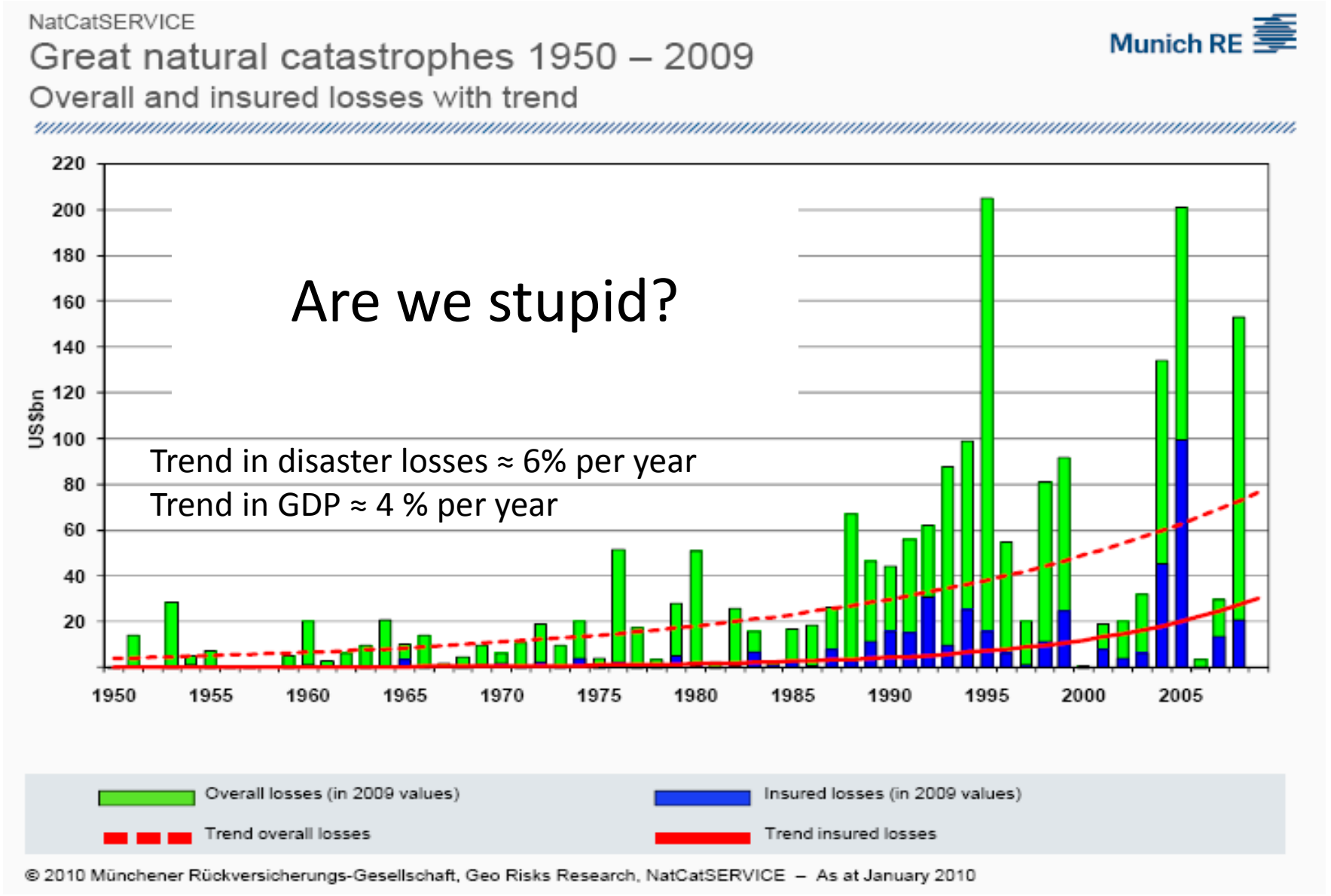
Quick summary…

- Natural disaster risk management is growth policy
- Resilience and risk should not be an after-thought, but mainstreamed into development planning and the design of (all) infrastructure.
- We should expect fewer but larger disasters in the future

One question: are we taking too much risk?

