



# A SECOND LOOK AT SECOND-STAGE BUSINESS DEVELOPMENT IN FLORIDA

*The impact of GrowFL*

DECEMBER 2017



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**David Mann**  
Chairman of the Board of Trustees

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President & Chief Executive Officer

Dear Fellow Taxpayer:

Florida officials continue to focus on policies to stimulate economic growth and development to diversify the state's economy. This has been made more challenging with the recent reduction in funding to attract businesses and create new jobs. Florida has successfully promoted the state's innovation economy by investing in entrepreneurial second-stage companies with great growth potential. Second-stage companies are those companies that have survived the start-up phase and are now focused on growth and expansion, and creating new jobs. Second-stage companies are now responsible for more than 30 percent of Florida jobs, and more than one-third of Florida's sales.

One important state program, GrowFL, works with these second-stage companies to help them connect with resources that will allow them to make better strategic decisions and have a larger positive impact on our economy. A January 2015 study by Florida TaxWatch found that GrowFL would generate jobs and help to diversify Florida's economy and the program has been recognized as the number one Economic Gardening® program in the nation.

Now, almost three years later, Florida TaxWatch has once again looked at the impacts of GrowFL on Florida's economy. Florida TaxWatch is pleased to present policymakers and taxpayers with an independent analysis of one of Florida's successful economic development programs.

Sincerely,

*Dominic M. Calabro*

Dominic M. Calabro

*President & CEO*



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## EXECUTIVE SUMMARY

Launched in 2009 to help second-stage companies grow and create new jobs, GrowFL uses principles of Economic Gardening® to help growing companies throughout Florida overcome obstacles to mature and prosper. A January 2015 study by Florida TaxWatch forecast the economic impact of GrowFL and concluded that “Florida should continue this approach to economic development.” Since that report was published, three important things have happened: (1) the GrowFL program has continued to assist Florida’s second-stage companies; (2) the state has changed its strategy of investing in economic growth and development; and (3) a new academic analysis has estimated the job creation attributable to the GrowFL program since its inception in 2009. This study also found that the program has generated a net return on investment of more than 9-to-1.

These changes have prompted TaxWatch to revisit the 2015 analysis, using the REMI PI+ economic forecasting model, to calculate GrowFL’s economic impact over the next 10 years (2018-2027). The REMI analysis concluded that, over the next decade, GrowFL will:

- generate \$4.72 billion in additional Gross Domestic Product (GDP);
- create 43,794 private sector, non-farm jobs statewide, with an average annual salary of \$97,815;
- produce \$4.61 billion in additional personal income for Floridians; and
- generate \$345.14 million in additional state tax receipts.

This analysis shows that GrowFL plays an important part in the development of Florida’s entrepreneurial economy, producing tens of thousands of high-paying jobs across the state and helping to diversify the state’s economy. If lawmakers are committed to growing Florida’s economy from within, then a continued public investment in GrowFL would be a wise investment indeed.

## INTRODUCTION

“Second-stage” companies are “growth-oriented firms that have moved beyond startup but haven’t yet reached maturity.”<sup>1</sup> While there is no set definition of “second-stage companies,” such companies are generally maturing companies employing between 10 and 99 employees, with revenues ranging from \$1 million to \$50 million, and opportunity for further growth. Generally, and for the purposes of this analysis, entrepreneurship begins at “Stage 1” (1-9 employees), then progresses to “Stage 2” (10 – 99 employees), before maturing into “Stage 3” (100 – 499 employees). Large businesses (of 500 employees or more) are considered “Stage 4,” although not all businesses aspire to, or could, become this size.<sup>2</sup>

In 2016, there were 181,648 second-stage companies in Florida. These firms represented 11.7 percent of Florida businesses,<sup>3</sup> 34.3 percent of the jobs,<sup>4</sup> and 34.7 percent of total sales.<sup>5</sup> Furthermore, Stage 1 firms, many of which are pre-Stage 2 employers, represented 76.7 percent of total Florida businesses and generated 90 percent of the net job growth in Florida from 2009–2016.

Looking only at companies headquartered in Florida, Stage 2 companies made up 9.3 percent of all companies, but accounted for 31.3 percent of all jobs.

In 2016, there were 127,076 Stage 2 resident Florida companies accounting for 2,630,928 jobs; there were

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1 “Edward Lowe Foundation, “Economic Gardening”: An entrepreneur-oriented approach to economic prosperity” (2017), available at <http://edwardlowe.org/wp-content/uploads/EG-4-pager.pdf>, accessed Nov 27, 2017.

2 “Very generally, the U.S. Small Business Administration (SBA) defines small businesses as those with fewer than 500 employees. See, e.g., U.S. SBA “Guide to Size Standards” available at [www.sba.gov/contracting/getting-started-contractor/make-sure-you-meet-sba-size-standards/guide-size-standards](http://www.sba.gov/contracting/getting-started-contractor/make-sure-you-meet-sba-size-standards/guide-size-standards) (accessed November 27, 2017). Note, however, “many exceptions exist.” For the detail of size standards by industry, see 13 CFR §121.201.

3 Retrieved from <http://www.youreconomy.org/profile/details.ye?type=e&key=all-businesses&state=FL&year1=2015&year2=2016&custom=undefined>, September 28, 2017.

4 Retrieved from <http://www.youreconomy.org/profile/details.ye?type=e&key=Stage-Two&state=FL&year1=2015&year2=2016&custom=undefined>, September 28, 2017.

5 Ibid.

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1,371,779 total resident Florida companies accounting for 8,417,988 jobs.<sup>6</sup>

The net job growth from 2009 -2016 by Stage 1 and Stage 2 companies exceeded the total net job growth for Florida because these two types of companies offset the net job losses during that period attributed to companies over 100 employees.<sup>7</sup>

Stage 1 and Stage 2 businesses are also generating the greatest net increases in sales (\$686.7 billion net increase), and account for more than 90 percent of Florida's net sales growth during the same period<sup>8</sup> (see Appendix 1 for details).

Overall, business and job growth in Florida is occurring in small businesses, those with fewer than 100 employees (which includes second stage companies). This is also where the new jobs are being created. As many of the Stage 1 businesses survive their start-up and move successfully into the second stage, the need for resources like GrowFL to help them continue to grow becomes paramount.

## ABOUT GROWFL

GrowFL was established in 2009 to provide second-stage companies and emerging second-stage companies statewide with the tools, training, and infrastructure necessary to create and sustain their economic growth.<sup>9</sup> GrowFL identifies those second-stage companies that have the greatest potential to strengthen Florida's economy and provides them a suite of proven tools and methods to help overcome the challenges facing growing companies.

