

Dynamic Scoring Webinar

Presenters



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Peter Bluestone and Carolyn Bourdeaux

Dynamic Revenue Analysis: Experience of the States

Introduction

- Do tax changes affect economic activity? Do these economic changes then result in changes in state tax revenues?
- These are some of the questions that dynamic revenue analysis or “dynamic scoring” attempts to answer.

Overview

- Theory
- Tax policy and economic growth: empirical evidence from the states
- Use of dynamic modeling by the states
 - Overview
 - Case study results
- Conclusion

Supply-Side Links to Dynamic Revenue Analysis

- Perhaps no economist is as associated with supply-side economics and the “dynamic effects” of tax changes as Arthur Laffer...

The Laffer Curve

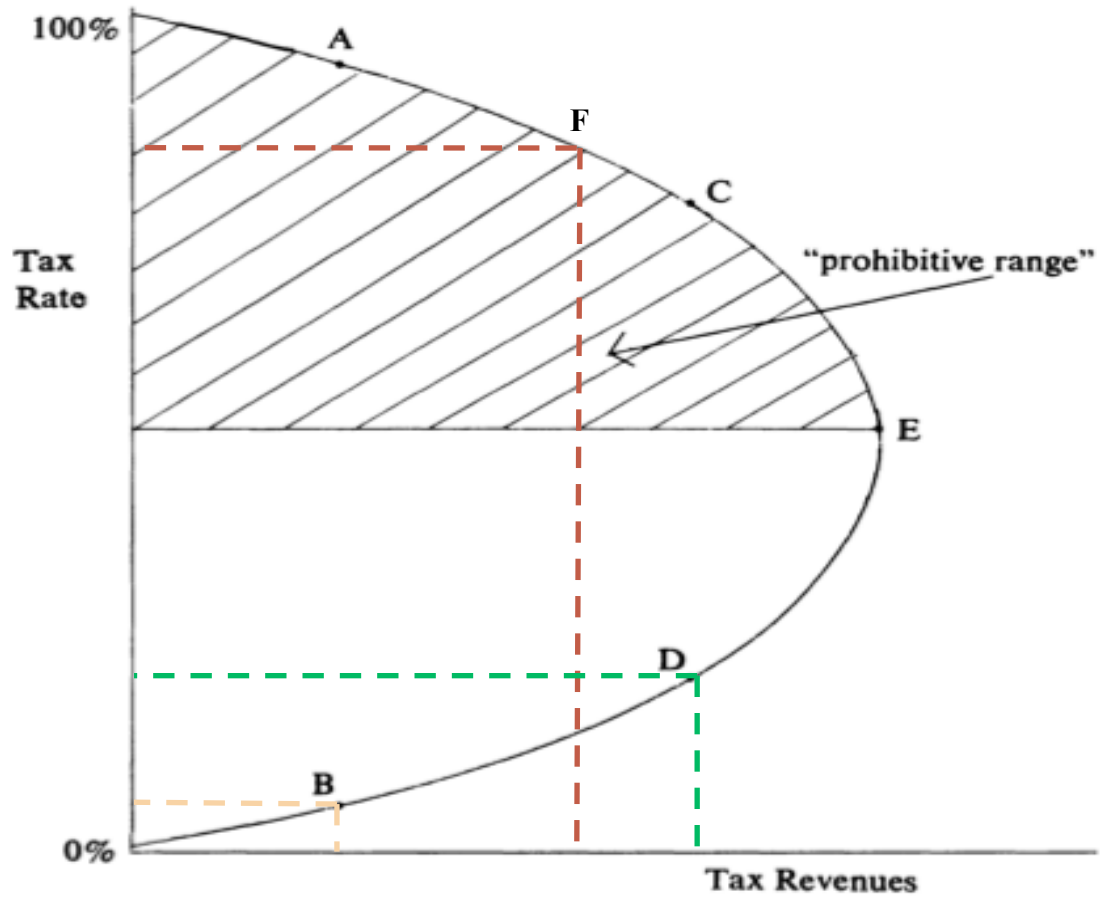
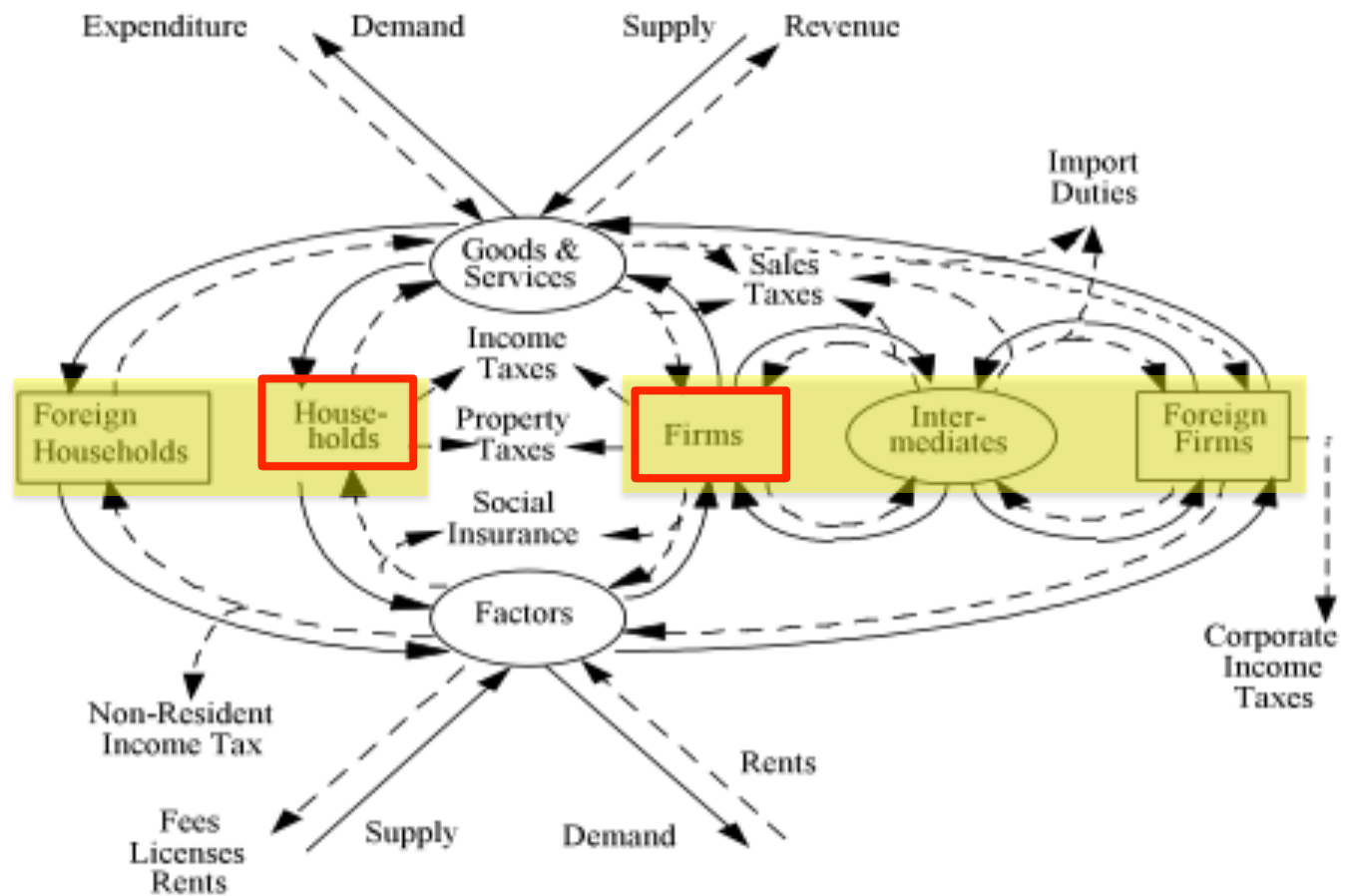


Figure 1: *The Laffer Curve*



Source: Berck, Golan, and Smith (1996). "Dynamic Revenue Analysis in California: An Overview." *State Tax Notes* 11:1227-37.