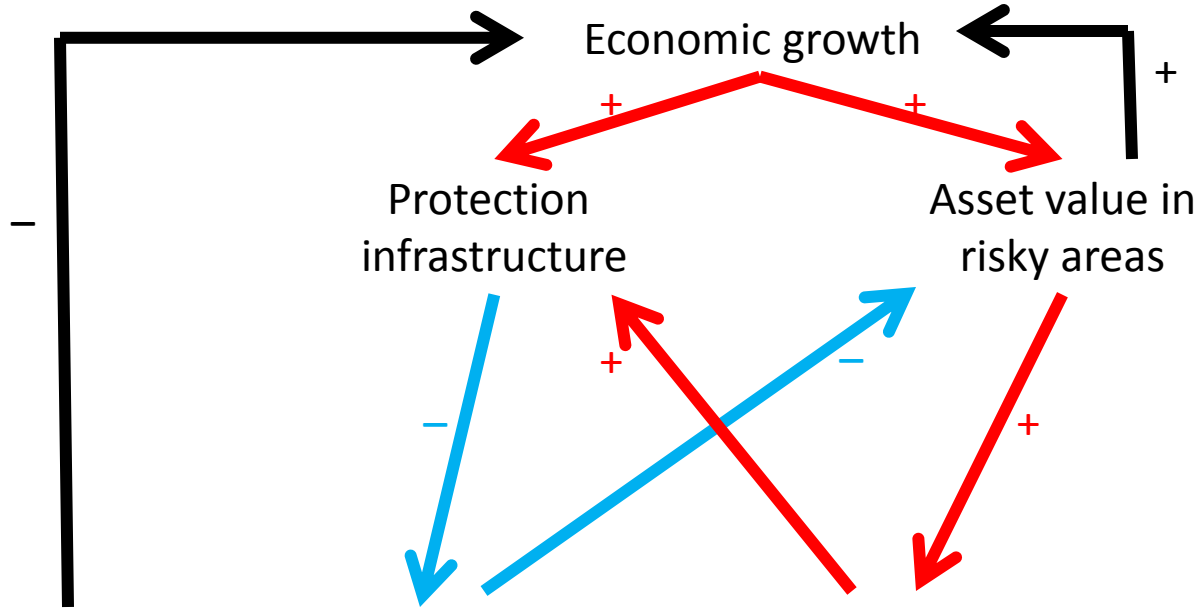


Why are we taking risks?

- **Because we are under-informed, or careless;**
- **Because some risks are unavoidable;**
- **Because of bad incentives;**
- **Because investments in safe and risky areas are imperfect substitutes**
  - Close to coast, for export-led industries
  - Agglomeration externalities in urban areas
  - Amenities
- **There are good reasons to take risks!**

A risk framework

- Classical definition of risk:



