

# Evaluating Economic Development Incentives Using REMI

Vikash Dangal  
Ben Vincent  
Economics Section, LDR Policy Services

**LOUISIANA**  
DEPARTMENT *of* REVENUE



# Overview

1. REMI Overview & Relative Strengths
2. REMI Process
  1. Program Data
  2. Model Calibration
  3. Scenario Construction
  4. Output & Interpretation
3. REMI Issues to Consider



# REMI: Overview

- General Equilibrium model built on I/O tables
- Allows for economic responses to economic shocks by firms, households, governments
- Geographic linkages
- Constructs forward-looking regional forecast baselines (State of Louisiana), based on:
  - Region-specific economic data
  - Mainstream projections constructed by various government & academic units
  - Customized government budget data, entered by user

# REMI: Overview

- REMI provides a method of simulating the impact of new scenarios on a model of the Louisiana economy, similar to IMPLAN
  - Forward-looking
  - Industry linkages (70 sectors)
  - Allows for price changes
  - Simulates dynamic responses based on profit- and utility-maximizing behavior
  - Built-in ability to account for typical state government balanced-budget constraint

# REMI: Process

- LDR Task: Estimate “ROI” for various economic development incentive programs
- Approach:
  - Analyze 10 incentive programs separately
  - Model each as an economic shock:
    - Incorporate data on actual program participation
    - “Forecast” the economy resulting from the program’s existence
    - Compare to a baseline economy

# REMI: Process

- Approach:
  - Gather benefits data by program participants (rebates, credits, etc.), and relevant economic input variables associated with participation in the particular program
  - Account for year-to-year volatility by assessing over a two- or three-year window, and averaging inputs as a typical single year
  - Account for balanced budget constraint, and confirm how the model should do the balancing

# REMI: Process

- Setup: Government Budget
  - Revenues & Expenditures

Budget Calibration - Budget2021

Options Budget Forecast Feedback Aggregations

### Budget

Setup a budget by adding revenue and expenditure items and entering budget va

Revenues Expenditures

+ Add Expenditure Display Settings Select which years are displayed on t 2001 2018

Edit	Expenditures	FY2018	FY2019	FY2020
	Business and Infrastructure	2525.4	2817.7	2796.3
	Education	7784.8	7935.5	8324.4
	Environment and Natural R...	402.5	409.6	441.9
	General Government	1866.5	1918.2	1836
	Human Resources	13518.7	13982.5	14790
	Public Safety	2117.6	2140.1	2633.1

Budget Calibration - Budget2021

Options Budget Forecast Feedback Aggregations

### Budget

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Revenues Expenditures

+ Add Revenue Display Settings Select which years are displayed o 2001 2018

Edit	Revenues	FY2018	FY2019	FY2020
	Alcohol Beverage	36.8	37.7	38.9
	Beer	39.3	38.4	39.3
	Corporate	477.6	630.55	578.5
	Gasoline and Special Fuel	601.8	635.5	581.2
	Hazardous Waste	3.1	2.6	2.5
	Individual Income	3268.58628...	3719.4	3780.3
	Natural Gas Franchise	0.72668286	0.8	1.5
	Public Utilities	7.57650733	7.7	7.3
	Auto Rental	6.8	7.4	6.3
	Sales	3892.1	3459.8	3313.7
	Severance	454.7	524.6	431.6
	Supervision Inspection	8.6	8.6	8.7
	Tobacco	296.2	284.8	277.9
	Undainged Property	51.9	15	26.7
	Miscellaneous	6.1	6.8	6.6
	Royalties	157.5	181.3	113.7
	Rentals	1.6	1.2	4.3
	Bonuses	4.1	13.6	2.1
	Mineral Interest	0.3	0.8	1
	Interest	-5.6	6.1	48.1
	Interest TTF	4.2	7.9	5.1
	Various Agency Receipts	138.2	204.1	208.8
	Agency Over Collections	52	16.5	17.9
	Bond Reimbursement	51	16.7	25.8
	Quality Education	40.5	41	33.4
	Lottery	164.3	181.6	171.2