GrowFL uses principles of Economic Gardening<sup>®</sup> to help growing companies throughout Florida overcome obstacles to mature and prosper. Economic Gardening<sup>®</sup> is an entrepreneurial approach to economic development that seeks to grow the local economy from within. Its premise is that local entrepreneurs create the companies that bring new wealth and economic growth to a region in the form of jobs, increased revenues, and a vibrant local business sector. Economic Gardening<sup>®</sup> seeks to focus on growing and nurturing local businesses rather than hunting for "big game" outside the area.<sup>10</sup>

Participating second-stage companies are selected through an online application process, during which the applicant must demonstrate that:

- The company must be a for-profit enterprise;
- The company must employ between 10 and 99 employees;
- The company must have between \$1 million and \$50 million in annual revenue; and
- The company should have the intellectual property and/or strategy to sell outside Florida.<sup>11</sup>

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6 Information provided directly by youreconomy.org.

7 See Table 2 in Appendix 1. Net job growth for Stage 1 and Stage 2 companies from 2009 to 2016 was 2,492,198, while the net job growth for all firms was only 2,190,377 because the net change for firms with more than 100 employees was -341,839 during the same time period. Source: www.youreconomy.org.

8 See Table 3 in Appendix 1. Net change in sales for Stage 1 and Stage 2 companies from 2009 to 2016 was \$467.2B and \$219.5B, respectively, while net sales growth for firms with more than 100 employees was \$47.6B. Total net sales growth for all firms during the same period was \$740.4B, meaning companies with fewer than 100 employees accounted for nearly 92.7% of all growth in sales. Source: www.youreconomy.org.

9 For a detailed explanation of the value of the services provided, please see Florida TaxWatch, "Cultivating Florida's Second-Stage Companies: Examining the Benefits of Expanding the Statewide Impact of the GrowFL Program," January 2015..

10 International City/County Management Association (ICMA), "Seven Steps to Developing an Economic Gardening<sup>®</sup> Implementation Strategy," retrieved from <https://icma.org/articles/seven-steps-developing-economic-gardening-implementation-strategy>, September 28, 2017.

11 GrowFL application guidelines, retrieved from <http://www.growfl.com/apply>, September 29, 2017.

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Upon a company's selection, GrowFL matches the second-stage company with a local and statewide team of professionals with specialized skills, which then analyzes the company's overall business strategy. Team members routinely provide strategic market research in the form of reports, data, and recommendations for the company's consideration. Team members also work on problems identified by the second-stage company and provide perspectives on potential issues and opportunities the company may have missed.

The intent is to "put the capabilities of a Fortune 500 company's market research department in the hands of a second-stage business for the purpose of increasing top-line revenue."<sup>12</sup>

GrowFL trains the CEO and their sales and marketing teams how to grow, which data are important to growth, where these data can be found, and how to use data to improve their strategic approach to growth.

Another valuable GrowFL tool is the CEO Roundtables, a peer learning process using a methodology designed specifically for leaders of second-stage companies. Meeting 10 times per year, the CEO Roundtables bring together participants from diverse, non-competing industries in a structured format with trained facilitators to share experiences and discuss new ideas.

In recognition of success, GrowFL identifies 50 "Florida Companies to Watch" each year. An awards ceremony is held each year, at which these Florida Companies to Watch are recognized and honored for their performance.

In its seventh year, GrowFL has recognized 350 companies nationally, as it is held in several other states in partnership with the Edward Lowe Foundation.

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<sup>12</sup> Retrieved from <http://www.growfl.com/strategic-research/>, September 29, 2017.

## QUANTIFYING THE ECONOMIC IMPACT OF GROWFL

A January 2015 study by Florida TaxWatch forecast the economic impact of GrowFL for the 10-year period from 2015 through 2024 based on the scientifically generated estimate of the program's job creation from July 2011 through June 2013.<sup>13</sup> At the time, the rounded and weighted average used for the forecast was 1,000 jobs per year, and the total economic impact for 2015-2024 was projected to be: \$2.95 billion increase in Gross Domestic Product (GDP); 23,012 private sector, non-farm jobs created; \$1.94 billion in increased personal income; and \$165.4 million in additional state tax receipts.<sup>14</sup>

These results buttressed the study's conclusion that "public investments in this type of the program are a reasonable part of a state's economic development strategy..." and that "Florida should continue this approach to economic development."<sup>15</sup>

Since that report was published, three important things have happened: 1) The GrowFL program has continued to assist Florida's second-stage companies; 2) The state has changed its strategy of investing in economic growth and development; and 3) A new academic analysis has estimated the job creation attributable to the GrowFL program since its inception in 2009.<sup>16</sup>

Based on these three factors, Florida TaxWatch has revisited the 2015 analysis of the economic impact of this program to provide the Legislature and the taxpayers of Florida with an updated analysis of the economic benefits of the GrowFL program.

<sup>13</sup> Florida TaxWatch, "Cultivating Florida's Second-Stage Companies: Examining the Benefits of Expanding the Statewide Impact of the GrowFL Program," January 2015.

<sup>14</sup> Ibid.

<sup>15</sup> Ibid.

<sup>16</sup> Vernet Lasrado, Ph.D., "A Summary of the GrowFL Program Economic Impact on the State of Florida Since Inception from July 01, 2009 through June 30, 2015," University of Central Florida, September 16, 2016.

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This updated analysis uses the leading multi-period dynamic economic forecasting model to calculate the economic impact of the program over the next 10 years (2018 - 2027). The REMI PI+ model is an “input-output” model that forecasts the future of a regional economy and predicts the effects on that same economy (outputs) when the user implements a change (inputs). (See Appendix 5 for a detailed explanation of the REMI model.) The first forecast is called the “control forecast”; the second forecast, which incorporates the change (GrowFL), is called the “alternative forecast” or “simulation.” The difference between the two represents the effects of the change.<sup>17</sup>

TaxWatch selected three GrowFL-related inputs for this analysis. The first input is regional sales related to GrowFL from 2009-2015, which is used to forecast economic growth as a result of GrowFL. The second input, the industry make-up of companies served by GrowFL, is used to forecast the number of jobs, wages, and sales by industry sector. The third input is the amount of investment into GrowFL, which varied widely over the 10-year period.<sup>18</sup>

Based on the updated projections, over the next decade GrowFL will:

- Generate \$4.72 billion in additional Gross Domestic Product (GDP);
- Create 43,794 private sector, non-farm jobs statewide, with an average annual salary of \$97,815, which is more than double the current average salary of \$45,116 in Florida.<sup>19</sup>
- Produce \$4.61 billion in additional personal income for Floridians; and,
- Generate \$345.14 million in additional state tax receipts.

