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# New Forms of Disaster Protection

## – combining financial and physical protection

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# Ex-Post disaster financing

- Disasters generally seen as human and physical destruction,
- Actually, result of deficiencies in the economic and financing infrastructure
- Case Study: Asian Tsunami of 26 December 2004,
  - earthquake detected within minutes around the world, yet no warnings provided,
  - 50,000 died hours later in Sri Lanka, India etc.
  - No tsunami warning system – the technology exists, but is not applied.
- Ex-Post disaster financing–most inefficient manner.
- Tsunami warning system <<< $5 billion committed by Donors

# Ex-Ante risk financing

•Ex-Ante risk financing combined with physical risk reduction much more efficient

•Most donor and development aid devoted to improving physical and social infrastructure.

•in designing a funding vehicle,

•natural hazard risk charge (ie, actuarial cost of the earthquake, wind or flood damage) included in the overall financing,

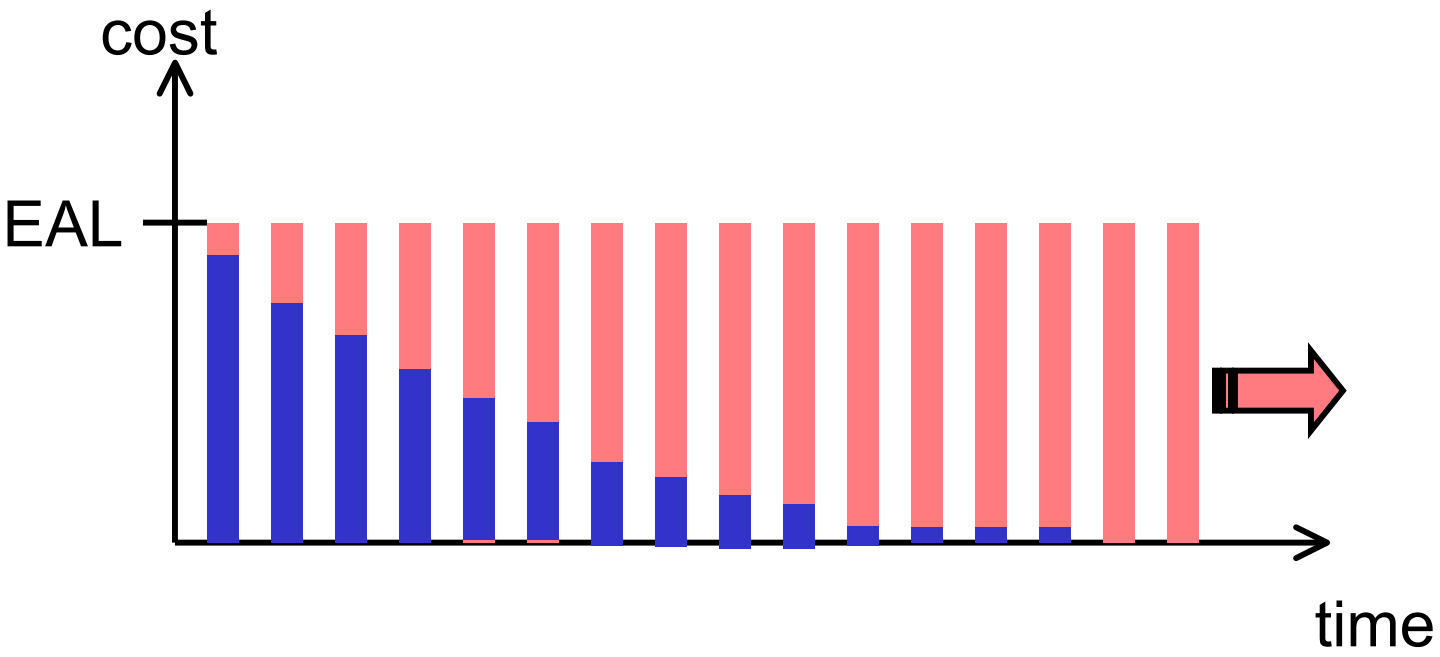
•new vehicle is created in which natural hazard risk is first transferred,

•then “built down” to an acceptable level.

# New Forms of Disaster Protection

- **Early part of the financing, a significant part of the finance cost is allocated to risk transfer**
- **As the risk is mitigated by improved physical and social infrastructure,**
- **Risk is reduced with time,**
- **Less of the financing cost is used for risk transfer.**
- **Result: single combined financial vehicle, two tranches,**
- **financial protection**
- **physical protection,**
- **each vary during the life of the instrument,**
- **as one form of protection replaces the other.**
- **new concept,**
- **has high potential in developing economies for reducing the impacts of natural disasters.**

