

# Flood insurance in the Netherlands

Ruben Jongejan & Pauline Barrieu

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the London School of **Economics**  
and **Political Science**



Technische Universiteit Delft

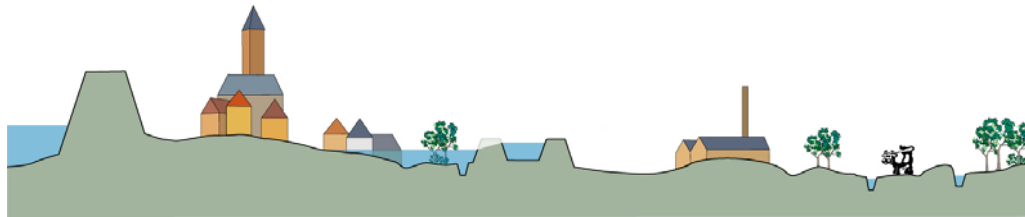
# Outline

- Introduction
- Causes of uninsurability
- Extending the limits of uninsurability
- Insurance and optimal protection
- Conclusions

# Introduction: types of flood



Heavy rainfall



Failure of a regional flood defense



Failure of a primary flood defense

# Introduction: primary flood defenses



# Introduction: historical outline

- 1953 The Big Flood
- 1955 The Dutch Association of Insurers forbids its members to underwrite floods
- 1995 Covenant between the DAI and government dismissed by the Council of State and withdrawn
- 1998 The DAI lifts its ban because of EU competition law
- 1998 Calamities Compensation Act ("WTS") enacted
- 2004 Borghouts Committee: resolve uninsurability

# Causes of uninsurability

(a selection)

1. Concentration
2. Moral hazard
3. Adverse selection
4. Risk perception

# 1. Concentration

Individual losses are correlated: insurable losses could be in the billions of euros

Reinsurance, securitization (cat-bonds)?

- Reinsurance against low-probability, large-scale losses appears costly
- Capacity of the (re)insurance industry is limited

## 2. Moral hazard

The insured lose an incentive to avoid losses

But..

Flood safety is publicly provided in the Netherlands



Moral hazard on the part of the government should be addressed



# 3. Adverse selection

Insurers ending up with portfolios of “bad risks”

Information asymmetries between insurers and the insured?

- Information is public rather than private
- Individuals can hardly influence their exposures

## 4. Risk perception

People might be reluctant to purchase insurance, even when fairly priced

“It won’t happen to me”

# Extending the limits of uninsurability

Government support:

1. Provide underwriting capacity  
Concentration, moral hazard
2. Make insurance (semi)compulsory  
Risk perception (adverse selection)

# Extending the limits of uninsurability

Towards a layered program?

1. Self-insurance

Deductible to reduce ex post moral hazard

2. (Re)insurance

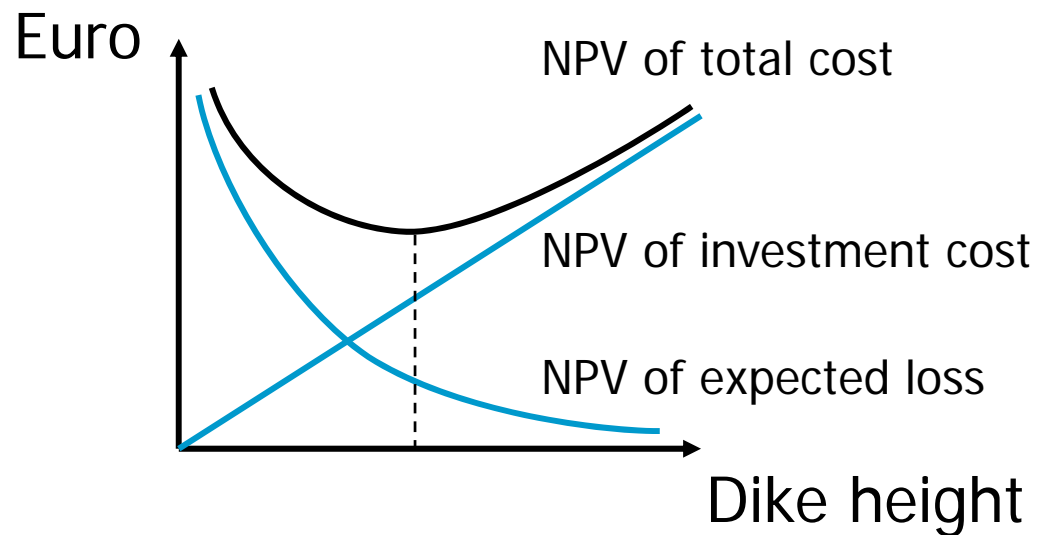
Or no (re)insurance...?