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17 Retrieved from <http://ledsgp.org/wp-content/uploads/2015/10/REMI-Brochure.pdf>, November 28, 2017.

18 The average annual investment over the 10-year period is \$951,686.

19 Department of Economic Opportunity Labor Market Statistics, retrieved from [www.floridawages.com/eds.php?compare=6&page=0](http://www.floridawages.com/eds.php?compare=6&page=0), November 29, 2017.

The detailed outputs of the REMI PI+ multi-period dynamic economic forecasting model analysis are provided in Appendix 2.<sup>20</sup>

The projections from the 2017 analysis are consistent with the results from the 2015 analysis, but show that the program is even more valuable as an economic development program. As in 2015, almost one-quarter of the new jobs will come from the *Professional, Scientific, and Technical Services* sector, which helps to explain the high average salary of nearly \$98,000 for these new jobs. When other traditionally high-paying industry sectors (*Manufacturing; Information; Finance and Insurance; and Health Care and Social Assistance*) are included, the high-paying industry sectors are projected to provide nearly half of these new jobs. See Appendix 3 for the detail of Jobs Created by Industry Sector.

Overall, these projections show that Economic Gardening® generates jobs, and that is important in a rapidly-growing state like Florida. Since 2010, Florida’s population has grown from 18.80 million residents to 20.48 million residents, an average increase of about 1.3 percent each year.<sup>21</sup> During that same period, Florida businesses have created more than 1.44 million jobs, and Florida’s unemployment rate has dropped 7.1 percentage points to 3.6 percent, the lowest unemployment rate in more than a decade.<sup>22</sup> Over the five years ending in 2016, the Florida economy grew in real terms by 12.69% at a compound annual growth rate of 2.42% per year. Real Florida Gross Domestic Product (GDP),<sup>23</sup> at \$815.07 bil-

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20 Note: The model results are generated in fixed 2009 dollars, so the values presented in this report and in the Appendix tables have been adjusted to reflect 2017 values, using the Bureau of Labor Statistics’ CPI Inflation Calculator through September 2017.

21 Florida Legislature, Office of Economic and Demographic Research, “Adjusted Population Estimates for Florida’s Counties and Municipalities,” October 17, 2017.

22 Department of Economic Opportunity, “Gov. Scott: Florida Unemployment Rate Drops to 3.6 Percent,” Press Release, November 17, 2017.

23 Gross domestic product (GDP) is the monetary value of all the finished goods and services produced within a state or country’s borders in a specific time period.

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lion in 2016, is at the highest level recorded to date and is indicative of a robust economy.<sup>24</sup> Florida's business-friendly climate, evidenced by impressive job growth, low unemployment, and a robust economy, continues to be a major attractor of new residents to Florida.

Job creation in Florida is accomplished by either enticing new businesses to relocate to Florida or by expanding existing Florida businesses. Historically, Florida has used economic development incentives targeted to specific industries and investments to attract qualifying businesses to bring high-wage jobs to the state and to diversify the state's economy. Although these important incentives have been shown to generate positive returns, funding for many of these incentives has recently been greatly reduced or eliminated. This has placed Florida at a competitive disadvantage compared to other states when it comes to enticing new businesses to relocate to Florida. This makes the role of Economic Gardening® programs like GrowFL, in the absence of other economic development incentives, even more critical in sustaining Florida's economic and population growth.

Businesses helped by GrowFL are not only creating tens of thousands of new jobs statewide, but these new jobs are high-wage jobs spread across a number of industry sectors. With average salaries approaching \$100,000, the average salary of GrowFL-created jobs is more than twice the average salary (\$45,116)<sup>25</sup> for all Florida jobs. The diversification of these jobs across 20 different industry sectors is reflected in Appendix 3.

Furthermore, the recent analysis of the economic and fiscal impact of the program since its inception in 2009 shows that the program has generated a net return on investment of \$9.10 for every \$1 of public investment.

<sup>24</sup> Retrieved from [www.deptofnumbers.com/gdp/florida/](http://www.deptofnumbers.com/gdp/florida/), November 29, 2017.

<sup>25</sup> Department of Economic Opportunity Labor Market Statistics, retrieved from [www.floridawages.com/eds.php?compare=6&page=0](http://www.floridawages.com/eds.php?compare=6&page=0), November 29, 2017.

## CONCLUSIONS

GrowFL is an important and effective tool in the state's economic development toolkit, as shown by the program's forecasted economic impact. Recently, the Florida Legislature has taken steps to reduce or eliminate the incentives traditionally used to attract new businesses to Florida. Now, more than ever, it is critical to focus on growing existing companies in Florida, and data demonstrate that first- and second-stage companies are the engines of growth in Florida.

GrowFL has a demonstrated track record of developing second-stage businesses and giving them the skills and competencies they need to grow and expand. GrowFL has plays an important part in the development of Florida's entrepreneurial economy, producing tens of thousands of high-paying jobs across the state and helping to diversify the state's economy. If lawmakers are committed to growing Florida's economy from within, then a continued public investment in GrowFL would be a wise investment indeed.

# APPENDIX 1

TABLE 1. NET CHANGE IN BUSINESS TYPES (2009-2016)

	2009	2016	(+/-)
Self-employed (1 employee)	126,242	166,260	40,018
Stage 1 (2-9 employees)	660,371	1,191,262	530,891
Stage 2 (10-99 employees)	149,650	181,648	31,998
Stage 3 (100-499 employees)	12,460	12,166	(294)
Stage 4 (500+ employees)	1,213	1,055	(158)

Source: [www.youreconomy.org](http://www.youreconomy.org)

TABLE 1. NET CHANGE IN JOBS (2009-2016)

	2009	2016	(+/-)
Self-employed (1 employee)	126,242	166,260	40,018
Stage 1 (2-9 employees)	2,420,382	4,385,147	1,964,765
Stage 2 (10-99 employees)	3,518,903	4,046,336	527,433
Stage 3 (100-499 employees)	2,110,679	2,018,503	(92,176)
Stage 4 (500+ employees)	1,438,879	1,189,216	(249,663)

Source: [www.youreconomy.org](http://www.youreconomy.org)

TABLE 1. NET CHANGE IN SALES (2009-2016)

	2009	2016	(+/-)
Self-employed (1 employee)	24.2	30.3	6.1
Stage 1 (2-9 employees)	505	972.2	467.2
Stage 2 (10-99 employees)	658.7	878.2	219.5
Stage 3 (100-499 employees)	387.4	429.4	42.0
Stage 4 (500+ employees)	213.6	219.2	5.6