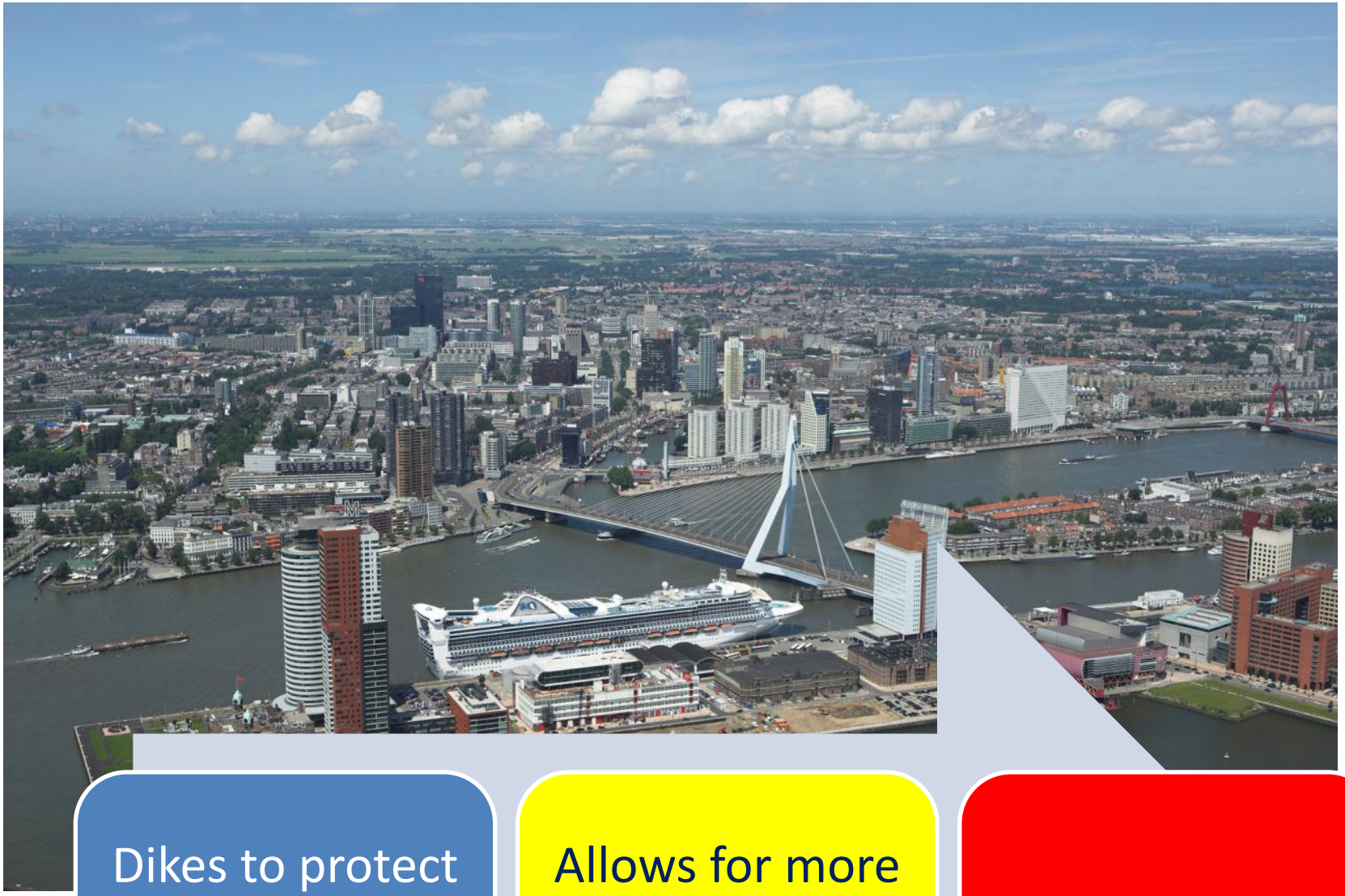
risk = probability x consequences

If we investigate this problem in a simple model, we find that it is optimal that…

- **Protection infrastructure improves over time, and the probability of disaster decreases,**
- **the losses if a disaster occurs increase over time, more rapidly than economic growth;**
  - Poor countries affected by frequent small events
  - Rich ones affected by few big events (Japan is an extreme case) ;
  - Poor countries need to focus on protection (hard and soft)
  - Rich countries need to focus on resilience and insurance

- **And average losses increase over time**.
  - Increasing economic losses may be the right thing to do, if we account for the benefits from risk taking.