3. Government support

Fund build-up, debt issuance

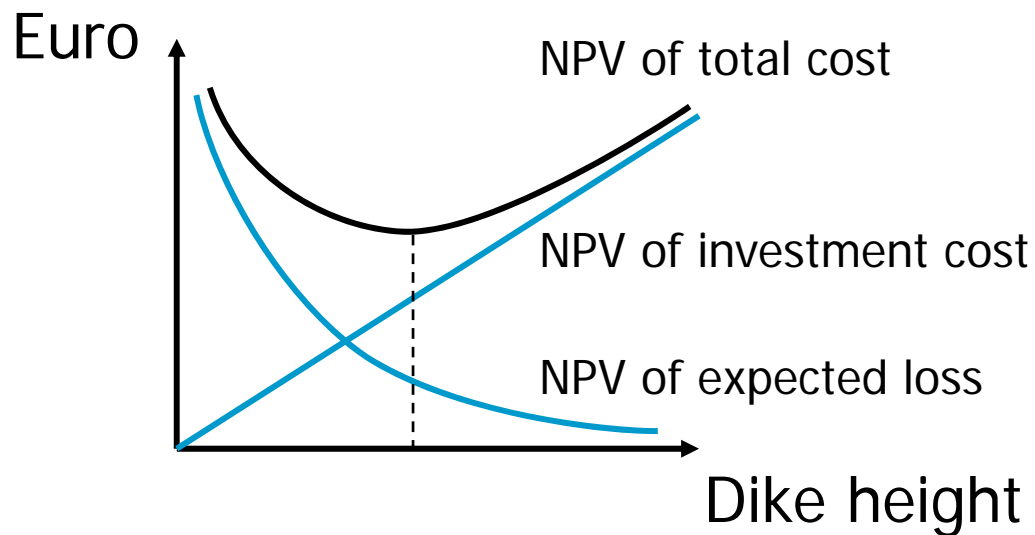
# Insurance and optimal protection

Min(NPV of investment cost + NPV of expected loss)



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Min(NPV of investment cost + NPV of expected loss)



# Insurance and optimal protection

Perfect insurance:

Cost of risk bearing = Expected loss

Risk neutral optimizations presuppose perfect insurance

# Conclusions

- Government involvement is needed to resolve the uninsurability of floods:
  - Provide underwriting capacity
  - Mandate/provide universal coverage
- Insurance and prevention are closely linked



# Conclusions

- The introduction of an insurance program cannot be used to justify lower standards of protection
- Current, risk neutral cost-benefit studies seem to yield unduly lenient safety standards

