

TRAINING: MODELING IN TAX-PI

Presented by Kyle Compton, Economic Associate

what does **REMI** say? sm

Modeling in Tax-PI: Overview

- Budget calibration
 - Economic drivers of revenue, expenditures
 - Interaction between the budget and the economy
 - Balanced budget
 - Unbalanced budget
- □ Modeling in Tax-PI
 - Analysis of incentives
 - Budget forecasting
 - Dynamic fiscal notes

Budget Calibration



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Budget Calibration - CT OFA	FY16-17 Backup	р					- [
Options Expenditures Determined By Start of Fiscal Year Units Revenues Demand Settings 						Budget Data Enter actual or forecasted budget data. The budget will be projected forward using the last year of entered data and an indicator that is selected from the model results.						
Revenues	Disp	lay Years 014	2017 >			Indicator Policy Variable Rate Info Revenue Details Corporation Tax						
Revenues Expenditures	FY2014	FY2015	FY2016	FY2017		Economic Indicator						
Personal Income Taxes	9456142	9748600	9834400	10357200	H	Value-Added						
Sales & Use Tax	4123470	4251000	4121065	4084665			-					
Corporation Tax	608481	627300	902200	910700			Include A					
Public Service Tax	298760	308000	308000	316500		Details Units	All Years					
Inheritance & Estate Tax	172078	177400	173400	174700		▶ Forestry and logging; Fishing, hunting, ar Percent 100						
Insurance Companies Tax	230084	237200	243800	24600		Agriculture and forestry support activities Percent 100	=					
Cigarettes Tax	326599	336700	361200	363300		Oil and gas extraction Percent 100						
Real Estate Conveyance Tax	188859	194700	194700	200800	=	Mining (except oil and gas) Percent 100						
Oil Companies Tax	0	0	0	0		Support activities for mining Percent 100						
Alcoholic Beverages Tax	59364	61200	61700	62100		Utilities Percent 100						
Admissions & Dues Tax	37539	38700	38300	39600		Construction Percent 100						
Health Provider Tax	465503	479900	676900	683900		Wood product manufacturing Percent 100						
Misc. Tax	20273	20900	20800	21300		Nonmetallic mineral product manufacturini Percent 100						
Other Revenues	1108904	1143200	1174313	1183475		Primary metal manufacturing Percent 100						
Special Transportation Fund (S	1381335.29	1424057	1468100	1596900		Fabricated metal product manufacturing Percent 100						
Mashantucket Pequot and Mor	58147.62	59946	61800	61800		Machinery manufacturing Percent 100						
Regional Market Operating Fur	1034.99	1067	1100	1100		Computer and electronic product manufac Percent 100						
Banking Fund	28227	29100	30000	30200		Electrical equipment and appliance manufi Percent 100						
Insurance Fund	75224 055	77551 5	79950	81400		Motor vehicles bodies and trailers and p Percent 100	1					