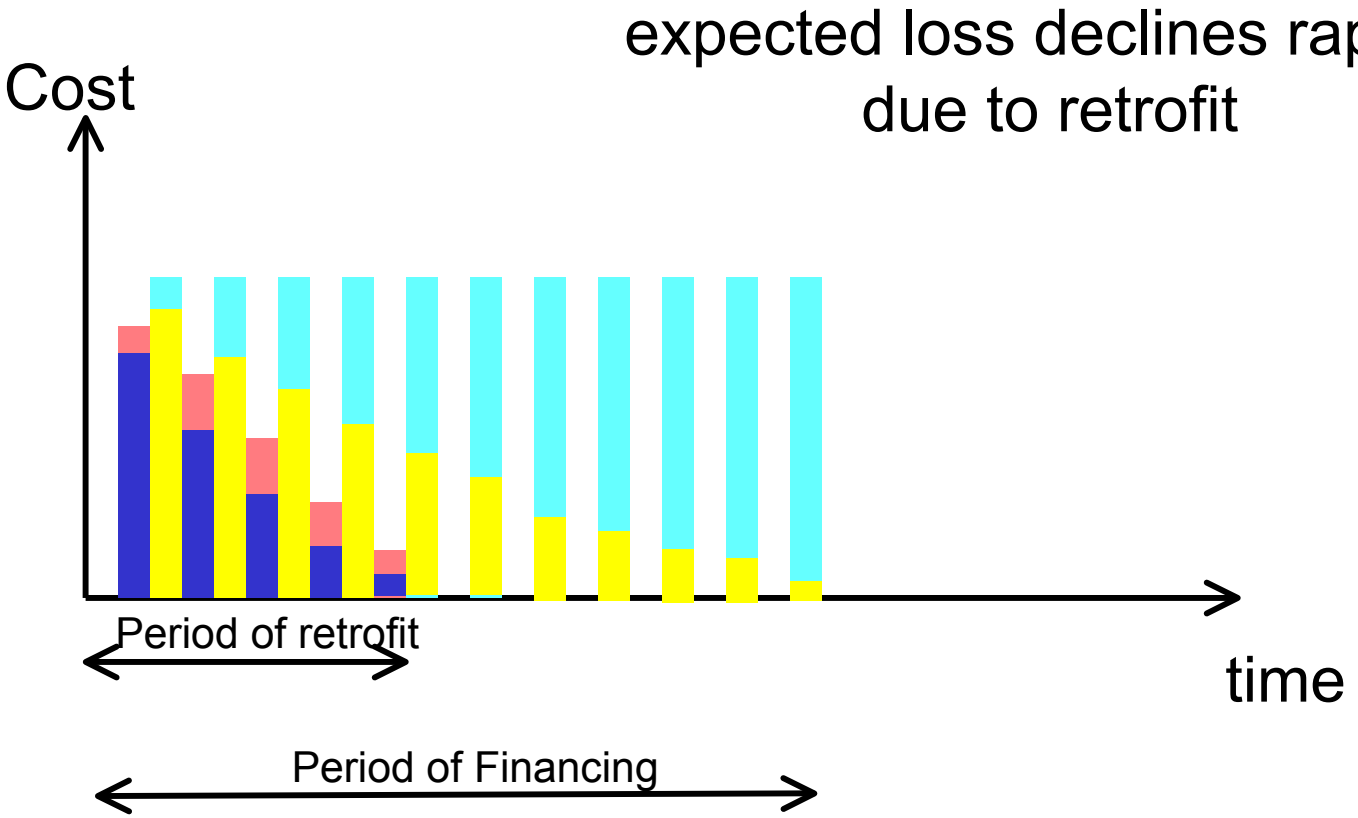
# No action




Total cost = PV (EAL)

# Retrofit + risk charge

Total cost = PV (cost of retrofit) + PV(Expected loss)



# example

| | | |
|---|---|---|
| value | $1,000 | |
| EAL pa (risk charge) | 0.3% | |
| EAL pa (risk charge) | $3 | |
| retroft cost | 5% | |
| retroft cost | $50 | |
| retrofit duration (yrs) | 5 | |
| interest rate | 3% | |
| loan term (years) | 20 | |

No action (Risk Charge)

| | | |
|---|---|---|
| PV future damage | $100 | = cost of insurance |

Retrofit + Risk Charge

| | | |
|---|---|---|
| PV future damage | $9 | (damage eliminated after 5 years) |
| PV loan | $50 | = cost of retrofit |
| PV (retrofit only) | $59 | |
| | 59% | |

# Valid for higher risks, lower retrofit costs

| Retrofit cost | EXPECTED ANNUALIZED LOSS (EAL) | | | | | | | | | |
|---|---|---|---|---|---|---|---|---|---|---|
| | 0.1% | 0.2% | 0.3% | 0.4% | 0.5% | 0.6% | 0.7% | 0.8% | 0.9% | 1.0% |
| 2% | 69% | 39% | 29% | 24% | 21% | 19% | 17% | 16% | 15% | 15% |
| 4% | | 69% | 49% | 39% | 33% | 29% | 26% | 24% | 22% | 21% |
| 6% | | 99% | 69% | 54% | 45% | 39% | 34% | 31% | 29% | 27% |
| 8% | | | 89% | 69% | 57% | 49% | 43% | 39% | 35% | 33% |
| 10% | | | | 84% | 69% | 59% | 52% | 46% | 42% | 39% |
| 15% | | | | | 99% | 84% | 73% | 65% | 59% | 54% |
| 20% | | | | | | | 94% | 84% | 75% | 69% |
| 25% | | | | | | | | | 92% | 84% |

3% 20 YEARS

# Summary

- Ex-ante financing much more efficient
- Financing combined with retrofit same cost as retrofit only, immediately transfers risk to financier, protecting borrowe