

Developing Projections for Health Reform: Understanding Microsimulation Models

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State Health Reform Assistance Network
Charting the Road to Coverage



Robert Wood Johnson Foundation

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Welcome and Introductions

- **Lynn Blewett, SHADAC Director**
- **Deborah Bae, RWJF Senior Program Officer**



Featured Speaker

Jean Abraham

Assistant Professor in the University of Minnesota's School of Public Health, Division of Health Policy and Management



Featured Speaker

Danielle Holahan

Project Director for Health Insurance Exchange
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Questions about the webinar:

Contact Paige Hubbell at phubbell@umn.edu



Predicting the Effects of PPACA: A Comparative Analysis of Health Policy Microsimulation Models

March 21, 2012

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State Health Reform Assistance Network
Charting the Road to Coverage



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Presenter's Background

- Jean Abraham
 - Assistant Professor
Division of Health Policy & Management
University of Minnesota
 - Health Economics and Policy
 - Senior Economist on President's Council
of Economic Advisers, 2008-2009



Questions Addressed Today

- What are health policy microsimulation models and their key components?
- What are the similarities and differences among the major federal health policy models being used with respect to these components?
- When considering different modeling options, what questions should states ask?

What is a microsimulation model?

- Tool for estimating potential behavioral and economic effects of public policies on decision-making units (individuals, households, and employers) and government
- Outcomes of Health Policy Models
 - Coverage
 - ESI, Non-group (Exchange), Medicaid, Uninsured Counts
 - Transitions from baseline scenario over time
 - Costs/Spending
 - Individuals
 - Employers
 - Government

Major health policy simulation models

- Congressional Budget Office
- GMSIM (J. Gruber from MIT)
- RAND Compare
- HIPSM (Urban)
- HBSM (Lewin Group)

Methodology

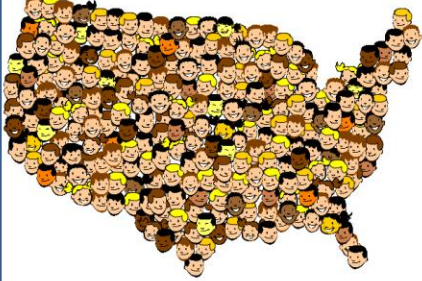
- Conducted a comprehensive review of publicly-available technical documentation for the major health policy microsimulation models.

Data Infrastructure

Behavior

Outcomes

Population



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Individuals:

- Take-up of employer-sponsored insurance (ESI) and Non-group
- Public insurance enrollment given eligibility

Employers:

- Offer health insurance
- Premiums and plan generosity (employer and employee share)

Individuals:

- Insurance coverage distribution (ESI, Medicaid/CHIP, non-group, uninsured) overall and by other attributes

Employers:

- % offering health insurance
- ESI premiums

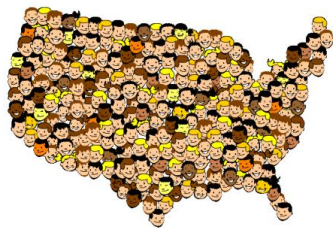
Government:

- Public program participation
- Public program spending

Data Infrastructure: Individuals and Employers

Key Population Data Sources:

- 1) Current Population Survey Annual Social and Economic Supplement
- 2) Survey of Income and Program Participation
- 3) Medical Expenditure Panel Survey