Add Revenue

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OK

Budget Calibration: Economic Drivers



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Budget Calibration - CT OF	A FY16-17 Backup				- ¤ ×				
Options		Expenditures Deter	rmined By	Budget Data Enter actual or forecasted budget data. The budget will b	a projected forward usion				
Start of Fiscal Year Ur	nits	Revenues	 Demand 	the last year of entered data and an indicator that is select	ted from the model results.				
July 🖳 N	ominal \$ (000s)	Settings	Settings						
Revenues	Display Years	e 2017 👂		Indicator Policy Variable Rate Info Revenue Details Corporation Tax					
Revenues Expenditures			1.0	Economic Indicator					
Revenue Name	FY2014 FY2015	FY2016	FY2017	Value-Added	~				
Salar & Line Tax	4122470 4251000	0 9834400	4094665				111/1		
Forestation Tax	608481 627300	0 902200	910700	Time Series	Include All				
Public Service Tax	298760 308000	0 308000	316500	Details Units	All Years ^				
Inheritance & Estate Tax	172078 177400	0 173400	174700	Forestry and logging; Fishing, hunting, ar Percent	100				
Insurance Companies Tax	230084 237200	0 243800	24600	Agriculture and forestry support activities Percent	100 =	17-2			
Cigarettes Tax	326599 336700	0 361200	363300	Oil and cas extraction Percent	100				
Real Estate Conveyance Tax	188859 194700	0 194700	200800	Mining (except oil and gas) Percent	100	117			
Ol Companies Tax	0 (50264 61200	0 0	62100	Support activities for mining Percent	100				
Aconolic Beverages Tax	39304 01200	0 81700	30600	Construction Percent	100				
Health Provider Tax	465503 479900	0 676900	683900	Work product manufacturing Percent	100				
Misc. Tax	20273 20900	0 20800	21300	Nonmitallic mineral product manufacturine Percent	100				
Other Revenues	1108904 1143200	0 1174313	1183475	Primary vetal manufacturing Percent	100				
Special Transportation Fund (1381335.29 142405	7 1468100	1596900	Fabricate metal product manufacturing Percent	100 Indicator	Policy Variable Date Info			
Mashantucket Pequot and Mo	58147.62 5994	6 61800	61800	Machinery Munufacturing Percent	100	Policy variable Rate 1110			
Regional Market Operating Fu	1034.99 1063	7 1100	1100	Computer and electronic product manufac Percent	100				
Banking Fund	28227 29100	0 30000	30200	Electrical equipment and appliance manuf. Percent	100	nue Detelle			
Insurance Hund	75224.955 77551.	5 /9950	81400	Motor vehicles, be ves and trailers, and p Percent	Kever	nue Details			
Add Revenue					Corr	erstien Tox			
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-	1	22			P Forestr	y and logging; Fishing, hunting, a	Percent	100	
	gicali	indi	cato	NCC .		16	<b>D</b>	100	
	BILDI	Indi	Lall	12	Agricult	ture and forestry support activitie	s Percent	100	=
	0.11.1						-		

### Budget Calibration: Associated Policy Variables

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Options		E	xpenditures Det	ermined By	Policy Variable
Start of Fiscal Year Uni	ts		O Revenues	Demand	change is made to this budget item, the a
July 💟 Nor	ninal \$ (000s)	$\overline{\mathbf{M}}$	Settings	Settings	) changed. Select a variable that best represents ho sales tay on consumer coords would be wo
Revenues	Displ	ay Years			Indicator Policy Variable Rate Info
Revenues Expenditures	12	)14 🖻 to 🔄	2017 🕨		Revenue Details Corporation Tax
Revenue Name	FY2014	FY2015	FY2016	FY2017	Policy Variable
Personal Income Taxes	9456142	9748600	9834400	10357200	Production Cost
Sales & Use Tax	4123470	4251000	4121065	4084665	Time Serier
Corporation Tax	608481	627300	902200	910700	
Public Service Tax	298760	308000	308000	316500	Details
Inheritance & Estate Tax	172078	177400	173400	174700	Forestry and logging; Fishing, hunting,
Insurance Companies Tax	230084	237200	243800	24600	Agriculture and forestry support activiti
Cigarettes Tax	326599	336700	361200	363300	Oil and gas extraction
Real Estate Conveyance Tax	188859	194700	194700	200800	Mining (except of and case)
Oil Companies Tax	0	0	0	0	Support activities for mining
Alcoholic Beverages Tax	59364	61200	61700	62100	Utilities
Admissions & Dues Tax	37539	38700	38300	39600	Instruction
Health Provider Tax	465503	479900	676900	683900	Wind product manufacturing
Misc. Tax	20273	20900	20800	21300	Nonnetallic mineral product manufactur
Other Revenues	1108904	1143200	1174313	1183475	Primare metal manufacturing
Special Transportation Fund (5	1381335.29	1424057	1468100	1596900	Fabricated metal product manufacturing
Mashantucket Pequot and Moh	58147.62	59946	61800	61800	Machinerymanufacturing
Regional Market Operating Fur	1034.99	1067	1100	1100	Computer and electronic product manuf
Banking Fund	28227	29100	30000	30200	Electrical equipment and appliance man
Insurance Fund	75224.955	77551.5	79950	81400	<ul> <li>Motor vehicles, odies and trailers, and</li> </ul>