Source: [www.youreconomy.org](http://www.youreconomy.org)



## APPENDIX 2

### SUMMARY RESULTS: 2018 - 2027

Total Employment	47,141 jobs
Private Non-Farm Employment	43,794 jobs
Average Salary of New Jobs	\$97,815*
Gross Domestic Product	\$4.72 billion*
Total Output	\$7.75 billion*
Personal Income	\$4.61 billion*
Disposable Personal Income	\$4.03 billion*
Population Increase	50,836 persons
Estimated Sales Tax Receipts	\$345.14 million*

\* Dollar figures are reported 2009 dollars adjusted to 2017 using the Bureau of Labor Statistics' CPI Inflation Calculator

## APPENDIX 3

### JOBS CREATED BY INDUSTRY SECTOR

Industry	Total Jobs Created
Forestry, Fishing, and Related Activities	124
Mining	120
Utilities	61
Construction	4,739
Manufacturing	3,224
Wholesale Trade	1,392
Retail Trade	3,882
Transportation and Warehousing	1,051
Information	945
Finance and Insurance	1,530
Real Estate and Rental and Leasing	1,609
Professional, Scientific, and Technical Services	10,966
Management of Companies and Enterprises	597
Administrative and Waste Management Services	4,012
Educational Services (Private)	722
Health Care and Social Assistance	2,904
Arts, Entertainment, and Recreation	658
Accommodation and Food Services	2,604
Other Services, Except Public Administration	2,654
Government	3,347
<b>TOTAL</b>	<b>47,141</b>

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## APPENDIX 4

A 2014 study by the University of Central Florida (UCF)<sup>26</sup> looked at the number of new jobs attributed to GrowFL for the period from July 2011 through June 2013. With more than 650 firms participating, GrowFL was credited with the creation of 1,867 net new jobs during this period. These new jobs were created in every geographic region of the state; however, most of these new jobs were created in the East Central, Tampa Bay, and Southeast Florida regions. The industry sectors creating the most jobs were manufacturing; professional, scientific, and technical services; wholesale trade; and information. These industry sectors generally provide jobs that are high-wage. Every \$1 invested in GrowFL generated a return of \$7.58.

A September 2016 study by the University of Central Florida used the IMPLAN<sup>®</sup> economic model to look at GrowFL's economic impacts from July 2009 through June 2015 and found:

- Past GrowFL client firms created 10,942 new jobs (net);
- These new jobs had a total impact on regional gross domestic product (GDP) of more than \$941.6 million;
- These new jobs had a total impact on regional sales (economic output) of more than \$1.882 billion;
- These new jobs had a total impact on state and local sales taxes of more than \$81.1 million; and
- Every \$1 invested generated a net return on investment (ROI) of \$9.10.<sup>27</sup>

TABLE 4. SUMMARY RESULTS: 2015-2024

Total Employment	25,244 jobs
Private Non-Farm Employment	23,012 jobs
Average Salary of New Jobs	\$77,067
Gross Domestic Product	\$2.95 billion
Total Output	\$4.79 billion
Personal Income	\$1.94 billion
Disposable Personal Income	\$1.68 billion
Population Increase	3,021 persons
Estimated Sales Tax Receipts	\$165.4 million

Note: Dollar figures are reported 2014 dollars

The industry sector in which the greatest number of new jobs are forecast to occur is the Professional, Scientific, and Technical Sector, with more than 4,300 new jobs expected. The next greatest number of new jobs (3,361) were forecast to occur in the Manufacturing Sector. Occupations that are forecast to experience the greatest growth are Sales and Related Office and Administrative (6,841 new jobs) and Management, Business, and Financial (3,137 new jobs).<sup>28</sup> It is important to note that the average salary for these new jobs (\$77,067) is substantially higher than the average salary of \$41,140<sup>29</sup> for Floridians.

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26 Vernet Lasardo, Ph.D., "A Review of the GrowFL: the Florida Economic Gardening<sup>®</sup> Institute at the University of Central Florida Economic Impacts from July 1, 2011 Through June 30, 2013," University of Central Florida, July 11, 2014.

27 Vernet Lasrado, Ph.D., "A Summary of the GrowFL Program Economic Impact on the State of Florida Since Inception from July 01, 2009 through June 30, 2015," University of Central Florida, September 16, 2016.

28 Florida TaxWatch, "Cultivating Florida's Second-Stage Companies: Examining the Benefits of Expanding the Statewide Impact of the GrowFL Program," January 2015.

29 Bureau of Labor Statistics, "May 2013 State Occupational Employment and Wage Estimates", [www.bls.gov/oes/current/oes\\_fl.htm#00-0000](http://www.bls.gov/oes/current/oes_fl.htm#00-0000).

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## APPENDIX 5

### General Overview of the REMI Model

Regional Economic Models, Inc. (REMI) utilized a one region, state of Florida Tax-PI model for this analysis. The model includes an underlying regional and national forecast. The REMI model utilizes publicly available data interlinked with peer reviewed theories to develop a dynamic economic and demographic structure. This structure provides historic data and a forecast out to 2060 on the regional and national economy. REMI models are most commonly utilized to evaluate government policy, infrastructure and other ‘what if?’ scenarios. REMI models are utilized within Florida by the state government entities, regional planning organizations, universities and consultants to model similar types of incentive programs and for other ongoing analysis that requires the use of dynamic macroeconomic regional analysis. For more information on the REMI model, please see *Appendix Tax-PI Model Overview*.



### Tax-PI Overview

The REMI Tax-PI model is a combined economic, demographic, and fiscal model within a Windows-based software package. It performs economic impacts, demographic analysis, and the dynamic scoring of state budgets at the regional level. Perhaps the most significant characteristic of Tax-PI is its tying of these analytical factors together in a consistent framework. Tax policy influences the economy, which, in turn, influences tax revenues and state expenditures in the medium- and long-term and the location decisions of households, labor, businesses, and investment opportunities.

It integrates input-output, computable general equilibrium, econometric and economic geography methodologies. The model is dynamic, with forecasts and simulations generated on an annual basis and behavioral responses to compensation, price, and other economic factors.

The model consists of thousands of simultaneous equations with a structure that is relatively straightforward. The exact number of equations used varies depending on the extent of industry, demographic, demand, and other detail in the specific model being used. The overall structure of the model can be summarized in five major blocks: (1) Output and Demand, (2) Labor and Capital Demand, (3) Population and Labor Supply, (4) Compensation, Prices, and Costs, and (5) Market Shares. The blocks and their key interactions are shown in Figures 1 and 2.