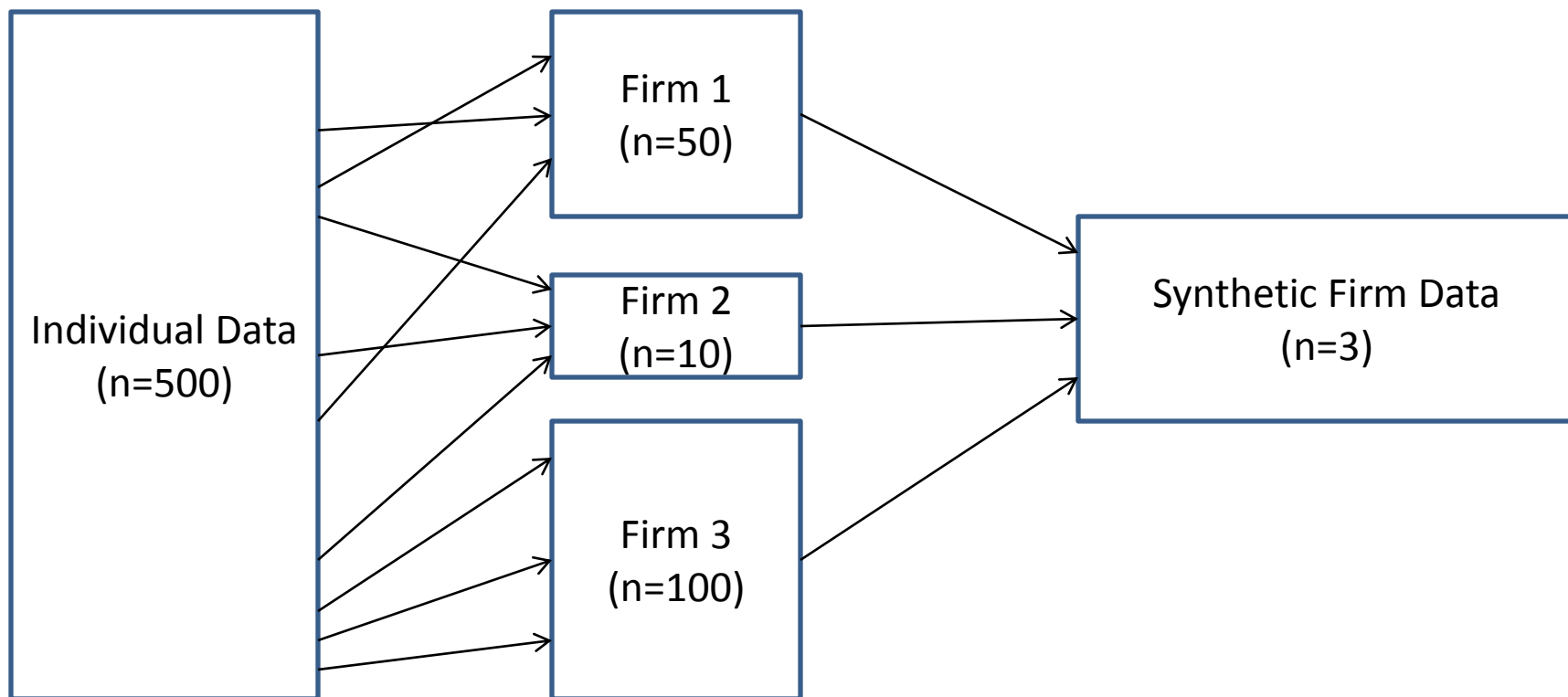


Key Employer Data Sources:

- 1) Statistics of U.S. Businesses
- 2) National Compensation Survey
- 3) Kaiser Family Foundation/HRET Employer Health Benefits Survey

Data Infrastructure: Building Synthetic Firms

Synthetic Firms: group individuals from population survey data based on their characteristics and those of business establishments (e.g., firm size, geography, health insurance offer status). Aligned to reflect distribution of U.S. businesses.



Model Comparison: Population and Employment Data

| | CBO | GMSIM (Gruber) | RAND COMPARE | HBSM (LEWIN) | HIPSM (URBAN) |
|------------------------|--|----------------------------------|--|---|---|
| Population Survey Data | 2002 SIPP | 2005 Feb/March CPS | 2008 SIPP | 2002-2005 MEPS | 2009/2010 CPS |
| Employment Data | BLS National Compensation Survey | BLS National Compensation Survey | KFF Employer Survey; Statistics of U.S. Businesses | KFF Employer Survey & 1997 RWJF Employer Survey | Statistics of U.S. Businesses |
| Calibration | Re-weighted to reflect U.S. population projections 2008-2017 | Re-weighted to 2008 March CPS | Re-weighted to reflect 2010 and beyond age-sex-race distribution | Re-weighted to 2009 March CPS on population attributes and coverage | Re-weighted and adjusted to align with coverage, income, expenditures, and firm distribution as of 2009 |

Data Infrastructure: Premiums



Key Data Sources:

- Medical Expenditure Panel Survey-Household Component
- Medical Expenditure Panel Survey-Insurance Component
- Kaiser Family Foundation/HRET Employer Health Benefits Survey

Data Infrastructure: Premiums

ESI Premium Construction:

- 1) Built from expected medical spending among a synthetic firm's workers with adjustments made for administrative loads and state regulation.
- 2) Built from reported premium data (IC or KFF) and adjusted to account for actuarial value differences and geography/state regulations.

Individual Market Premium Construction:

- 1) Built from estimated individual health spending with adjustment factors for demographics, health status, and geography. Loading factor that reflects administrative costs and profits is applied.