# REMI: Process

- Setup: Scenario Inputs

Save Forecast Import Export Print Tools

### Policy Variable Inputs

Active	Edit	Group							
<input checked="" type="checkbox"/>			New Business Taxes Topic						
Active	View	Category	Detail	Region	Units	2020	20		
<input checked="" type="checkbox"/>		Capital Cost	Nonmetallic mineral product manufacturing	Louisiana	Nominal \$ (Units)	-66931.6	0		
<input checked="" type="checkbox"/>		Capital Cost	Primary metal manufacturing	Louisiana	Nominal \$ (Units)	-3756534.2	0		
<input checked="" type="checkbox"/>		Capital Cost	Fabricated metal product manufacturing	Louisiana	Nominal \$ (Units)	-2696679.0	0		
<input checked="" type="checkbox"/>		Capital Cost	Machinery manufacturing	Louisiana	Nominal \$ (Units)	-720573.65	0		
<input checked="" type="checkbox"/>		Capital Cost	Other transportation equipment manufacturing	Louisiana	Nominal \$ (Units)	-944867.44	0		
<input checked="" type="checkbox"/>		Capital Cost	Miscellaneous manufacturing	Louisiana	Nominal \$ (Units)	-201356.62	0		
<input checked="" type="checkbox"/>		Capital Cost	Food manufacturing	Louisiana	Nominal \$ (Units)	-1397818.4	0		
<input checked="" type="checkbox"/>		Capital Cost	Textile mills; Textile product mills	Louisiana	Nominal \$ (Units)	-10627.015	0		
<input checked="" type="checkbox"/>		Capital Cost	Paper manufacturing	Louisiana	Nominal \$ (Units)	-2135123.2	0		
<input checked="" type="checkbox"/>		Capital Cost	Petroleum and coal products manufacturing	Louisiana	Nominal \$ (Units)	-3620696.0	0		
<input checked="" type="checkbox"/>		Capital Cost	Chemical manufacturing	Louisiana	Nominal \$ (Units)	-53987737.0	0		
<input checked="" type="checkbox"/>		Capital Cost	Plastics and rubber products manufacturing	Louisiana	Nominal \$ (Units)	-649906.62	0		
<input checked="" type="checkbox"/>		Capital Cost	Wholesale trade	Louisiana	Nominal \$ (Units)	-3199508.8	0		
<input checked="" type="checkbox"/>		Capital Cost	Retail trade	Louisiana	Nominal \$ (Units)	-15495.235	0		
<input checked="" type="checkbox"/>		Capital Cost	Air transportation	Louisiana	Nominal \$ (Units)	-79358.31	0		
<input checked="" type="checkbox"/>		Capital Cost	Rail transportation	Louisiana	Nominal \$ (Units)	-449466.49	0		
<input checked="" type="checkbox"/>		Capital Cost	Couriers and messengers	Louisiana	Nominal \$ (Units)	-78284.39	0		
<input checked="" type="checkbox"/>		Capital Cost	Pipeline transportation	Louisiana	Nominal \$ (Units)	-35122	0		
<input checked="" type="checkbox"/>		Capital Cost	Scenic and sightseeing transportation; Support activities for t	Louisiana	Nominal \$ (Units)	-436356.62	0		
<input checked="" type="checkbox"/>		Capital Cost	Warehousing and storage	Louisiana	Nominal \$ (Units)	-1374294.0	0		
<input checked="" type="checkbox"/>		Capital Cost	Data processing, hosting, and related services; Other informa	Louisiana	Nominal \$ (Units)	-144291.71	0		
<input checked="" type="checkbox"/>		Capital Cost	Telecommunications	Louisiana	Nominal \$ (Units)	-1139635.4	0		
<input checked="" type="checkbox"/>		Capital Cost	Insurance carriers and related activities	Louisiana	Nominal \$ (Units)	-982505.99	0		
<input checked="" type="checkbox"/>		Capital Cost	Real estate	Louisiana	Nominal \$ (Units)	-121051.97	0		
<input checked="" type="checkbox"/>		Capital Cost	Rental and leasing services; Lessors of nonfinancial intangible	Louisiana	Nominal \$ (Units)	-1038052.5	0		
<input checked="" type="checkbox"/>		Capital Cost	Professional, scientific, and technical services	Louisiana	Nominal \$ (Units)	-3663168.1	0		



# REMI: Process

- Output:
  - Represented as deviation from baseline (or control)
  - In terms of GDP, Personal Income, Value Added, Employment, etc.
  - Tax revenue gain/loss is estimated as part of the model resolving
    - Budget input steps include specification of linkages between government budget and economy
    - Linkages determine how shocks ultimately filter into tax collections & economic activity

# REMI: Process

- Output

Save Forecast   Master Selection   Export Results   Select Inputs

Search Result Tables

**Key Results**

- Economic Summary**
- Employment
- Demographics
- Gross Domestic Product
- Output**
- Personal Income
- Regional Overview