Figure 1: REMI Model Linkages

REMI Model Linkages (Excluding Economic Geography Linkages)

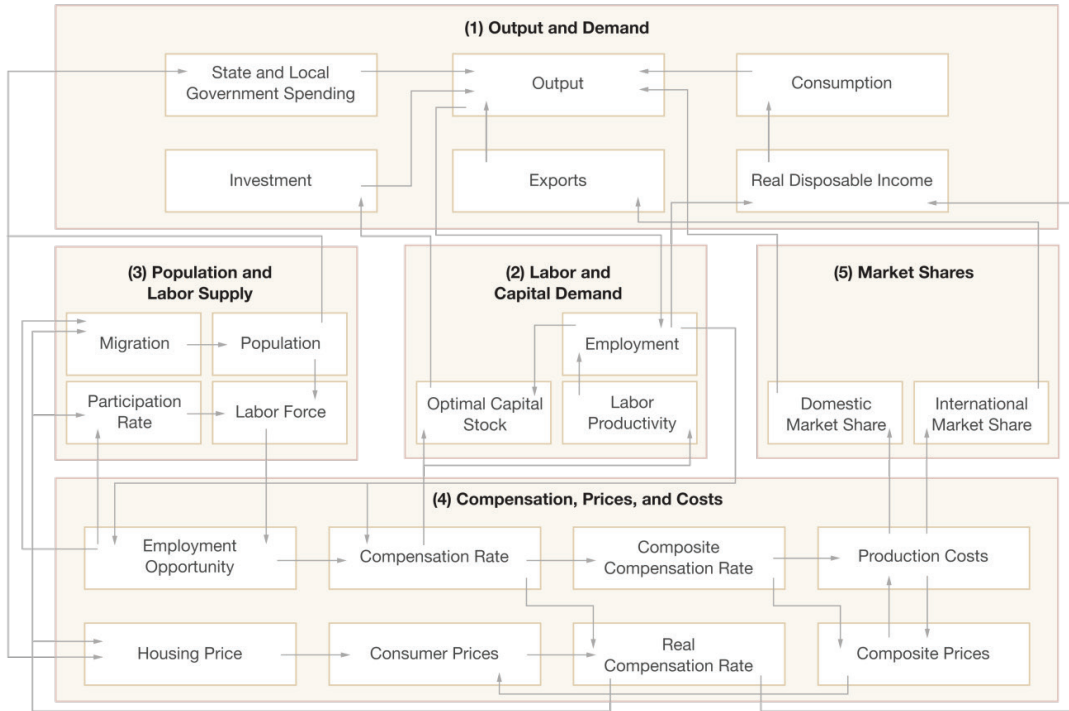
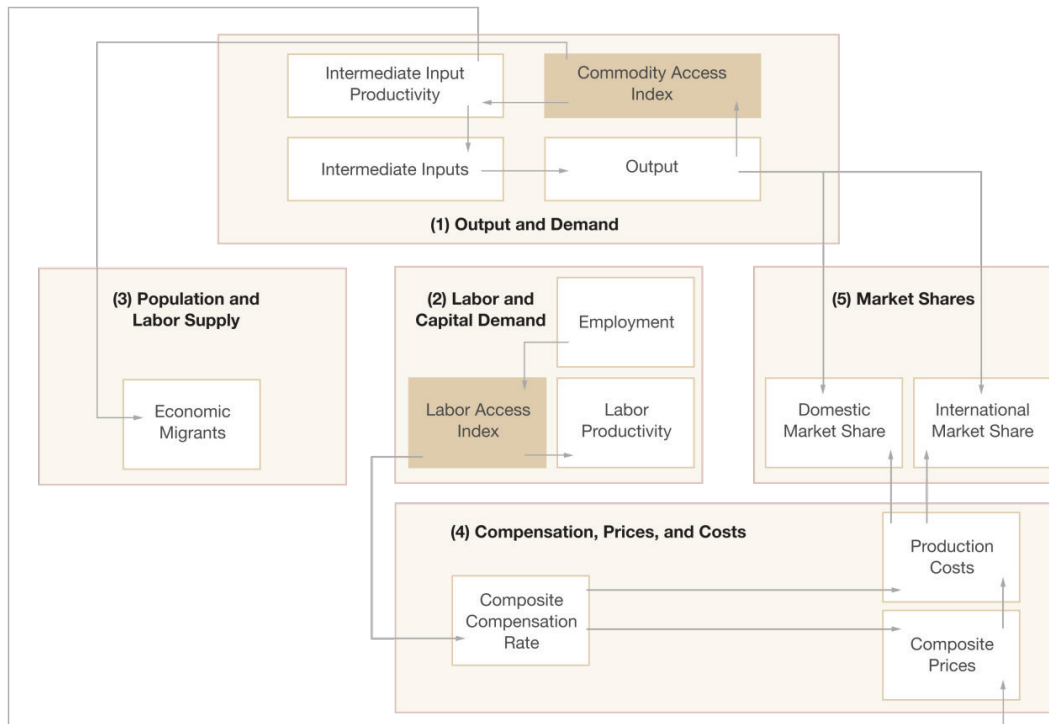




Figure 2: Economic Geography Linkages



The Output and Demand block consists of output, demand, consumption, investment, government spending, exports, and imports, as well as feedback from output change due to the change in the productivity of intermediate inputs. The Labor and Capital Demand block includes labor intensity and productivity as well as demand for labor and capital. Labor force participation rate and migration equations are in the Population and Labor Supply block. The Compensation, Prices, and Costs block includes composite prices, determinants of production costs, the consumption price deflator, housing prices, and the compensation equations. The proportion of local, inter-regional, and export markets captured by each region is included in the Market Shares block.

