Social Costs and Benefits of the National Flood Insurance Program

Wednesday, 18 January 2012

National Flood Insurance Program

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Missouri floods in the 1920s caused significant damage.
Private insurers pulled out of the market for decades.
Gilbert White proposed national flood insurance in 1942.
After initial trials in 1956, NFIP comes in 1968
Changes include introduction of flood mitigation standards
--and requirements for actuarial soundness

Flood Recovery

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Flood Insurance implemented to piggy back on homeowners policies
FEMA manages the National Flood Insurance Fund
Traditional insurers provide administrative duties
Severe losses from major storms.
--Katrina hit ~16B losses
--Rita ~2B losses

Flood Mitigation

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Flood mitigation comes from three programs
FMA
SRL
RLF

Project Goals

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This dissertation is for the public policy department at UMBC
UMBC defines public policy around three disciplines--economics, sociology and political science
BCA provides an opportunity to explore a program or policy through each of those lenses simultaneously
BCA is often applied prospectively, going forward
This dissertation will apply BCA retrospectively

Benefit-Cost Analysis

What are the net social benefits of flood protection?

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This is fundamentally an economic analysis
Will cover from 1996-2009
Will address both flood mitigation and flood recovery

Distributional Benefit-Cost Analysis

What are the net social benefits
impacts are valued by recipient class?

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This adds a sociological analysis to the first analysis
Will revalue and weight impacts based on recipient
Will use the first analysis as a baseline

Impact on Government Revenue

Has the program saved government money?

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This adds an important political question to the analysis
NFIP originally established to partially shift costs of recovery to victims
Uses BCA, but only permits the Federal government standing

Implementation

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There are a number of complications that arise from this dissertation. This is not unusual, but some key areas of the implementation are worth discussing in greater detail.

Valuing Flood Insurance

$$\Delta S = \Delta C + \Delta P + \Delta G + \Delta E$$

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BCA may be considered as a balance sheet, looking like an accounting question
BCA can also be considered as the sum of economic surpluses contributing to the NSB

Delta-S is the change in S due to the program

This takes advantage of that thought to simplify the development of the flood insurance NSB model

Valuing Flood Insurance

$$\Delta C \equiv w - \varpi - a$$

$$\Delta P \equiv \varphi \varpi \pi$$

$$\Delta G = \varpi - \kappa + a$$

$$\Delta E = B - \beta + ma$$

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w is willingness to pay for flood insurance
The betas are ecological impacts
k is the amount of claims in a given year
e is the exante adjustment to the expost willingness to pay
m is the marginal excess tax burden
phi is the WYO premium to insurers
varpi is the premiums paid to the NFIP
pi is the historical profit ratio of insurers

Valuing Flood Insurance

$$\Delta S = \kappa(e + m) + \varphi\varpi\pi$$

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This is the key equation in valuing the flood insurance component
represents 1 year's net social benefits
k is the amount of claims in a given year
e is the exante adjustment to the expost willingness to pay
m is the marginal excess tax burden
phi is the WYO premium to insurers
varpi is the premiums paid to the NFIP
pi is the historical profit ratio of insurers

Flood Insurance Data

- Data provided by FEMA
- County-level premiums and claims
- Covers FY1977 to FY2009

- Also uses insurance profitability from BEA

Valuing Flood Mitigation

BCR = 5.0 at 2% SDR

⇓

≅ 17.4% annualized

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This is what the Multi-Hazard Mitigation Council found
forms a major baseline in establishing the NSB of flood mitigation today

BCR is lifetime returns (at 50 years). MMC report premised on funds spent in year 0 and a useful lifetime of 50 years
The 2% SDR is removed and we are free to apply our own SDR

Flood Mitigation Data

- Data provided by FEMA
- FMA grant programs at state-level
- Covers FY1996 to FY2011