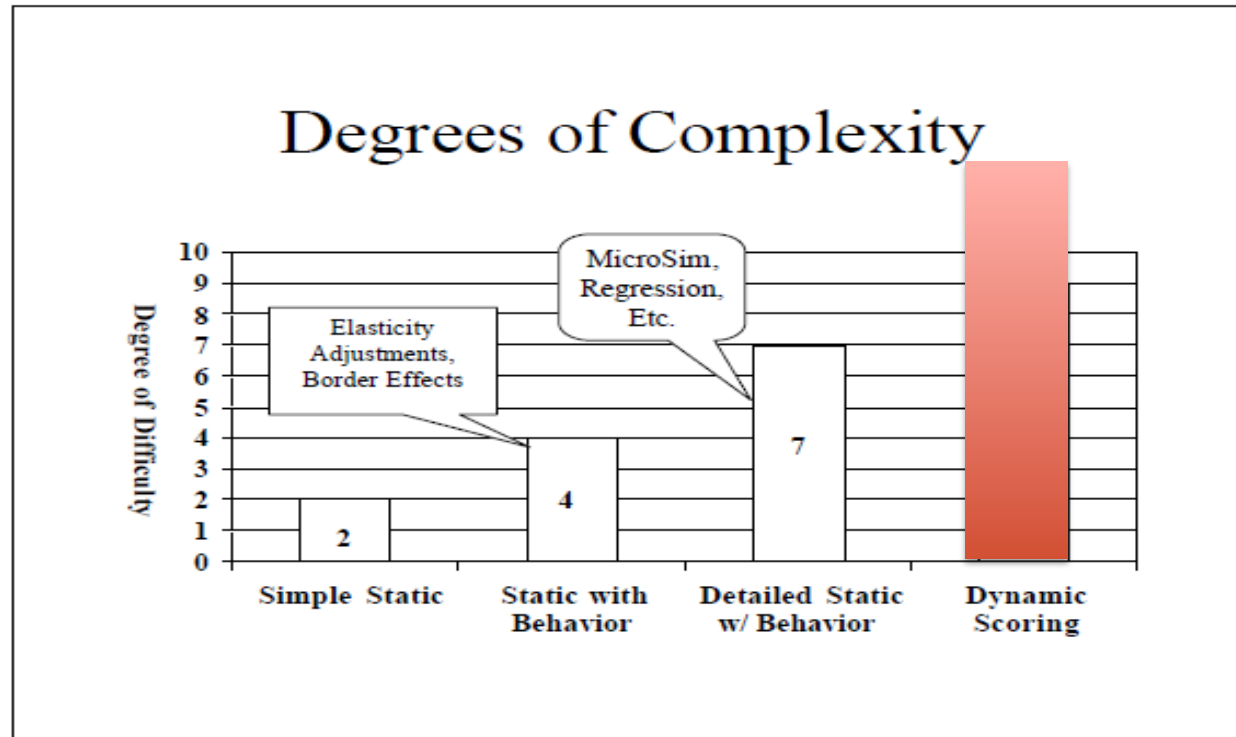
Empirical Evidence: Effect of Taxes on State Economies

- Taxes generally create a drag on state economies.
- Key reviews of the early literature found:
 - Taxes had a statistically significant negative impact on state economic output—
 - *The size of the effect was potentially subject to measurement error and most likely small.*
- Recent studies find a negative effect of tax changes on economic variables, but typically the effect is small.
- Some evidence that government spending on productive services can offset the negative effects of taxes.