Add Revenue

 Budget changes will be reflected by policy variable changes in the model

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- 	(Years	Include AI				
					$\langle \langle$	
	In	ndicator Policy Variable Rate Info				
00	1	Revenue Details Corporation Tax				
	P	Policy Variable				
	ŀ	Production Cost		$\checkmark$		
		Time Series			Include	All
		Details	Units		All Years	<u>^</u>
	Þ	Forestry and logging; Fishing, hunting, a	Percent	100		
		Agriculture and forestry support activities	Percent	100		=
		Oil and gas extraction	Percent	100		

### Budget Calibration: Balanced Budget

- Expenditures Determined by Revenues
  - Pooled general fund
  - Funds for specific uses
    - State highway fund
    - Death Taxes

Views © Expenditures x Revenues © Expenditures x Year Flat View	ear 015 V Spread	Revenue Mapping Create a mappin be used to balan	g from each of the reven ce the budget when the	ue categories to each o revenue mapping feedb	of the expenditure categories. ack option is on.	This mapping will
Create a mapping of revenues to expe	nditures		Peue	nuer.		
Expenditures	Personal Income Taxes	Sales & Use Tax	Corporation Tax	Public Service Tax	Inheritance & Estate Ta: Insu	rance Companies
Non-Functional	26.745%	26.745%	26.745%	26.745%	26.745%	26.745
Education, Museums, Libraries	23.938%	23.938%	23.938%	23.938%	23.938%	23.938
Human Services	14.972%	14.972%	14.972%	14.972%	14.972%	14.972
Health	8.748%	8.748%	8.748%	8.748%	8.748%	8.748
Corrections	6.960%	6.960%	6.960%	6.960%	6.960%	6.960
General Government	3.436%	3.436%	3.436%	3.436%	3.436%	3.43
Transportation	2.910%	2.910%	2.910%	2.910%	2.910%	2.910
Judicial	3.000%	3.000%	3.000%	3.000%	3.000%	3.000
Regulation and Protection	2.084%	2.084%	2.084%	2.084%	2.084%	2.084
Conservation and Development	1.127%	1.127%	1.127%	1.127%	1.127%	1.127
Legislative	0.398%	0.398%	0.398%	0.398%	0.398%	0.398
Tax Incentives	5.682%	5.682%	5.682%	5.682%	5.682%	5.682
Urban Reinvestment Act Tax Credits	0.000%	0.000%	0.000%	0.000%	0.000%	0.000
Sum	100.000%	100.000%	100.000%	100.000%	100.000%	100.000
<][		( ~~				

- Expenditures Determined by Demand
  - Adjusting for surplus or deficit
    - Does revenue or expenditure get adjusted?
    - Which categories get adjusted?