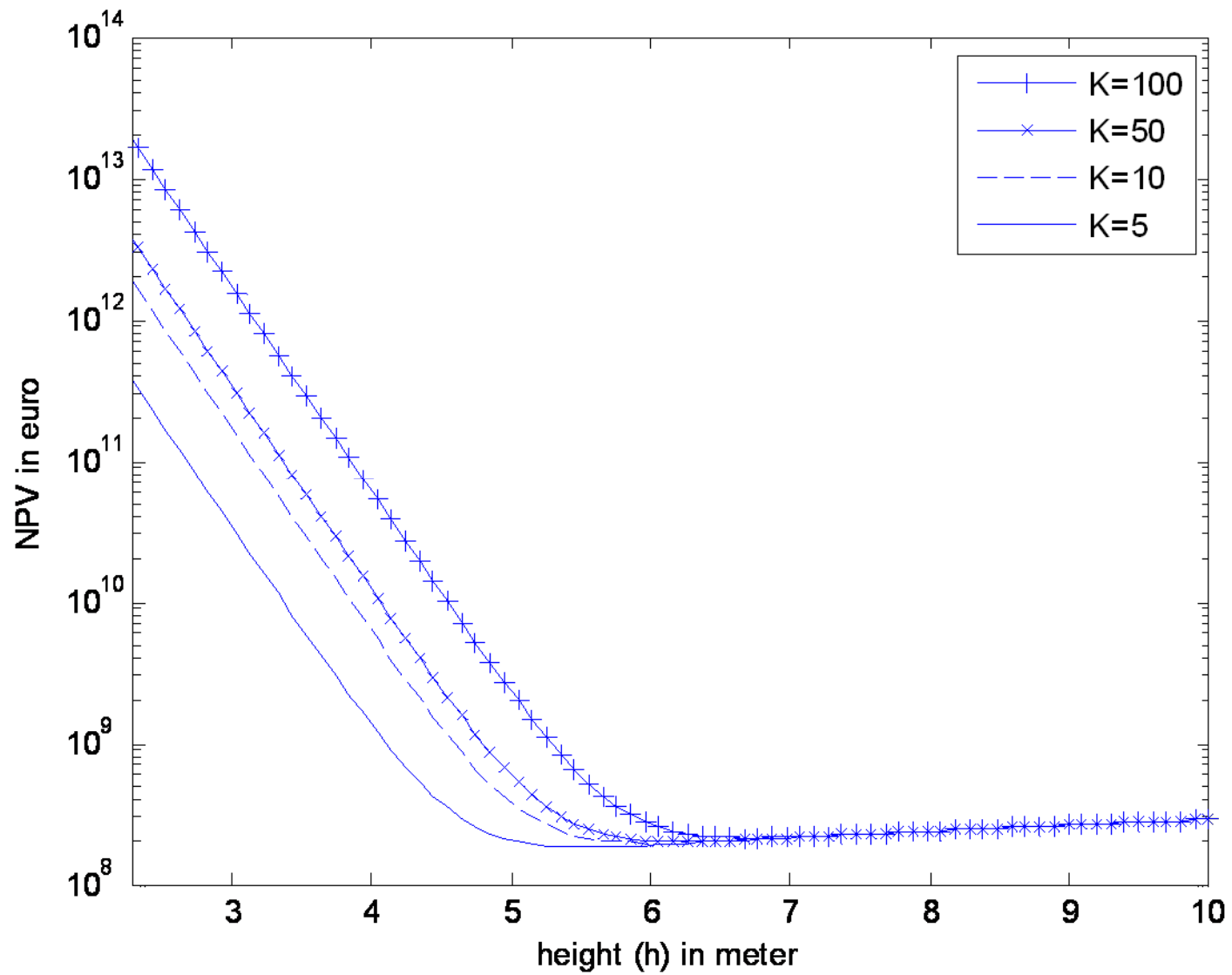


Ruben Jongejan

r.b.jongejan@tudelft.nl

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# Financial innovations

## I: Reinsurance

Geographical diversification, greater extent of pooling

But a 25 bln euro loss would still be huge..