Experience of the States

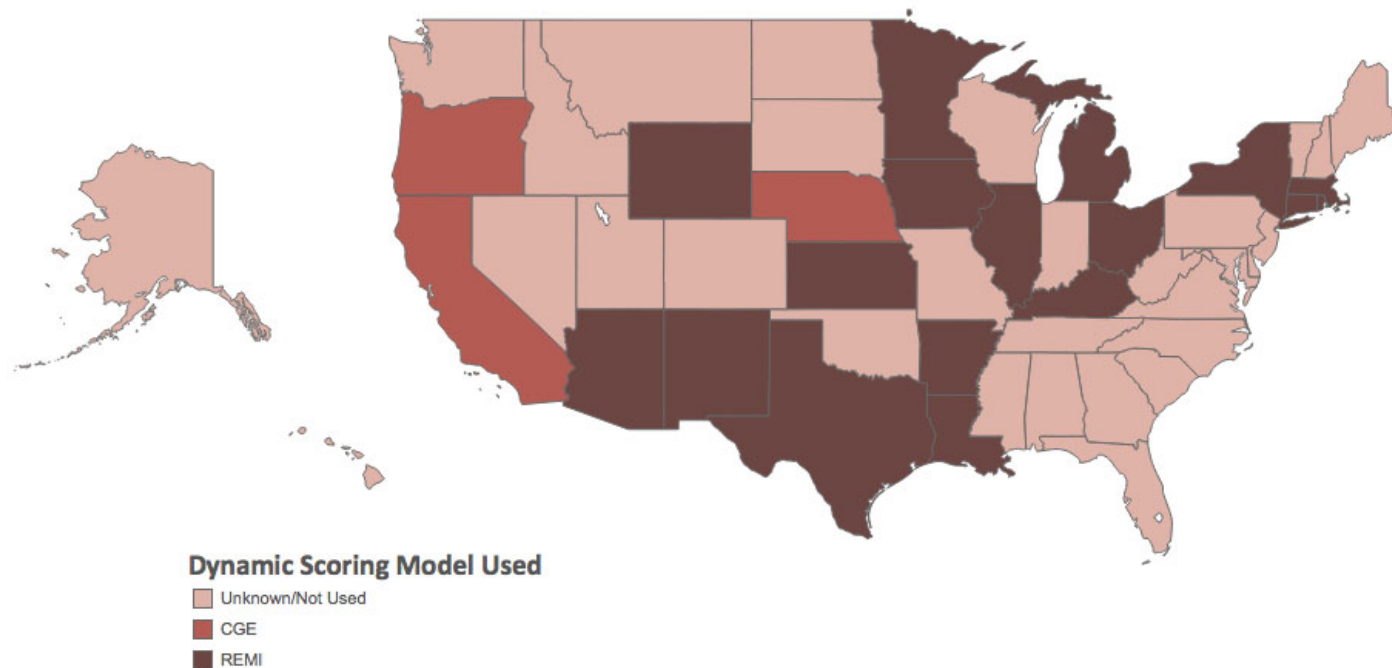
How States Currently Score Tax Legislation



Source: *Dynamic Impacts of Tax Law Changes* (Greg Harkenrider, Office of State Budget Director, Commonwealth of Kentucky, September 22, 2004, Presentation to Federation of Tax Administrators)

States Experimenting with Dynamic Scoring of Tax Policies

REMI v. CGE v. Unknown/Not Used



Dynamic Scoring

- Do tax cuts pay for themselves? No.
- Does the increased economic activity from tax cuts help offset some of the revenue loss? Yes – possibly.
- Assuming there is an effect, what is the estimated magnitude of effect?