Name	Name	FY2015	FY2016	FY2017	FY2018	FY2019	FY2020	FY2021	FY2022	FY2023	FY2024	FY2025	FY2026	FY2027
Distribution of	Revenue Share	0.000%	0.000%	0.000%	0.000%	0.000%	0.000%	0.000%	0.000%	0.000%	0.000%	0.000%	0.000%	0.0007
Adjustments	Expenditure Share	100.000%	100.000%	100.000%	100.000%	100.000%	100.000%	100.000%	100.000%	100.000%	200.000%	100.000%	100.000%	100.000*
-	Personal Income Taxes	51.108%	\$1,108%	51.108%	51.108%	51.108%	51.108%	SL.108%	51.108%	\$1.108%	51.108%	51.108%	51,108%	51.1081
	Sales & Use Tax	20.156%	20.155%	20.156%	20.156%	20.156%	20.156%	20.156%	20.156%	20.15635	20.156%	20.156%	20.156%	20.1563
	Corporation Tax	4.494%	4,494%	4.494%	4.494%	4,494%	4.494%	4.494%	4.494%	4.494%	4.494%	4.494%	4,494%	4.494
	Public Service Tax	1.562%	1.562%	1.562%	1.552%	1.562%	1.562%	1.962%	1.562%	1.562%	1.562%	1.552%	1.562%	1.562*
	Inheritance & Estate Tax	0.862%	0.862%	0.862%	0.862%	0.862%	0.862%	0.862%	0.862%	0.862%	0.862%	0.862%	0.862%	0.862
	Insurance Companies Tax	0.121%	0.121%	0.121%	0.121%	0.121%	0.121%	0.121%	0.121%	0.121%	0.121%	0.121%	0.121%	0.121
	Cigarettes Tax	1.793%	1.793%	1.793%	1.793%	1.793%	1.793%	1.793%	1.793%	1.793%	1.793%	1.793%	1.793%	1.793
	Real Estate Conveyance Tax	0.991%	0.991%	0.991%	0.991%	0.991%	0.991%	0.991%	0.991%	0.991%	0.991%	0.991%	0.991%	0.991
	OI Companies Tax	0.000%	0.000%	0.000%	0.000%	0.000%	0.000%	0.000%	0.000%	0.000%	0.000%	0.000%	0.000%	0.000
	Alcoholic Beverages Tax	0.306%	0.306%	0.306%	0.305%	0.306%	0.306%	0.306%	0.306%	0.306%	0.306%	0.305%	0.306%	0.306
	Admissions & Dues Tax	0.195%	0.195%	0.195%	0.195%	0.195%	0.195%	0.195%	0.195%	0.195%	0.195%	0.195%	0,195%	0.195
evenues	Health Provider Tax	3.375%	3.375%	3.375%	3.375%	3.375%	3.375%	3.375%	3.375%	3.375%	3.375%	3.375%	3.375%	3.37
	Msc. Tax	0.105%	0.105%	0.105%	0.105%	0.105%	0.105%	0.105%	0.105%	0.305%	0.105%	0.105%	0.105%	0.105
	Other Revenues	5.840%	5.840%	5.840%	5.840%	5.840%	5.840%	5.840%	5.840%	5.840%	5.840%	5.840%	5.840%	5.84
	Special Transportation Fund (STF)	7.880%	7.880%	7.880%	7.880%	7.880%	7.880%	7.880%	7.880%	7.880%	7.880%	7.880%	7.880%	7.880
	Mashantucket Pequot and Mohegan Fund (MPSMP)	0.305%	0.305%	0.305%	0.305%	0.305%	0.305%	0.305%	0.305%	0.305%	0.305%	0.305%	0.305%	0.305
	Regional Market Operating Fund (RMOF)	0.005%	0.005%	0.005%	0.005%	0.005%	0.005%	0.005%	0.005%	0.005%	0.005%	0.005%	0.005%	0.005
	Banking Fund	0.149%	0.149%	0.149%	0.149%	0.149%	0.149%	0.149%	0.149%	0.149%	0.149%	0.149%	0.149%	0.14
	Insurance Fund	0.402%	0.402%	0.402%	0.402%	0.402%	0.402%	0.402%	0.402%	0.402%	0.402%	0.402%	0.402%	0.403
	Consumer Counsel and Public Utility Control Fund (CC&PUOF)	0.135%	0.135%	0.135%	0.135%	0.135%	0.135%	0.135%	0.135%	0.135%	0.135%	0.135%	0.135%	0.135
	Workers' Compensation Fund (WOF)	0.201%	0.201%	0.201%	0.201%	0.201%	0.201%	0.201%	0.201%	0.201%	0.201%	0.201%	0.201%	0.201
	Criminal Injuries Compensation Fund (CIOF)	0.015%	0.015%	0.015%	0.015%	0.015%	0.015%	0.015%	0.015%	0.015%	0.015%	0.015%	0.015%	0.015
	Cost of Incentive	0.00054	0.000%	0.000%	0.000%	0.000%	0.000%	0.000%	0.000%	0.000%	0.000%	0.000%	0.000%	0.000



