Dynamic Forecasting

NCSL Budgets and Revenue Committee

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Dynamic vs. Static Estimates

- **Dynamic Revenue Estimate** – takes into account the behavioral response of households and businesses to a change in tax policy and how those changes affect overall economic activity and thus tax receipts.
- **Static Revenue Estimate** - ignores changes in the economy brought about by changes in tax policy.

Taxpayer Behavior Reflected In Dynamic Estimates

- Behavioral responses generally run counter to the direction of the tax change.
- Tax increase will net less revenue than a static estimate would indicate.
- Tax cut will result in a smaller revenue loss than under a static estimate.

Dynamic Feedback Effect

- Feedback effect refers to the additional revenue loss or gain resulting from the change in economic output induced by the tax change.
- Feedback effects are expressed as a percentage of the static estimate.
- Example: Static estimate = -$100m
  Revenue Feedback = +$10m
  Feedback Effect = 10%

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2002 Legislation Requires Arizona To Use Dynamic Estimates

- HB 2178 requires JLBC Staff to add "probable behavioral response" of taxpayers to fiscal notes.
- Behavioral analysis can be omitted if it is "unreasonable to do so."
- UofA economists conducted extensive evaluation of several potential models.
- Based on their recommendation, JLBC acquired REMI.

What is REMI?

- Regional Economic Models, Inc.
- REMI is a dynamic model based on CGE techniques, econometric estimations, economic geography.
- 6,000 policy variables available to the model user.
- Model configured to assess policy changes at both state and county levels.

Dynamic Forecasting: A Multi-Step Process

1. Establish a baseline forecast.
2. Calibrate Fiscal Variables.
3. Produce a static estimate.
4. Decide which variables in the model to use to best represent the policy change.
5. Convert static estimate into a format that can be entered into the model.
6. Run simulation and interpret result.

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JLBC Staff Produces Dynamic Estimates When Requested

- Typically, no more than 2 requests received per legislative session.
- Requests usually involve larger tax proposals.
- Dynamic estimates require considerably more time to prepare than static estimates.
- Dynamic estimates have been produced mostly for informational purposes.

REMI Generates Relatively Modest Feedback Effects

Feedback Effects After 5 years:

- Individual Income Tax: 5 – 6%.
- Corporate Income Tax: 10 – 14%
- Sales Tax: 10 – 11%
- Property Tax: 8 – 10%

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Other States' Experiences With Dynamic Forecasting

- Massachusetts was the first state to develop a dynamic model (early 1990s).
- A handful of other states followed suit in the mid-1990s.
- In recent years, several states have begun producing dynamic estimates.
- However, a number of states have also scaled back or abandoned earlier efforts.

How Many States Produce Dynamic Estimates?

- In 2003 the Heritage Foundation reported that 10 states produced dynamic estimates (5 states used REMI).
- In 2004, 16 states were reported using REMI models.
- In 2005, REMI claimed that "more than half of" of state governments used its models.

California's Experience

- 1994 law required CA to adopt dynamic estimation techniques.
- DOF built sophisticated and expensive model known as DRAM.
- Used for tax law changes with a static impact of at least $10 million.
- Dynamic feedback effects comparable to those produced by REMI.
- Legislation that required dynamic estimates sunset in 2000.

Kentucky

- In 2004, Office of the State Budget Director used REMI to analyze a tax package.
- Included $100 million increases (each) in the individual income, corporate license, and cigarette excise taxes.
- Dynamic revenue loss of $300m tax increase was estimated to be $(18.1)m, or 6%, in 2008.

New Mexico

- Legislative Finance Committee staff acquired REMI in 2005 with the intent to produce dynamic estimates.
- Department of Finance and Administration used REMI to produce dynamic estimates of individual income tax rate reductions enacted in 2003.
- Dynamic feedback effect estimated to be about 2% in 2008.

Ohio

- Department of Development contracted with REMI in 2005 to provide a detailed analysis of a broad tax reform package.
- REMI estimated a dynamic feedback effect of 8% for individual income tax, 10% for corporate franchise tax, 11% for sales tax, and 9% for tangible property tax.

Oregon

- In 1999, LRO acquired a similar model to California's DRAM.
- The model provides not only dynamic estimates but also distributional effects of a tax policy change.
- Simulations of a $100m tax change produced feedback effects of 10% for individual income tax, 17% for corporate income tax, and 11% for business property tax.

Dynamic Models Can Add Value To The Analysis of Tax Bills

- Dynamic scoring provides more information of a bill's potential impact, but results must still be viewed cautiously.
- Dynamic models serves the added purpose of describing how a specific tax proposal affects various macroeconomic measures.
- Dynamic models can also be helpful in terms of evaluating alternative tax proposals.

Issues To Be Aware Of When Acquiring A Dynamic Model

- Expensive to acquire and maintain, especially if custom-built.
- Requires extensive training of staff (custom-built models typically require very specialized skills).
- Some states report that after the departure of key personnel, model was left unused.
- Dynamic estimates take a long time to prepare.
- Model may be a "Black Box"; users are not able to modify model parameters.

Issues To Be Aware Of When Acquiring A Dynamic Model (cont.)

- Dynamic impacts have long time horizons (~5 yrs.), which make them less suitable for bill scoring purposes.
- Behavioral responses are uncertain; economists may agree on direction but not magnitude.
- Regional and national models have many key differences (balanced-budget requirement, quality and timeliness of data, etc.)

Final Comments

- Most states report feedback effects of 2% to 20% after 5 years.
- Dynamic scoring remains an "inexact science." Estimates are influenced by underlying assumptions.
- While dynamic scoring provides an additional layer of information for policymakers, results must be interpreted with caution.