Cat-reinsurance appears costly (market imperfections)

# Financial innovations

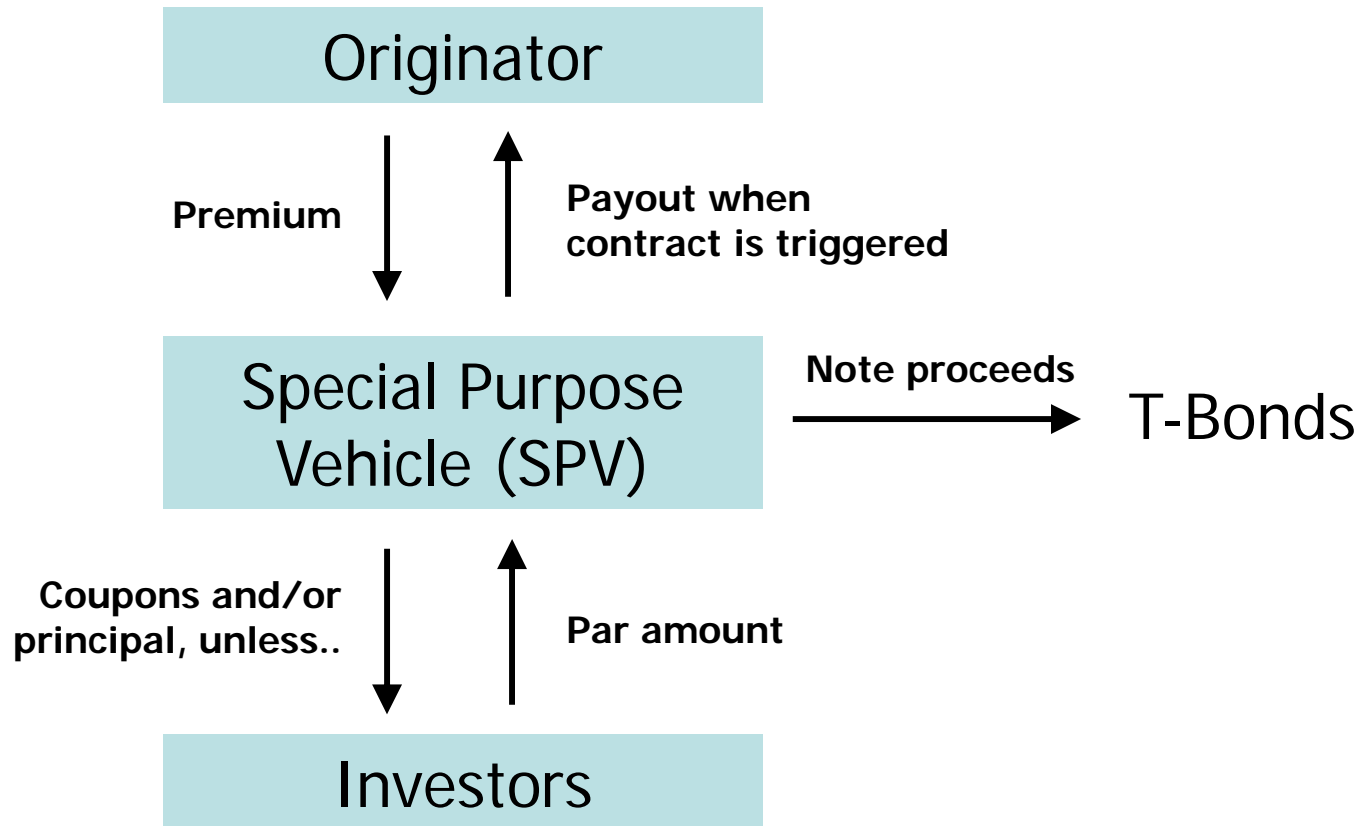
## II: Securitization

Tap into capital markets directly

Daily fluctuations on global asset markets ~100 bln

- Cat-bonds
- Cat-futures and options

# Cat-bond



# Financial innovations

## Cat-futures and cat-options (NYMEX, 2007)

- Written on a PCS-index
- Purchase a cat-future: when cat occurs, futures price goes up

But..

- Basis risk: imperfect hedge
- Who are the natural counterparts?
- The CBOT stopped trading these products in the 1990s