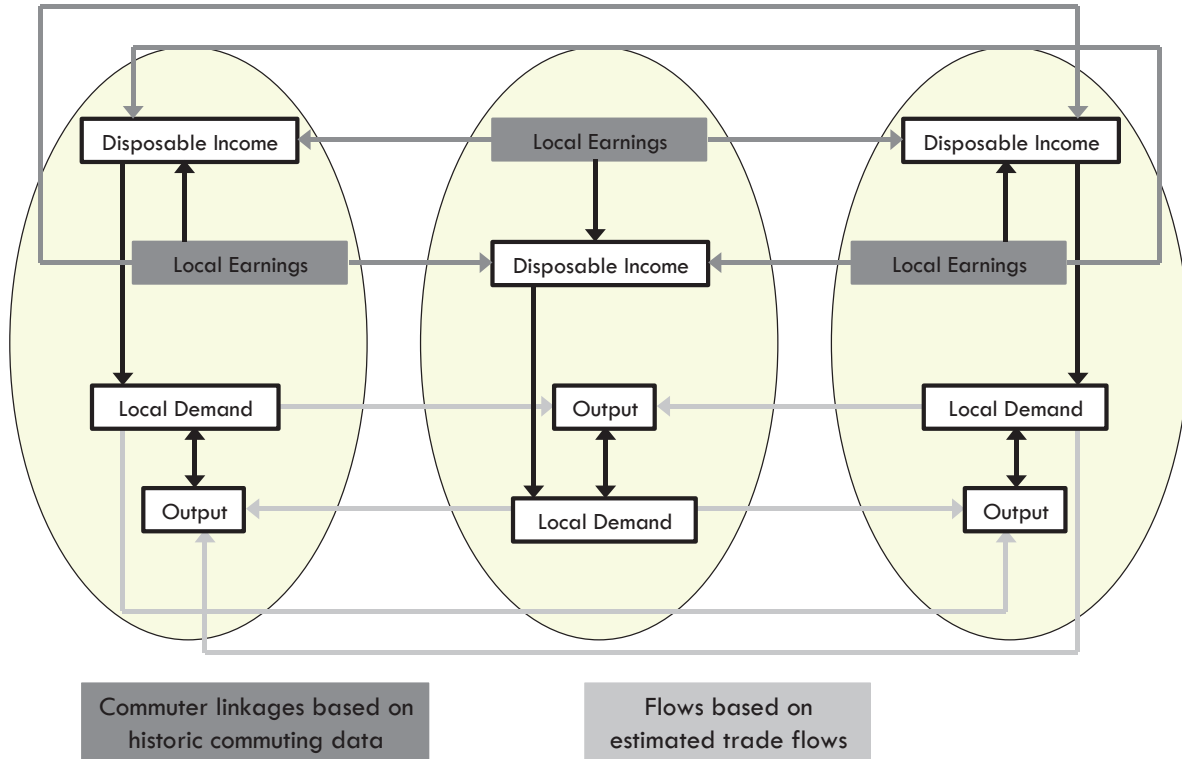
Models can be built as single region, multi-region, or multi-region national models. A region is defined broadly as a sub-national area, and could consist of a state, province, county, or city, or any combination of sub-national areas.

Single-region models consist of an individual region, called the home region. The rest of the nation is also represented in the model. However, since the home region is only a small part of the total nation, the changes in the region do not have an endogenous effect on the variables in the rest of the nation.

Multi-regional models have interactions among regions, such as trade and commuting flows. These interactions include trade flows from each region to each of the other regions. These flows are illustrated for a three-region model in Figure 3. There are also multi-regional price and wage cost linkages as shown in the Figure at the end of Section III.

Figure 3: Trade and Commuter Flow Linkages

## Trade and Commuter Flow Linkages



Multiregional national models also include a central bank monetary response that constrains labor markets. Models that only encompass a relatively small portion of a nation are not endogenously constrained by changes in exchange rates or monetary responses.

### Block 1. Output and Demand

This block includes output, demand, consumption, investment, government spending, import, commodity access, and export concepts. Output for each industry in the home region is determined by industry demand in all regions in the nation, the home region's share of each market, and international exports from the region.

For each industry, demand is determined by the amount of output, consumption, investment, and capital demand on that industry. Consumption depends on real disposable income per capita, relative prices, differential income elasticities, and population. Input productivity depends on access to inputs because a larger choice set of inputs means it is more likely that the input with the specific characteristics required for the job will be found. In the capital stock adjustment process, investment occurs to fill the difference between optimal and actual capital stock for residential, non-residential, and equipment investment. Government spending changes are determined by changes in the population.

### Block 2. Labor and Capital Demand

The Labor and Capital Demand block includes the determination of labor productivity, labor intensity, and the optimal capital stocks. Industry-specific labor productivity depends on the availability of workers with

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differentiated skills for the occupations used in each industry. The occupational labor supply and commuting costs determine firms' access to a specialized labor force.

Labor intensity is determined by the cost of labor relative to the other factor inputs, capital and fuel. Demand for capital is driven by the optimal capital stock equation for both non-residential capital and equipment. Optimal capital stock for each industry depends on the relative cost of labor and capital, and the employment weighted by capital use for each industry. Employment in private industries is determined by the value added and employment per unit of value added in each industry.

### *Block 3. Population and Labor Supply*

The Population and Labor Supply block includes detailed demographic information about the region. Population data is given for age, gender, and ethnic category, with birth and survival rates for each group. The size and labor force participation rate of each group determines the labor supply. These participation rates respond to changes in employment relative to the potential labor force and to changes in the real after-tax compensation rate. Migration includes retirement, military, international, and economic migration. Economic migration is determined by the relative real after-tax compensation rate, relative employment opportunity, and consumer access to variety.

### *Block 4. Compensation, Prices and Costs*

This block includes delivered prices, production costs, equipment cost, the consumption deflator, consumer prices, the price of housing, and the compensation equation. Economic geography concepts account for the productivity and price effects of access to specialized labor, goods, and services.

These prices measure the price of the industry output, taking into account the access to production locations. This access is important due to the specialization of production that takes place within each industry, and because transportation and transaction costs of distance are significant. Composite prices for each industry are then calculated based on the production costs of supplying regions, the effective distance to these regions, and the index of access to the variety of outputs in the industry relative to the access by other uses of the product.

The cost of production for each industry is determined by the cost of labor, capital, fuel, and intermediate inputs. Labor costs reflect a productivity adjustment to account for access to specialized labor, as well as underlying compensation rates. Capital costs include costs of non-residential structures and equipment, while fuel costs incorporate electricity, natural gas, and residual fuels.

The consumption deflator converts industry prices to prices for consumption commodities. For potential migrants, the consumer price is additionally calculated to include housing prices. Housing prices change from their initial level depending on changes in income and population density.

Compensation changes are due to changes in labor demand and supply conditions and changes in the national compensation rate. Changes in employment opportunities relative to the labor force and occupational demand change determine compensation rates by industry.