California



Table 1: California DRAM Model of Dynamic Effects of a \$1 Billion Increase in Each Tax Type (2000 Model Estimates)

	Change in Individual Income Tax	Change in Sales and Use Tax	Change in Bank and Corporation Tax
Size of Static Increase (\$millions)	\$1,000	\$1,000	\$1,000
Revenue Feedback (\$millions)	(\$40)	(\$120)	(\$180)
% of Static Estimate	-4%	-12%	-18%
Employment Change (persons)	-18,000	-10,000	-11,000
Business Investment Change (\$millions)	(\$83)	(\$109)	(\$479)

Note: The changes assume a balanced budget and therefore have expenditure side effects, which are modeled.

Vasche, Jon (2006). "Whatever Happened to Dynamic Revenue Analysis in California?" Proceedings at the Annual Revenue Estimation & Tax Research Conference, Federation of Tax Administrators, Portland, OR., September 17-20.

Oregon

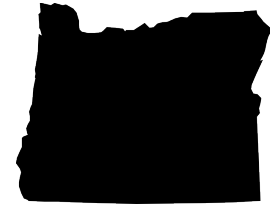


Table 2: Oregon OTIM Model of Dynamic Effects of a \$100 Million Decrease in Each Tax Type

	Change in Individual Income Tax	Corporate Income Tax	Business Property Tax
Size of Static Decrease (\$millions)	(\$100)	(\$100)	(\$100)
Revenue Feedback (\$millions) ⁽ⁱ⁾	\$9.65	\$15.84	\$10.98
State Revenue Portion (\$millions)	\$6.70	\$13.60	\$8.10
Local Revenue Portion (\$millions)	\$2.80	\$2.20	\$3.24
% of Static Estimate	9.65%	15.84%	10.98%
Employment (% change)	0.22%	0.06%	0.08%
Wages (% change)	-0.14%	0.07%	0.03%
Personal Income (% change)	0.12%	0.20%	0.17%
Return to Capital (% change)	0.01%	0.03%	0.01%
Investment (% change)	0.14%	0.53%	0.20%

Note: The changes assume a balanced budget and therefore have expenditure side effects, which are modeled.

(i) Some state and local revenue totals numbers do not sum to the total perhaps because of rounding issues. Oregon reported state and local revenues combined as their dynamic effect, but most other states would only report the state revenue portion.

Source: The changes assume a balanced budget and therefore have expenditure side effects, which are modeled. Oregon Legislative Revenue Office, and Oregon State University (2001). "The Oregon Tax Incidence Model." Report I-01 (March). Salem, OR: Legislative Revenue Office.

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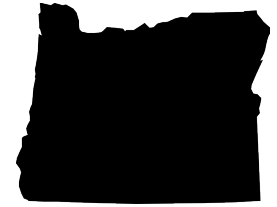


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Nebraska



Table 3: Nebraska Train Model of Dynamic Effects of a \$100 Million Decrease in Each Tax Type

	Change in Individual Income Tax	Sales and Use Tax
Size of Static Decrease (\$millions)	(\$100)	(\$100)
Revenue Feedback (\$millions)	\$6.40	\$20.60
% of Static Estimate	6.40%	20.60%
Employment Change Total (persons)	1,788	2,615
Employment Change Private Sector (persons)	1,594	2,538
Personal Disposable Income (\$millions)	\$121.60	\$181.20
Investment (\$millions)	\$64.80	\$123.34

Note: The changes assume a balanced budget and therefore have expenditure side effects, which are modeled.

Source: Nebraska Department of Revenue Research Services (2013). "2010 Nebraska Tax Burden Study." Lincoln, NE.