- Local-level info is inconsistent

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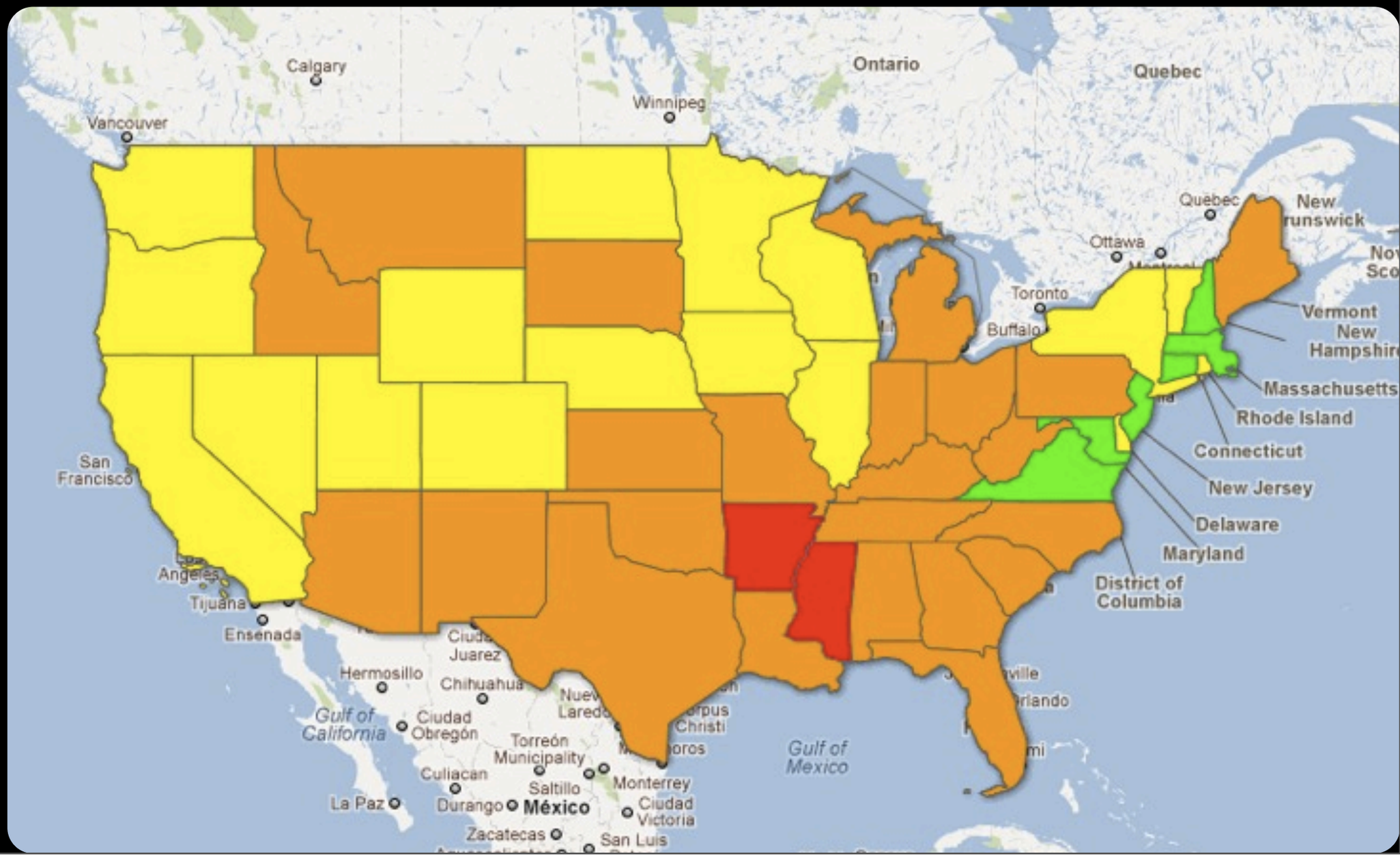
Have recoded info for local governments
Statewide-allocation issues
- by population makes distribution more equitable
- by income biases toward inequitable

Weighting by State



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income for states
hard to justify
disparate impact by income at state level is feasible, as show by map

Red is < 40k
orange 40-50
yellow 50-60
green > 60

State-Level Income Data

- Data provided by Census Bureau
- Population, income, quintiles, and Gini
- Covers 1996 to 2009

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Have recoded info for local governments
Statewide-allocation issues
- by population makes distribution more equitable
- by income biases toward inequitable

Governmental Revenues Impacts

- Presumed to be expected losses
- Government not gauranteed to fund
- Works with expected protection from MMC

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Revenue impacts are predicated on the assumption that the government is likely to make payments equalling the losses if there is no NFIP and no mitigation.
The government has historically made similar payments
MMC summarizes this by noting this extreme is unlikely, but so is the other. This is much better described as impacts "up to."

Importance

- Baseline for further study of the NFIP
- Baseline for analyzing prospective changes
- Baseline for analyses of other programs

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