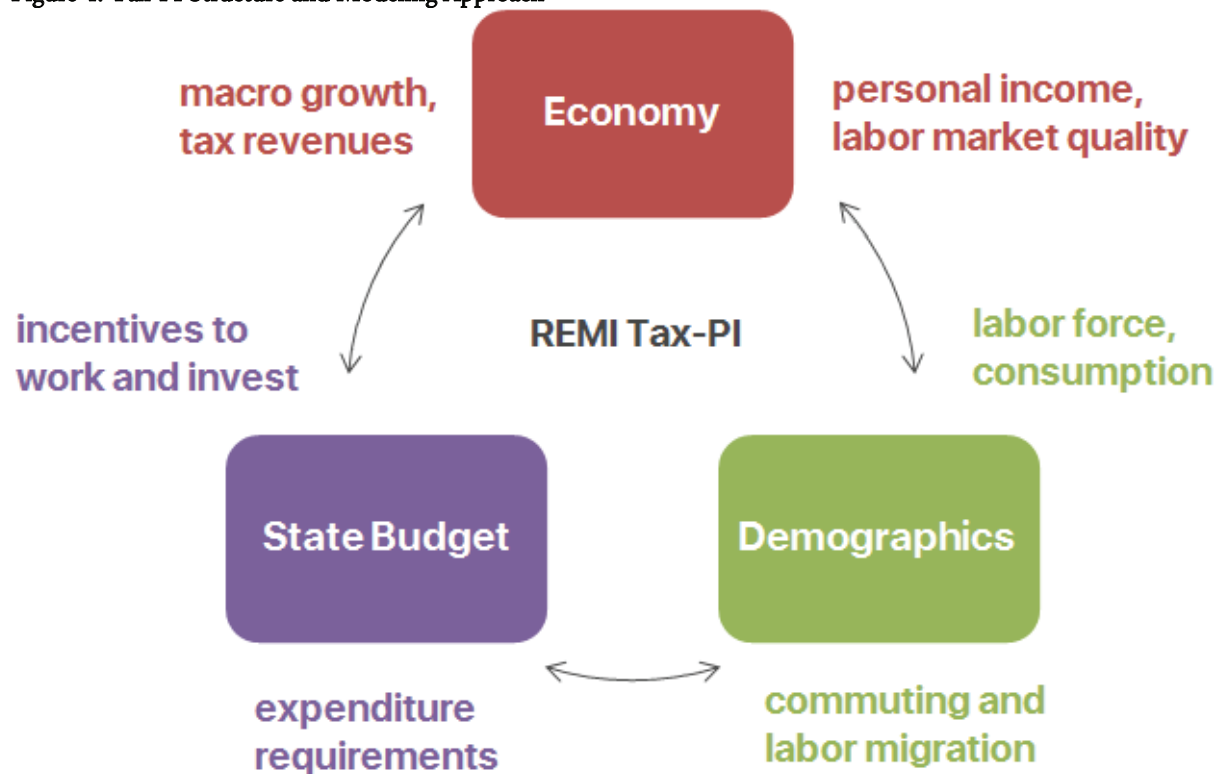
### *Block 5. Market Shares*

The market shares equations measure the proportion of local and export markets that are captured by each industry. These depend on relative production costs, the estimated price elasticity of demand, and the effective distance between the home region and each of the other regions. The change in share of a specific area in any region depends on changes in its delivered price and the quantity it produces compared with the same factors for competitors in that market. The share of local and external markets then drives the exports from and imports to the home economy.

Tax-PI ties in factors of the regional economy or demographics into the budget. There is an example screen shot below. For instance, consumer and business spending at retail drives sales tax revenues for a state, but these revenues also influence the regional cost of living, real incomes, and the cost of doing business. A change in

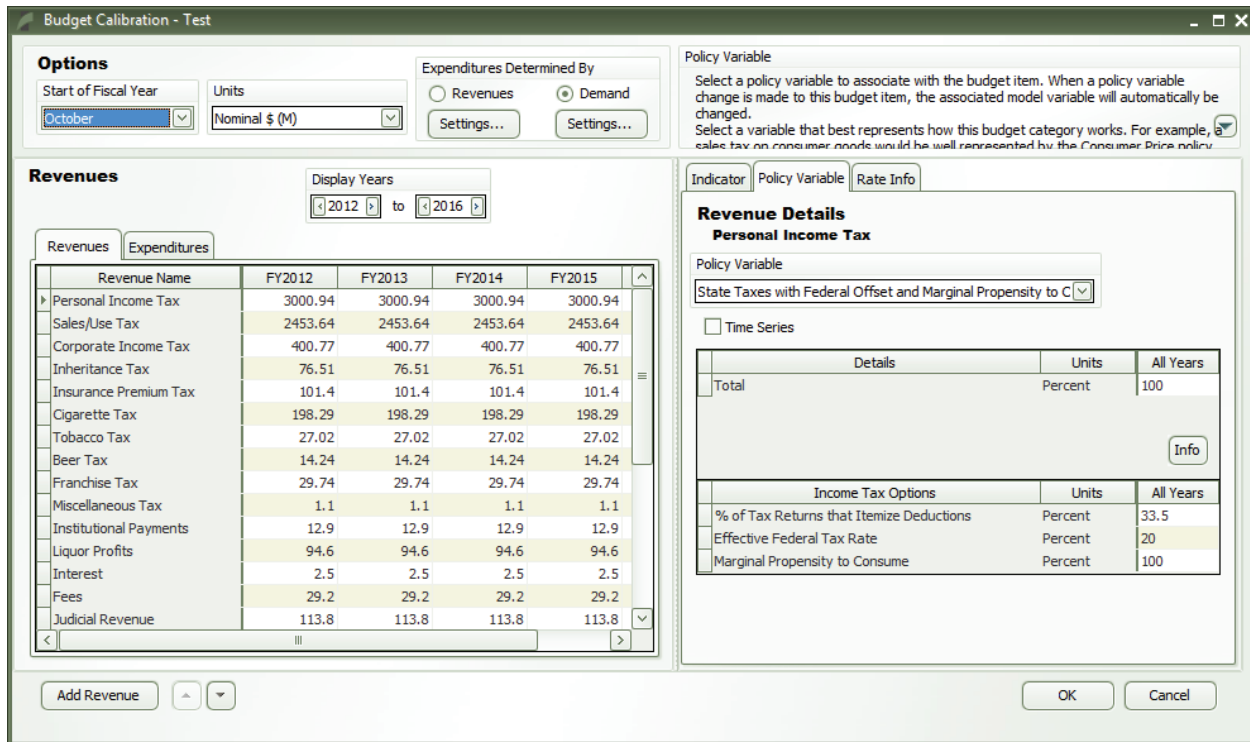
demographics, such as an anticipated “baby bulge” in the population from age 4 through age 18, would drive the demand for expenditures on public education higher in the future. This detailed association of the state budget with economic and demographic trends allows a single, static fiscal change to influence the economy, which will then echo back into the budget - by influencing revenue and expenditure changes in other budget categories - in dynamic scoring. For instance, lowering the sales tax rate will encourage a higher rate of migration and more net commuters living in Connecticut. Therefore, the state might be able to capture some of its revenues back through income tax revenues (from the new residents, coming to the state in search of a lower cost of living and lower net taxes) or income/sales tax revenues on the increase in business activity. This allows for dynamic scoring with all key economic and demographic responses. Figure 4 as shown on the following page provides an overview of the Tax-PI model structure and approach.