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New Mexico

Reduced top personal income tax rate from 8.2% to 4.9% over 5 years
50% cut in capital gains tax

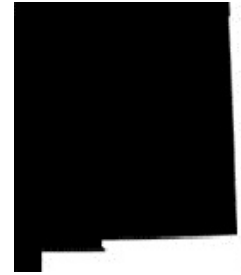


Table 5: New Mexico REMI Model of Tax Reform

	FY 2004	FY 2005	FY 2006	FY 2007	FY2008
Static Analysis (\$millions)	(\$21.80)	(\$83)	(\$167.20)	(\$275.20)	(\$360.30)
Dynamic Analysis (\$millions)	(\$21)	(\$80.80)	(\$163)	(\$268.70)	(\$352.20)
Difference	\$0.80	\$2.20	\$4.20	\$6.50	\$8.10
% Dynamic Effect	3.70%	2.70%	2.50%	2.40%	2.20%
Employment (thousands)	-0.031	-0.086	-0.156	-0.225	-0.242
Employment: Private Nonfarm	0.311	0.846	1.601	2.417	2.95
Employment: Government	-0.342	-0.932	-1.759	-2.641	-3.191
Personal Income (\$millions)	(\$1.50)	(\$5.00)	(\$9.00)	(\$11.50)	(\$9.50)
Disposable Personal Income (\$millions)	\$30.00	\$84.00	\$165.50	\$260.00	\$332.00
Output (\$millions)	0.597	1.824	4.326	10.064	16.627

Source: New Mexico Legislative Finance Committee Staff (2004). "2004 Post-Session Fiscal Review." Santa Fe, NM: New Mexico Legislative Finance Committee.

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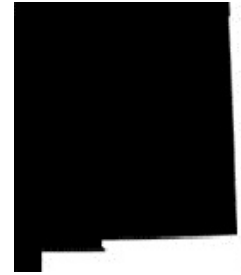
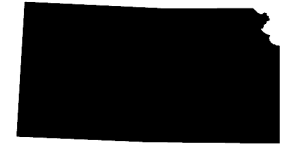


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Kansas



**Table 6: Kansas Legislative Research Department (KLRD) Estimates of Impact of 2012 HB2117 and STAMP
Dynamic Revenue Estimates**

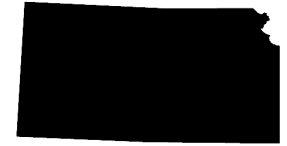
	FY 2013	FY 2014	FY 2015	FY 2016	FY 2017	FY 2018	Cumulative FY 2013-FY 2018
KLRD Final Revenue (pre-tax changes, millions) ⁽ⁱ⁾	\$6,394	\$6,231	\$6,466	\$6,708	\$6,980	\$7,259	\$40,038
KLRD Final Revenue (post-tax changes, millions)	\$6,163	\$5,428	\$5,642	\$5,854	\$6,087	\$6,325	\$35,499
KLRD Estimate of HB 2117 (2012 Tax Impact)	(\$231)	(\$803)	(\$824)	(\$854)	(\$893)	(\$934)	(\$4,539)
% Decline from Original General Funds Budget	-4%	-13%	-13%	-13%	-13%	-13%	-11%
STAMP Dynamic Revenue (Pass-Through)	\$18	\$87	\$93	\$101	\$111	\$123	\$533
STAMP Dynamic Revenue (Standard)	\$27	\$108	\$110	\$115	\$122	\$130	\$612
% Dynamic Effect (Standard)	11.72%	13.47%	13.37%	13.43%	13.70%	13.87%	13.48%
% Dynamic Effect of Post-Tax General Funds Budget	0.44%	1.99%	1.95%	1.96%	2.01%	2.05%	1.72%

Sources: Davidson, Todd, David Tuerck, Paul Bachman, and Michael Head (2012). "Tax Reform Gears Kansas for Growth: A Dynamic Analysis of Additional Revenue and Jobs Generated by Tax Reform." Wichita, KS: Kansas Policy Institute.

Kansas Legislative Research Department (2012). "Supplemental Note on Senate Substitute for House Bill 2117." Edited by Kansas Legislature. Retrieved from www.kslegislature.org.

(i) These are calculated by authors and are derived by restoring the projected HB2117 static tax revenue declines to the post HB2117 baseline.