Dikes to protect against frequent floods



Dikes to protect against frequent floods

Allows for more investment in at-risk area

Dikes to protect against frequent floods

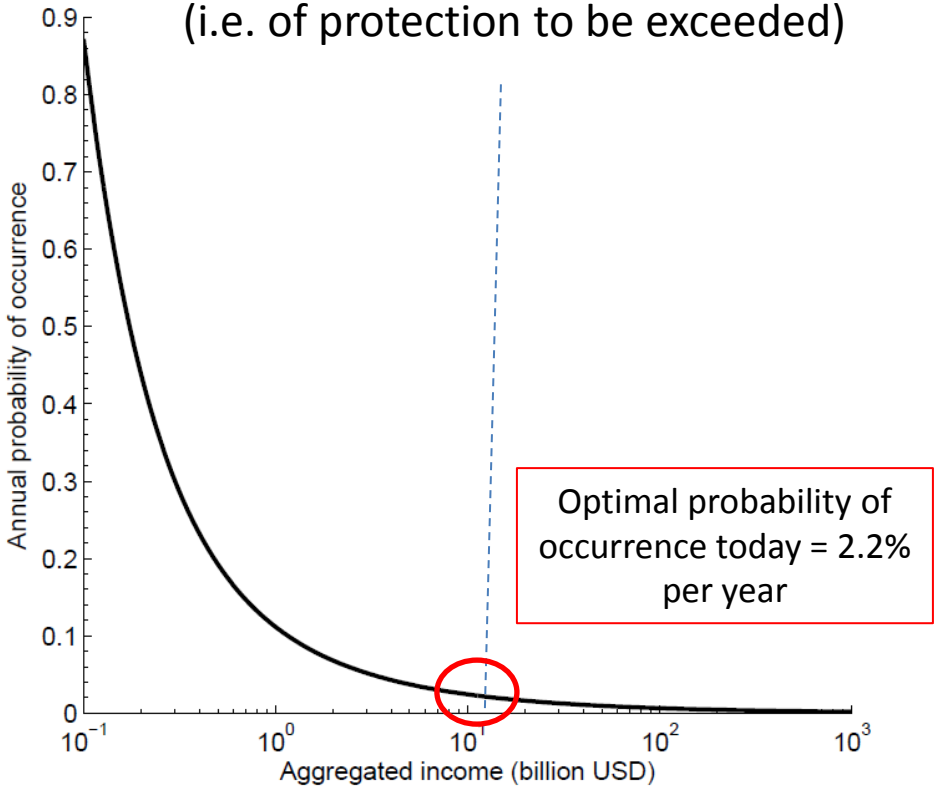
Allows for more investment in at-risk area

Increase vulnerability in case of extreme flood

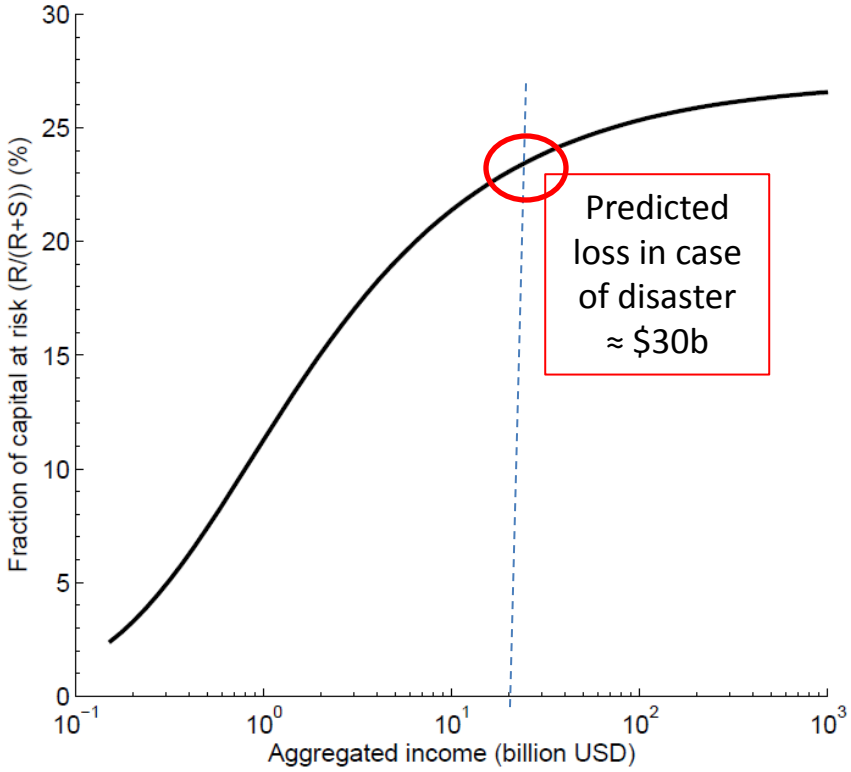
Works also in other sectors…

Illustration on New Orleans

Optimal probability of disaster
(i.e. of protection to be exceeded)