### Budget Calibration: Expenditures Determined by Demand



FILE HOME Navigation	Regional Control 2 - Tax-PI v2.0	
Select Inputs Forecast Inputs Units Navigation		300 ··· · //////////////////////////////
Forecast Name Regional Control 2	<b>الر</b> Run Forecast	
Budget Options	Frequently asked Questions	
Budget Name CT OFA FY16-17 Backup	How do I use forecast years?	
Balanced Budget Feedback	What happens to policy variable changes made in the years prior to the forecast start	
NU (COLS	How do 1 use iteration settings?	
- + 2015 ¹¹¹¹ 2040 ¹¹¹¹ 2060	Why can't I change feedback settings in a regional simulation?	
Run forecast from 2015 to 2040		
Iteration Settings Minimum Iterations: 15 26		Budget Options
Maximum Iterations: 35 (b)		budget options
Solution Tolerance: 0.00005		
Running a Regional Control (Based on Standard National Control) with 1 regions for 26 years		Budget Name CT OFA FY16-17 Backup
) policy variable(s) active. Not Saved C:\Use	ers\KyleC\Desktop\June Seminars\Amazon, *ax-CTwin14.70 · Connecticut Co	Balanced Budget Feedback
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### Budget Calibration: Expeditures Determined by Demand





### Modeling in Tax-Pl



- Analysis of Incentives
  - Big River Steel
- Budget Forecasting
  - Amazon HQ2 example
- Dynamic Fiscal Notes

Utah Manufacturing Equipment Sales Tax Exemption

# Modeling in Tax-PI: Analysis of Incentives

### Big River Steel

- Modeling project
- Estimating incentive amount
- Economic impact
- Fiscal impact
  - Economic "return on investment"

#### MODELING THE BIG RIVER STEEL PROJECT IN REMI

Inputting the information about this project into Tax-PI requires four main sets of variables. Those are the initial construction and capital investment to build the plant, its long-term operations over its project lifecycle, the cost of the state to pay back its bonds, and the offset of the incentives offered the direct project. Each of these goes into the model in their own way and has their own influence over the eventual net economic and fiscal impact. This table describes how each of them went into the model before generating results:

REMI

Category	Specific Item	Policy Variables
Constructior	<ul> <li>2,000 construction jobs for 20 months</li> <li>\$1.1 billion total capital investment</li> </ul>	<ul> <li>Annualized industry employment in construction</li> <li>Upward adjustment of the baseline productivity</li> </ul>
Operations	<ul> <li>525 fulltime jobs at operation</li> <li>\$75,000 average annual wages</li> </ul>	<ul> <li>525 fulltime jobs in primary metal product manufacturing</li> <li>Adjusted average wages to match the \$75,000 required</li> <li>Adjusted productivity to keep real output of the plant constant</li> </ul>
Bond Repayment	<ul> <li>Bond repayment schedule for the state of Arkansas for the \$125 million</li> </ul>	<ul> <li>Negative government spending to adjust for bond repayment</li> </ul>
Incentives	<ul> <li>Education and training programs</li> <li>Arkansas Advantage Program exempting direct taxes on the project for creating net new payroll in the state</li> <li>PILOT program to lower regular <i>ad valorem</i> assessment to 35% of the normal amount</li> <li>Tax exemptions on purchases made for construction materials, machinery, and equipment for operations</li> <li>Exempted sales tax revenue from the purchase of natural gas and electricity</li> <li>Recycling equipment tax credit to reduce net tax burden on Big River</li> </ul>	<ul> <li>Demand for education and training services in Arkansas</li> <li>Less corporate income to the state for the exemption</li> <li>Reduced tax revenue in ad valorem categories for the state</li> <li>Reduced tax revenue for the state over capital investments</li> <li>Reduced revenue to the state for less fuel/energy tax income</li> <li>Opportunity cost of the lost revenue to tax credits</li> </ul>