ESI Premium Data and Construction

| | CBO | GMSIM (Gruber) | RAND COMPARE | HBSM (LEWIN) | HIPSM (URBAN) |
|-------------------------------|--|--|--|---|---|
| Data | 2004 MEPS | 2004 MEPS-IC | 2007-08 KFF/HRET 2002-2003 MEPS | 2006 KFF/HRET and 1997 RWJF Employer Health Insurance Survey 2002-2005 MEPS-HC | MEPS-IC 2006-2008 MEPS- HC |
| Expected Spending / Costs | Expected aggregate spending of a firm's workers | Individual-level cost index based on age, sex, health rating. Averaged over synthetic firm. Index matched up to employer premium distribution to assign premium to firm. | Firm-specific premiums are a function of experience-rated and community-rated estimates. Former use predicted spending of workers and dependents, while the latter use 12 pools based on 4 census regions by 3 firm sizes. | Use expenditures of workers and apply rating practices (e.g., small group market). Also simulate premiums for self-funded plans. | Built from risk pools from underlying health care spending. Blend of actual and expected costs. |
| Actuarial Value adjustment | Yes (firm size, income, health status) | Yes (income, firm size) | Yes (firm size) | Yes (comparison of employer plan to standard benefits) | Yes (firm size) |
| Loading Fee | 27% for 2 employee firm to 9% for 100+ workers | Implicit in premium | 20%: < 25 workers 13%: 25-99 workers 8.3% for 100+ workers | Ranges from 40% for 1-4 workers to 5.5% for 10,000+ workers | Yes (industry and firm size) |
| State-specific information | Regulatory environment | Accounts for state variation in premiums | Details not available | Impute state code to MEPS; small group rating rules | Accounts for state variation in spending |

Non-Group Premium Data and Construction


| | CBO | GMSIM (Gruber) | RAND COMPARE | HBSM (LEWIN) | HIPSM (URBAN) |
|---|---|--|---|--|---|
| Expected spending | Factor-based approach using information on age, sex, health, experience, and state. | Age-health status spending distribution from MEPS and applied to CPS. | Age-health status risk pools and estimate spending from MEPS for those reporting individual coverage. | Predict spending and apply rating practices (age, sex, health status). | Predicted spending among those in non-group market. Model based on age, sex, health status, and “typical” rating rules. |
| Loading fee for baseline | 29% | Fixed load of 15%; Varying load component equal to 30% of average unloaded non-group cost, based on age interval | Yes (details not available) | 40% | Yes (details not available) |
| State-specific information/ adjustments | Yes | Yes | Yes (approximated) | Yes | Yes |

Examples of ACA Provisions Modeled


- Creation of Exchanges
- Premium and cost-sharing subsidies for Exchange-based plans
- Employer shared responsibility requirements
- Medicaid expansion
- Individual mandate

How are Policies Simulated?

Establish baseline scenario to reflect 'status quo' regarding premiums and coverage distribution.



Model the behavioral responses of individuals and employers to a policy change(s) to arrive at new scenario.



Using coverage status information from new scenario, update premiums and other information to estimate output for subsequent years.

Approaches to Modeling Behavioral Responses

- Elasticity-Based Approach
 - CBO, Gruber, and Lewin
 - Utilizes findings from empirical health economics and health services research literatures
 - Studies on individuals' price-sensitivity of take-up of coverage
 - Marquis and Long (1994)
 - Blumberg, Nichols, and Bantlin (2001)
 - Studies of employers' price-sensitivity with respect to offering and spending on health insurance
 - Gruber and Lettau (2004); Gruber and McKnight (2001)
 - » Estimate how changes in the “tax-price” of health insurance affect employer provision

Simple Example: Elasticity

- Availability of an Exchange-based premium subsidy to a low-income single individual without ESI access.
 - \$5,000 premium in the baseline scenario
 - With application of policy (e.g., subsidy), premium decreases 40% to \$3,000.
 - Published estimates from literature on degree of price-responsiveness used to quantify change in probability of a person taking up non-group coverage, given a % change in premium.
 - Elasticity is $-.5$.
 - Probability of purchasing a plan increases 20% ($-.5 * 40%$)

Approaches to Modeling Behavior

- **Utility-Based Approach**
 - RAND, Urban, and Lewin
 - Individuals can choose among a given number of options (ESI, non-group, public, uninsured)
 - Utility (satisfaction) of each insurance choice is a function of
 - Expected out-of-pocket costs
 - Value of health care consumed
 - Out-of-pocket premiums
 - Tax incentives
 - Out-of-pocket expenses relative to income

Approaches to Modeling Behavior

- Utility-Based Approach
 - Policy shocks are modeled to affect utility of options
 - Firms' decision to offer insurance is contingent on workers' total willingness to pay (based on model above) exceeding total costs of offering insurance as a fringe benefit (premium and HR administrative fixed costs)
 - Individuals make coverage decisions based on options available to them and select the one that maximizes utility
 - Results are calibrated to ensure that elasticity estimates are within range of historical estimates