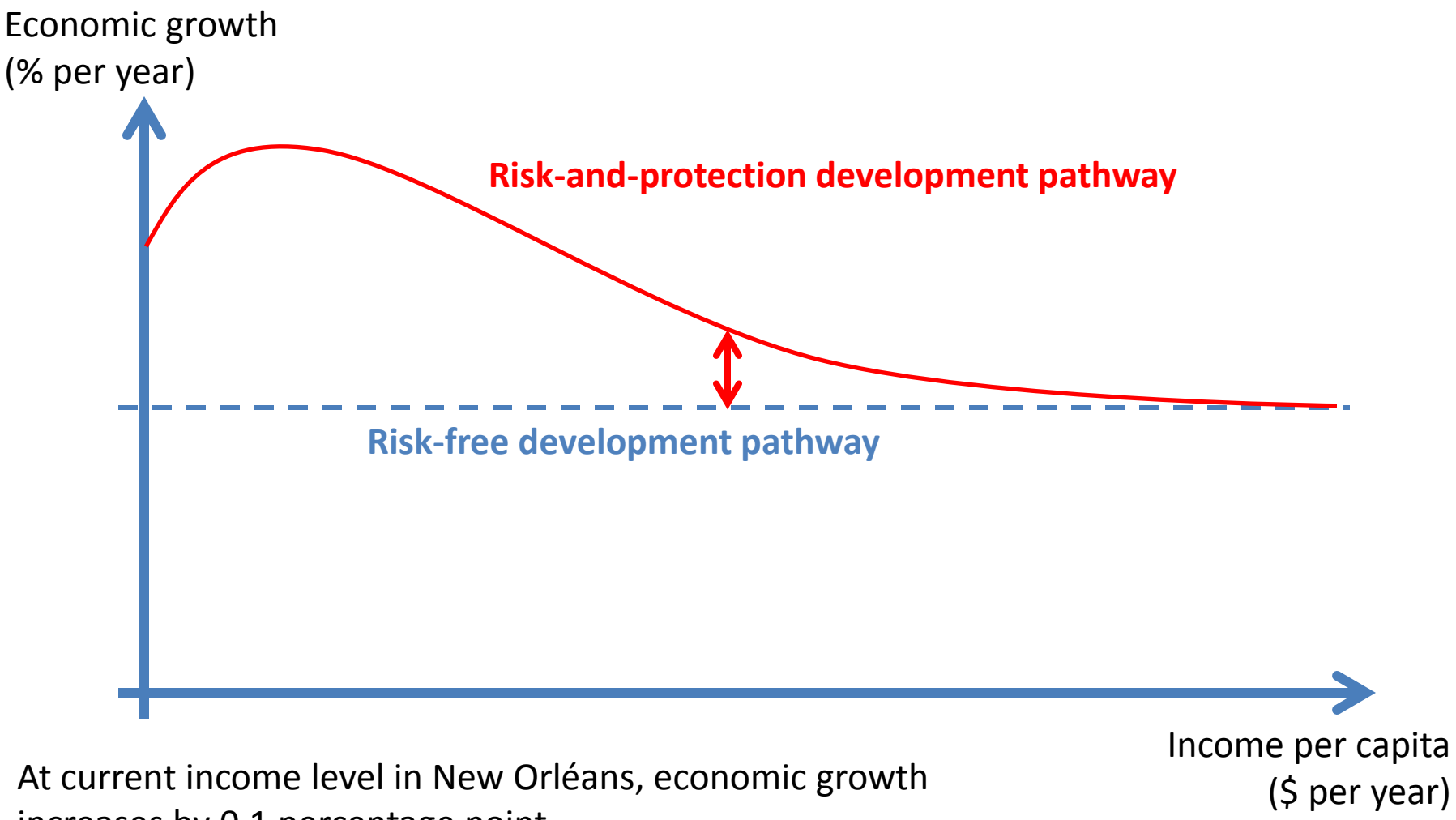
Fraction of capital at risk



Economic growth leads to more risk-taking
(and more protection infrastructure)