### Economic Summary

			Forecast		Comparison Forecast								
Differences			<input checked="" type="checkbox"/> Quality Jobs Program	<input checked="" type="checkbox"/> Control with budget									
Category	Units		2020	2021	2022	2023	2024	2025	2026	2027	2028	2029	2030
Total Employment	Thousands (Jobs)		+0.767	+0.250	+0.140	+0.060	+0.011	-0.016	-0.029	-0.033	-0.031	-0.028	-0.024
Private Non-Farm Employment	Thousands (Jobs)		+0.731	+0.237	+0.132	+0.057	+0.011	-0.015	-0.027	-0.030	-0.028	-0.025	-0.021
Residence Adjusted Employment	Thousands		+0.769	+0.245	+0.139	+0.060	+0.013	-0.014	-0.027	-0.030	-0.029	-0.026	-0.022
Population	Thousands		+0.357	+0.326	+0.286	+0.238	+0.190	+0.149	+0.116	+0.089	+0.069	+0.053	+0.041
Labor Force	Thousands		+0.315	+0.219	+0.174	+0.126	+0.085	+0.053	+0.029	+0.013	+0.002	-0.004	-0.007
Gross Domestic Product	Billions of Fixed (2012) Dollars		+0.068	+0.027	+0.018	+0.010	+0.005	+0.003	+0.001	+0.000	0.000	0.000	0.000
Output	Billions of Fixed (2012) Dollars		+0.125	+0.054	+0.035	+0.021	+0.012	+0.007	+0.003	+0.002	+0.001	+0.001	+0.001
Value-Added	Billions of Fixed (2012) Dollars		+0.068	+0.027	+0.018	+0.010	+0.005	+0.003	+0.001	+0.000	0.000	0.000	0.000
Personal Income	Billions of Current Dollars		+0.044	+0.020	+0.013	+0.008	+0.004	+0.002	+0.000	-0.001	-0.001	-0.001	-0.001
Disposable Personal Income	Billions of Current Dollars		+0.064	+0.018	+0.012	+0.007	+0.004	+0.002	+0.000	0.000	-0.001	-0.001	-0.001
Real Disposable Personal Income	Billions of Fixed (2012) Dollars		+0.077	+0.012	+0.009	+0.005	+0.003	+0.001	+0.000	0.000	0.000	0.000	0.000
Real Disposable Personal Income per Capita	Thousands of Fixed (2012) Dollars		+0.013	0.000	-0.001	-0.001	-0.001	-0.001	-0.001	-0.001	-0.001	-0.001	-0.001
PCE=Price Index	2012=100 (Nation)		-0.010	+0.002	+0.001	+0.001	+0.000	+0.000	+0.000	0.000	0.000	0.000	0.000

# REMI: Process

- Output & Interpretation:
  - Return On Investment concept:

$$\text{Economic ROI} = \frac{(\text{Value Added} - \text{Total Cost})}{\text{Total Cost}} \times 100\%$$

$$\text{Fiscal ROI} = \frac{(\text{Tax Revenue} - \text{Total Cost})}{\text{Total Cost}} \times 100\%$$

# REMI: Process

- Output & Interpretation- Quality Jobs Program:
  - Average annual incentives: \$105.5 million
  - Estimated GDP growth: \$131.3 million
    - Economic ROI: 25.67%
  - Estimated Revenue Loss: \$97.9 million
    - Fiscal ROI: -93.65%

# REMI: Process

- Output & Interpretation:

- Ranking by Economic ROI

1. Retention and Modernization Credit	397.0%
2. Musical & Theatrical Productions Tax Credit	105.6%
3. Digital Interactive Media & Software Tax Credit	72.4%
4. Motion Picture Investor Tax Credit	40.7%
5. Louisiana Quality Jobs Program	25.7%
6. Enterprise Zones	23.5%
7. Procurement Processing Company Rebate Program	1.6%
8. Rehabilitation of Historic Structures	2.0%
9. Industrial Tax Equalization Program	1.6%
10. Research and Development Tax Credit	-26.7%

# REMI: Process

- Output & Interpretation:

- Ranking by Fiscal ROI

1. Retention and Modernization Credit	-73.7%
2. Musical & Theatrical Productions Tax Credit	-84.9%
3. Digital Interactive Media & Software Tax Credit	-90.9%
4. Rehabilitation of Historic Structures	-92.5%
5. Motion Picture Investor Tax Credit	-93.0%
6. Procurement Processing Company Rebate Program	-93.3%
7. Louisiana Quality Jobs Program	-93.7%
8. Industrial Tax Equalization Program	-93.9%
9. Enterprise Zones	-94.3%
10. Research and Development Tax Credit	-95.5%

# REMI: Issues to Consider

- Interpretation:
  - A crucial “return” assumption is made by default in the approach we have described:
    - Associated benefits & costs are fully attributed to the program being analyzed
      - Little or no controversy: the causal effect of program expenditure *on the budget-balancing response*
      - Significant controversy: the causal effect of program *on new economic activity* associated with the program

# REMI: Issues to Consider




- Interpretation:
  - “But-for” analysis
    - Credible assessment should account for activity that would have occurred in the absence of the program
  - Any specific accounting for “but-for” must be done manually by the analyst
    - RI example: “breakeven” analysis concept



# REMI: Issues to Consider

- Sensitivity to Input Choices:
  - Illinois Example: windfall that was simply used to pay down of debt → minimal economic gain
    - Choice of Policy Variable determines how the program or policy will affect production or consumption decisions
    - Choice of Indicator determines how economic activity drives government revenues
    - Indicator and Policy Variable Inputs all be considered carefully & with program goals in mind
    - These choices will determine how shocks propagate through our model of the economy

# Questions?

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