### Modeling in Tax-PI: Budget Forecasting

- Amazon HQ2 example: what to expect from a new development
   Jobs and consumption increase revenues
  - Increased population necessitates larger expenditures





### Modeling in Tax-PI: Dynamic Fiscal Notes



Static Fiscal Note

Direct revenue and expenditure impacts

Dynamic Fiscal Note
 Effect of economic response on budget

Budget feedback effect on economy

FISCAL NOTE No Bill Nu SHORT TITLE Sales Tax Exemption for Man SPONSOR No Sponsor Note: Sub	mber 201 ufacturing Eq	3 Interim uipment Purcl	hases, LT 3 Y	ear Life
	Je ee to enninge	uu ing ine ner	inur riscur no ch	-b process
CURRENT PRACTICE STATE GOVERNMEN	T STATIC IN	MPACT (UCAS	36-12-13(2)(b))	
Enactment of this bill reduces sales tax revenue to the in FY 2016. The bill also reduces Restrcited Revenue ( FY 2016.	General Fund by earmarks) by \$1	\$17,293,000 in I 2,707,000 in FY	FY 2015 and by 2015 and \$13,34	\$18,158,000 2,000 in
Revenues General Fund, static General Fund, One-time, static Restricted Revenue, static	FY 2014	FY 2015 \$ (18,158,000) \$ 865,000 \$ (12,707,000)	FY 2016 \$ (18,158,000) \$ (13,342,000)	
Total		(30,000,000)	(31,500,000)	
Appropriations	FY 2013	FY 2014 \$0	FY 2015 \$0	
Total	\$0	\$0	\$0	
NET STATE GOVERNMENT STATIC IMPAC	T			
STATIC	FY 2014	FY 2015	FY 2016	
Net All Funds (RevApprop.) (static)	0	(30,000,000)	(31,500,000)	
Net General & Education Funds (RevApprop.) (static)	0	(17,293,000)	(18,158,000)	

DYNAMIC FISCAL NOTE         No Bill Number         2013 Ir           SHORT TITLE         Sales Tax Exemption for Manufacturing Equipment Purchases, LT 3 Year Life         SPONSOR         Note: Subject to change during the normal fiscal noting process										
SCENARIO 4 COMPETITIVE EFFECT	S WITH BEH	IAVIORAL RES	PONSE & SCEN	ARIO 3	S	CENARIO 4				
Revenue Dynamic Impact	FY 2014	FY 2015	FY 2016	FY 2017	FY 2018	FY 2019				
General Fund/Education Fund, Static		(\$30,000,000)	(\$31,500,000)	(\$33,075,000)	(\$34,729,000)	(\$36,465,000)				
General Fund/Education Fund, Dynamic		(22,935,000)	\$ (20,834,000)	\$ (18,508,000)	\$ (15,685,000) \$	(14,018,000)				
Jobs		1,437	2,059	2,664	3,287	3,681				
Wages		\$78,500,000	\$121,000,000	\$166,500,000	\$217,500,000	\$258,500,000				
Gross Domestic Product (GDP) (millions)		\$177,500,000	\$268,000,000	\$366,000,000	\$478,500,000	\$564,000,000				

### Modeling in Tax-Pl



#### Important Considerations

- What assumptions are made about both the budget and about the components of a simulation
- The way the unique characteristics of a state budget affect growth
- The way the budget dynamically interacts with the economy