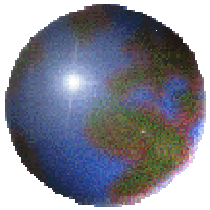

Discussion of Raschky "Natural Hazards, Growth and Risk-Transfer"

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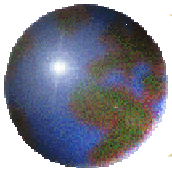
May 8, 2008

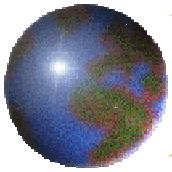
Overview: "If a Tree Falls in a Forest"

- "If a flood occurs in an area where there are no people to be affected by it, is it a natural disaster?"
- No – a natural process is a natural hazard only if it affects humans in some way
- Thus, human *behavior* is a critical ingredient in understanding how floods matter
  - This behavior is potentially influenced by the social mechanisms in place for sharing risk
  - So, does insurance matter for behavior?



Two Important Issues …

- Risk transfer mechanisms can have two important effects on welfare
  - Insurance – whether risk is or is not transferred efficiently
    - Spreading out diversifiable risk
    - Ensuring that systematic risk is held by those most willing to bear it
  - Incentives – do we get the right amount of economic activity?
    - Right amount of building in flood zones
    - Right amount of risk mitigation investments
- Optimal policy will get both right …



How Might Flood Risk be Shared?

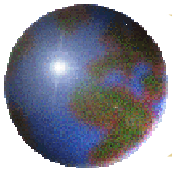
1. No sharing – risk is borne by those who build in a flood zone
   - Not efficient to have idiosyncratic risk borne by risk averse individuals
   - Probably get too little risk exposure
     - Marginal benefit of building would have to surpass utility cost of both systematic and idiosyncratic risk

How Might Flood Risk be Shared?

2. Ex Post "Relief"
   - Not necessarily the case that risk spreading through tax system is efficient
   - May get too much or too little risk taking, depending on how confident individuals are in the provision of relief
   - Relief may also be inefficiently targeted

How Might Flood Risk be Shared?

3. Insurance
   - If actuarially fairly priced, this is generally first best
     - Efficiently spreads idiosyncratic risk
     - Systematic risk borne by those most willing to bear it (e.g., insurance company shareholders)
     - Provides appropriate incentives for location and risk mitigation decisions
   - If subsidized (e.g., NFIP),
     - Get some of the risk sharing
     - But likely excessive risk exposure



The Key Empirical Question

- Does behavior actually change based on loss exposure (and thus based on risk-sharing mechanisms)?
  - Are people less likely to locate in flood zone if insurance is available/unavailable?
  - Are people more likely to undertake risk mitigation measures if it influences their premium and/or their loss exposure?
- This is a very important empirical question
  - Does behavior change?
  - If so, how large are the effects?

What this Paper Does …

- Uses a standard growth model (of income or GDP), implements at "county" level, and adds controls for:
  - Whether experienced a flood
  - Whether flood occurred in area with or without an explicit *ex ante* insurance mechanism

$$\ln(y_{it}) = \gamma_t \ln(y_{i,t-1}) + \ldots + \beta_4 Flood_{it}$$
$$+ \beta_5 Flood_{it} \cdot Ins_{it} + \mu_i + \eta_t + \varepsilon_{it}$$

- Hypothesis 1: Flood has negative effect on contemporaneous GDP/income → $\beta_4 < 0$
- Hypothesis 2: The effect is mitigated in areas with *ex ante* insurance program → $\beta_5 > 0$

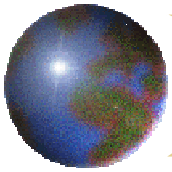
Results: What We Learn

- In Europe:
  - β_4 = -0.006 → flood reduced growth by 0.6%
  - B_5 = +0.007 → But this effect completed mitigated when area is covered by insurance program
- Similar results found in US …
- Suggested conclusion: risk-transfer mechanisms at least partially effective with regard to their insurance function, i.e., spreading the economic impact broadly

Need Additional Info to Evaluate Policy

- We do learn how well losses are distributed, i.e., the insurance component
- We do not learn about whether the presence of insurance affects *ex ante* incentives for risk taking – do we get the right amount of economic activity?
  - This is important for evaluating whether insurance is better than the "bailout" approach

- Ex: Does presence of NFIP get us closer to, or farther from, the optimal housing stock in a flood zone?
  - These regressions are not designed to answer this.
  - Even if they did, it is difficult to identify causal effects. For example, residential investment may be lower in NFIP county, but is this because of NFIP or because this county is more exposed to floods?



A Few Questions / Suggestions

1. Direct controls for insurance (in addition to flood*insurance interaction effect
2. Explanation of alternating time patterns
3. Identification of political variables

Summary

- This is a nice contribution to an important line of research – what is the optimal public policy response to risk?
- This paper shows that presence of ex ante insurance matters for effect of floods on growth
- But harder to know how it affects ex ante incentives, so the jury is still out on optimal policy response
- Future Work?
  - Testing for effect of insurance on ex ante risk-taking
  - Are government bail-outs less likely in presence of insurance? Or can both occur simultaneously?
  - Richer analysis of the political considerations …