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The Problem with Measuring Dynamic Effects

- Size of the effects are small
- The largest effects fall within 3.5% average error rate for state level revenue estimates
- Tax cuts do not pay for themselves
- Non-revenue neutral tax cuts lead to expenditure reductions, which have negative dynamic effects

Conclusion: Pros and Cons of Dynamic Revenue Models

- Dynamic modeling has some interesting applications:
 - Impacts of policy on jobs and wages
 - The ability to measure different economic responses to different types of tax changes
 - The ability to take a more refined look at the incidence of tax policy changes
- Where dynamic modeling falls short:
 - Problematic for budgetary decision-making or forecasting
 - Impact of effects takes time
 - Effects small compared to state revenues
 - Hard to pinpoint dynamic effects for policy makers and citizens

Conclusion: Important Questions for Policymakers

- First, what do policymakers want to learn from dynamic revenue estimation?
 - Inform a policy debate
 - May not be appropriate for the budgetary process
- Second, states need to consider the resources required to develop, customize and then interpret the results from a dynamic model.
 - Models are costly and require annual updating
 - Models are complicated
 - Not a few states have abandoned their efforts at dynamic revenue estimation due to this cost and complexity

A Dynamic Model of State Tax Reform: An Application to the State of Georgia and its Competitor States

June 26, 2015

Dynamic Scoring Webinar

Center for State and Local Finance

Andrew Young School of Policy Studies

Georgia State University

Mark Rider

Associate Professor of Economics

Revenue estimating conventions

1) Micro-static and Macro-static

- 1) Static revenue estimation.
- 2) Assumes taxes have no or very small behavioral effects.

2) Micro-behavior and Macro-static

- 1) The revenue estimating community refers to this methodology as “static”, by which they mean the macroeconomic forecast does not change but the estimator DOES account for a limited amount of behavioral response to changes in tax laws.
- 2) This is the JCT/OTA revenue estimating convention.
- 3) They assumes GDP is fixed AND the wage bill is fixed.
- 4) This methodology accounts for own-price effects and perhaps some cross-price effects, except in the case of a tax on labor income.

3) Micro-behavioral and Macro-behavioral

- 1) “Dynamic” revenue estimation.
- 2) The macroeconomic forecast of GDP is allowed to change in response to tax law changes *when appropriate*.

Modeling Fundamental State Tax Reform

The Reform

Replace Georgia's personal and corporate income tax with a revenue neutral change in Georgia's sales tax, by broadening the sales tax base to include services and increasing the sales tax rate.

For this purpose, we developed a dynamic, multiregional CGE model

- Dynamic
 - 11 time periods
- 11 economic sectors
- Multiregional
 - Six states,
 - Rest of the United States, and
 - Rest of the World.
- Assumes balanced budget in the initial year of the reform.

Size of state economies and tax structure prior to reform

Region	Gross state product (GSP) (billions \$'s)	Share in GSP of		Share in total tax revenue of		
		state and local expenditures (percent)	state and local tax revenue (percent)	capital taxes (percent)	sales taxes (percent)	personal income tax (percent)
	(1)	(2)	(3)	(4)	(5)	(6)
Alabama	169.1	16.5	7.7	31.3	46.2	22.5
Florida	737.1	14.1	9.0	53.5	46.5	-
Georgia	398.6	14.2	7.8	37.7	35.8	26.5
North Carolina	411.4	14.0	7.6	33.2	34.7	32.1
South Carolina	160.6	18.2	8.0	42.8	34.2	23.0
Tennessee	246.4	14.4	7.0	40.4	58.3	1.4
Rest of the USA	11,995.8	16.2	9.0	43.7	32.2	24.1
USA	14,119.0	16.0	8.9	43.6	33.7	22.7

What do you do?

- Use the model to simulate the pre-reform baseline economy.
- Use the model to simulate the post-reform economy.
- Compare the two simulations.