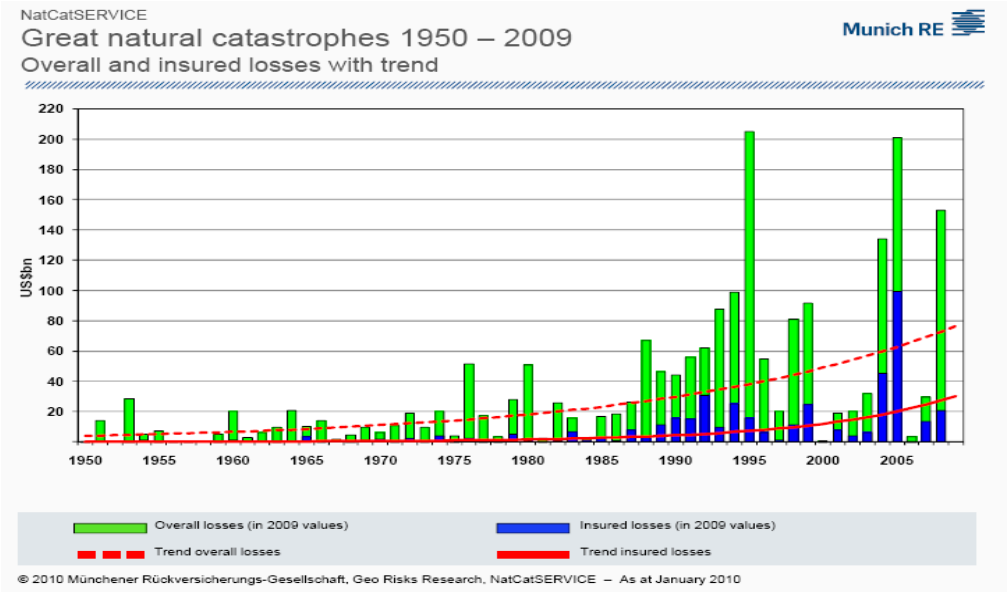
This is consistent with the history of New Orleans

We also find that improved protection infrastructure and more risk-taking accelerates economic growth!



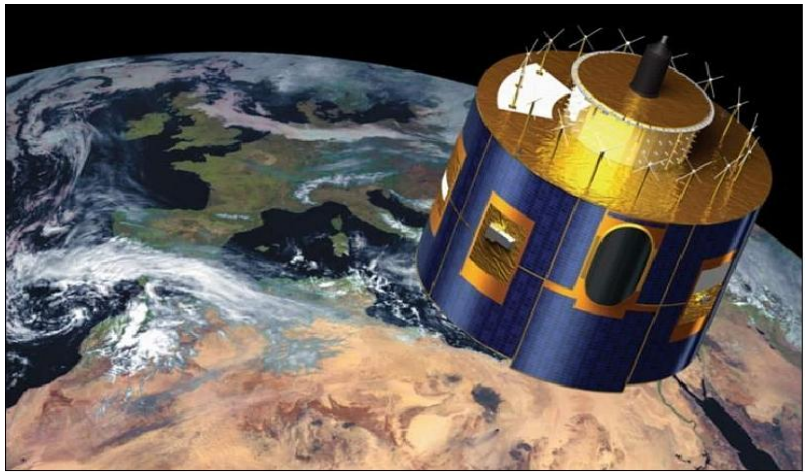
At current income level in New Orléans, economic growth increases by 0.1 percentage point.

Back to our question: Are we taking too much risk?



- *Provided that human losses can be avoided*, it can be rational to suffer from increasing losses (even in relative terms and especially in poor countries).

- **Investing in protection infrastructure, investing in at-risk areas, and losing part of this capital repeatedly can be preferable to investing in safe locations only.**



Policy conclusion #1:

Risk management is growth policy

- Increasing risk-taking is increasing economic growth… if:
  - Protection infrastructure improves over time;
  - Early warning and evacuation infrastructure avoid human losses and health impacts;
  - Insurance schemes (and social protection) help share the losses

- **Good risk management helps individuals take informed and worthy risks, and increases economic growth;**

And do not forget frequent risks… they affect the poorest and most vulnerable

And by preventing poverty alleviation, they reduce growth potential

Policy conclusions #2

transportation is a risk management policy

- There is an incentive to increase disaster losses *only because investments in risky and safe areas are imperfect substitutes.*

- Transportation infrastructure can make them closer substitutes and thus remove the need to take dangerous risks.

- **Transportation infrastructure needs to be designed to create <u>in safe places</u> the benefits that are found only in risky locations today**

Stop being the “bad guys” !

Policy conclusions #3:

crisis management will become even more important

- **We can expect fewer but larger disasters in the future.**

- Preparation for large-scale disasters will be increasingly important:
  - **early warning and evacuation**
  - **contingency and recovery plans,**
  - **increasing role of international aid,**
  - **international risk sharing through financial instruments** (e.g., the Caribbean catastrophe risk insurance facility, CCRIF)