Behavior of Individuals

| | CBO | GMSIM (Gruber) | RAND COMPARE | HBSM (LEWIN) | HIPSM (URBAN) |
|--|--|---|--|---|---|
| Coverage Take-up (ESI; Non-group; Public; Uninsured) | <p>Informed by ESI-take-up literature. Sensitivity varies by income, previous uninsurance status, and subsidy size.</p> <p>Doesn't assume many will drop ESI and buy non-group.</p> <p>Private coverage take-up among those eligible for public programs is low.</p> | <p>Specifies elasticities of various insurance transitions, given baseline insurance status (e.g., uninsured to non-group (-.5).</p> <p>Assumes low probability of moving from ESI to public insurance given eligibility (Gruber and Simon (2008)).</p> | <p>Utility-based approach (Goldman et al.)</p> <p>Calibrate behavioral responses to ranges of estimates for ESI take-up; non-group /Exchange demand; Medicaid enrollment</p> | <p>Simulate eligibility and enrollment in Medicaid.</p> <p>Simulate ESI take-up given an offer, based on own modeling with MEPS</p> <p>Estimate non-group demand again using own model. Implied elasticity is -.34 and declines with age and income.</p> <p>Updated version includes utility-based approach</p> | <p>Utility-based approach.</p> <p>Existing coverage is assumed optimal at baseline.</p> <p>Benchmark that behavioral responses consistent with historical ranges indicated by Glied et al. (2003).</p> <p>Model iterates until stable</p> |

Behavior of Firms

| | CBO | GMSIM (Gruber) | RAND COMPARE | HBSM (LEWIN) | HIPSM (URBAN) |
|-----------------------------------|---|---|---|--|--|
| Firm's Decision to Offer Coverage | Price-sensitivity varies by firm size (Gruber and Lettau, 2004; Hadley and Reschovsky, 2002, etc) | Price-sensitivity varies by firm size (Gruber and Lettau, 2004) Includes “damp-down” factor to capture relative attractiveness of non-ESI options for workers. | Firm's decision is a function of cost of ESI to employer and workers, tax treatment, admin costs, and value of outside options. | Estimate reduced-form model using 1997 RWJF Employer survey. Generate offer elasticities by firm size. | Offer if workers' total willingness to pay > total costs. Depends on premiums, penalties, HR costs, tax subsidy, tax credits. |

Output of Microsimulation Models

- Coverage
 - ESI, Non-group (Exchange), Medicaid, Uninsured Counts
 - Transitions from baseline scenario over time
- Costs/Spending
 - Individuals
 - Employers
 - Government

Comparing Estimates from Various Models

- Very challenging
- Reasons
 - Differences in data infrastructure or modeling approach
 - Reference period varies
 - “Implemented today” vs. 2014 vs. 2016
 - Results are stated differently
- Likely multiple factors driving differences

Potential Questions to Ask

- Data
 - Beyond adjusting for demographics and health status of my state population, in what other ways can a model be customized to reflect our state's health care market environment?
 - What is the lowest level of geography that microsimulation models can capture?

Potential Questions to Ask

- Policy Scenarios
 - To what extent can a model incorporate decisions about state-based Exchange functions or other decisions to be made by state policymakers that would affect premiums and coverage decisions (e.g., pooling individual and small groups)?
 - How easily can certain provisions be relaxed in order to gauge their importance?

Potential Questions to Ask

- Output
 - To what extent can a model generate information about distributional effects (e.g., attributes of the newly insured)?
 - How might the model results be used to assess the impact of the policy from an economic standpoint?
 - What value does the model have after 2014? How can it be used longer-term regarding implementation?

Concluding Remarks

- Microsimulation models are complex and take years to develop.
 - Data infrastructure
 - Modelers use both elasticity-based and utility-based approaches
 - Multiple steps and assumptions embedded in the modeling process
- Understanding the basics of these models can help analysts to ask more direct questions about their flexibility and how they can be tailored to reflect a state's particular needs.

Sources

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- GMSIM
 - <http://economics.mit.edu/files/5939>
- RAND Compare
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Federal Health Care Reform in New York State

New York State Exchange Planning: Use of Simulation Modeling

**Danielle Holahan
Project Director, Health Insurance Exchange Planning**

March 21, 2012

New York's Use of Simulation Modeling to Inform Exchange Planning

- New York has contracted with the Urban Institute to model the cost and coverage impacts of reform in New York:
 - Standard implementation scenario
 - Non-group and small group market merger
 - Defining small group size as 50 and 100 in 2014
 - Basic Health Plan
- Health Insurance Policy Simulation Model-New York (HIPSM-NY)
- Questions the model answers:
 - Number of newly insured New Yorkers under health reform
 - New and previous sources of coverage
 - Estimated cost to government, employers, and individuals
 - Impact of various policy decisions
 - Modeling results will inform Exchange policy decisions and budget needs

New York's Use of Simulation Modeling to Inform Exchange Planning

- Built on work with Urban Institute in 2007 (“Partnership for Coverage”)
- Current contract began April 2011
 - Scope of work developed with New York’s interagency Exchange planning team
- Contract cost: approximately \$150,000
- Deliverables:
 - Numerous rounds of draft output
 - Public presentation of results
 - Final written report

Contact Information



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