Pre-reform baseline simulation (personal income)

State	Period										
	0	1	2	3	4	5	6	7	8	9	10
Alabama	100.0	101.4	103.4	106.1	109.3	112.7	116.2	119.8	123.6	127.5	131.6
Florida	100.0	101.2	103.0	105.2	108.0	110.8	113.6	116.5	119.3	122.3	125.2
Georgia	100.0	102.0	105.0	108.4	112.3	116.4	120.6	125.0	129.6	134.3	139.3
North Carolina	100.0	102.7	106.7	111.2	116.2	121.4	126.7	132.3	138.1	144.2	150.6
South Carolina	100.0	100.9	101.8	103.4	105.4	107.5	109.6	111.7	113.9	116.0	118.1
Tennessee	100.0	100.8	101.6	103.1	105.0	107.1	109.2	111.3	113.5	115.6	117.8
Rest of USA	100.0	101.3	103.6	106.1	108.7	111.3	113.9	116.5	119.2	121.8	124.5
USA	100.0	101.4	103.6	106.2	108.9	111.6	114.3	117.1	119.9	122.7	125.6

Post-reform simulation (personal income)

State	Period										
	0	1	2	3	4	5	6	7	8	9	10
Alabama	100.0	101.2	103.0	105.7	108.7	111.8	115.1	118.4	121.9	125.4	129.0
Florida	100.0	101.1	102.5	104.9	107.5	110.2	112.8	115.5	118.2	120.9	123.6
Georgia	101.5	103.8	107.7	111.9	116.4	121.2	126.2	131.4	136.9	142.6	148.5
North Carolina	100.0	102.6	106.3	110.7	115.5	120.4	125.5	130.8	136.3	142.0	148.0
South Carolina	100.0	100.7	101.4	103.1	105.0	107.0	109.0	110.9	112.9	114.9	116.8
Tennessee	100.0	100.6	101.2	102.7	104.6	106.6	108.5	110.5	112.4	114.3	116.3
Rest of USA	100.0	101.3	103.6	106.1	108.5	111.0	113.5	116.1	118.6	121.1	123.6
USA	100.1	101.4	103.7	106.2	108.8	111.4	114.0	116.7	119.4	122.1	124.8

Comparisons of period 10 (personal income)

State	Baseline	Reform	%Δ
	10	10	
Alabama	131.6	129.0	-1.98
Florida	125.2	123.6	-1.28
Georgia	139.3	148.5	9.20
North Carolina	150.6	148.0	-1.73
South Carolina	118.1	116.8	-1.10
Tennessee	117.8	116.3	-1.27
Rest of USA	124.5	123.6	-0.72
USA	125.6	124.8	-0.64

Conclusions

- 9.2 percentage point increase in the growth rate of personal income by year 10 of the reform.
- 23.4 percent increase in the growth rate of personal income by year 10 of the reform.
- The reform is “beggar thy neighbor”
 - Therefore, neighboring states may respond with tax reforms of their own. Should the estimator take this into account?
- In my opinion, a revenue estimate of *fundamental* state tax reform should account for the potential “dynamic” effects of the reform on the macroeconomic forecast.

References

- “A Multiregional Model of Growth Oriented State Tax Reforms: An Application to Georgia and Five Comparison States.” FRC Report No. 269, April 21, 2015. (co-authored with Jeffrey Condon, Andrew Feltenstein, Florenz Plassman, and David L. Sjoquist).
- “A Regional Model of Growth Oriented Fiscal Policy: An Application to Georgia and Five Comparison States,” *The Review of Regional Studies* 44 (2), May 2015, pp. 177-209. (co-authored with Jeffrey Condon, Andrew Feltenstein, Florenz Plassmann, and David L. Sjoquist).
- “Dynamic Revenue Analysis: Experience of the States.” CSLF Report No. 12, April 21, 2015. (co-authored with Peter Bluestone and Carolyn Bourdeaux).

Questions?

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