**Figure 4: Tax-PI Structure and Modeling Approach**



*The above flowchart shows graphically some of the effects described in the previous paragraph and Tax-PI overall. The economy drives revenues and creates income for households, but fiscal policy in the region affects incentives and shifting demographics changes consumption patterns and growth in the labor force. Demographics reacts to fiscal policy in terms of commuting and location decisions while influencing long-term expenditure needs for healthcare, education, and other items. The state budget influences both firm and household locations through incentives but (in the long-term) must reflect the needs of the state’s demographics and the revenues available from macroeconomic growth. Dynamic scoring comes from when an initial, static tax change - clockwise from the bottom-left to the top - induces economic and demographic changes that then change the state budget situation across all revenue and expenditure categories, producing a dynamic economic and fiscal impact in a consistent structure.*





The above screen shot is an example calibration of Tax-PI. This screen links customized revenue categories to revenue generation (for the income tax, additional personal income net of transfer receipts) and the behavioral response (higher state taxes with adjustments to federal deductibility and a marginal propensity to consume). This allows further customization of expenditures, the start of the fiscal year, and balanced budgets.

All equations, assumptions, and linkages are available publicly and peer reviewed.<sup>1</sup> This includes the equations and structure,<sup>2</sup> data sources and estimation procedures,<sup>3</sup> and the calibration procedure and interface guide for Tax-PI.<sup>4</sup> The REMI staff will also provided unlimited training and technical support with the Tax-PI model, as spelled out in the user agreement, to further clients' understanding of the underlying model and aid in working with the graphical user interface (GUI) of the program.

## Tax-PI Clients & Applications

Since its launch in 2010, the users of Tax-PI across the United States have released a number of studies on dynamic effects within a state budget or the fiscal impacts of any non-fiscal policy (such as the economic development implications of a new factory and the secondary influence the perturbed labor market and demographic response has on the state budget). For reference and consideration, here are two examples of each type prepared by our clients or REMI for policymakers and the public:

<sup>1</sup> Full documentation page, <<http://www.remi.com/resources/documentation>>

<sup>2</sup> <[http://www.remi.com/download/documentation/pi+/pi+\\_version\\_1.7/PI+\\_v1.7\\_Model\\_Equations.pdf](http://www.remi.com/download/documentation/pi+/pi+_version_1.7/PI+_v1.7_Model_Equations.pdf)>

<sup>3</sup> <<http://tinyurl.com/remidatasources>>

<sup>4</sup> <[http://www.remi.com/download/documentation/tax-pi/tax-pi\\_version\\_1.0/Getting\\_Started\\_with\\_Tax-PI\\_v1-0-3.pdf](http://www.remi.com/download/documentation/tax-pi/tax-pi_version_1.0/Getting_Started_with_Tax-PI_v1-0-3.pdf)>

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### **Dynamic Scoring of Economic Impacts and Revenue Effects**

- Utah Office of the Legislative Fiscal Analyst (LFA), “Dynamic Fiscal Notes”<sup>5</sup>
- Washington Joint Legislative Audit and Review Committee (JLARC), “Aerospace Industry Tax Preference in Washington State: An Economic Analysis Using REMI”<sup>6</sup>

### **Fiscal Impact of Non-Fiscal Issues and Economic Development Projects**

- George Washington University (GWU) for the Iowa Hospital Association (IAHA), “Economic and Employment Effects of Expanding Medicaid in Iowa”<sup>7</sup>
- REMI for the Arkansas Bureau of Legislative Research (BLR), “The Projected Economic and Fiscal Impacts of the Big River Steel Project in Arkansas”<sup>8</sup>

### **Tax-PI Sample Client List**

Tax-PI is currently in use in over thirteen different public organizations. On a project by project basis, the use of the model can extend to various other private sector consulting groups, research centers, and within REMI. Government agencies are typically the more common perpetual license agreement holders.

Connecticut Department of Economic & Community Development  
Council of the District of Columbia  
Florida Legislature  
Illinois Department of Commerce & Economic Opportunity  
Illinois Department of Revenue  
Iowa Department of Revenue & Finance  
Kansas Department of Revenue  
Mississippi Institutions of Higher Learning  
Texas Legislative Budget Board  
University of Colorado Boulder - Common Sense Policy Roundtable  
Vermont Agency of Administration  
Vermont Joint Fiscal Office  
Washington Office of Financial Management  
Washington State Joint Legislative Audit and Review Committee

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<sup>5</sup> <<http://le.utah.gov/interim/2013/pdf/00004083.pdf>>

<sup>6</sup> <<http://tinyurl.com/washingtontaxpi>>

<sup>7</sup> <<http://blog.iowahospital.org/wp-content/uploads/2013/03/IA-Medicaid-Expansion-Econ-Full-Report.pdf>>

<sup>8</sup> <<http://talkbusiness.net/wp-content/uploads/2013/03/THE-PROJECTED-ECONOMIC-AND-FISCAL-IMPACT-OF-THE-BIG-RIVER-STEEL-PROJECT-....pdf>>

## ABOUT FLORIDA TAXWATCH

As an independent, nonpartisan, nonprofit taxpayer research institute and government watchdog, it is the mission of Florida TaxWatch to provide the citizens of Florida and public officials with high quality, independent research and analysis of issues related to state and local government taxation, expenditures, policies, and programs. Florida TaxWatch works to improve the productivity and accountability of Florida government. Its research recommends productivity enhancements and explains the statewide impact of fiscal and economic policies and practices on citizens and businesses.

Florida TaxWatch is supported by voluntary, tax-deductible donations and private grants, and does not accept government funding. Donations provide a solid, lasting foundation that has enabled Florida TaxWatch to bring about a more effective, responsive government that is accountable to the citizens it serves since 1979.

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The findings in this Report are based on the data and sources referenced. Florida TaxWatch research is conducted with every reasonable attempt to verify the accuracy and reliability of the data, and the calculations and assumptions made herein. Please feel free to contact us if you feel that this paper is factually inaccurate.

The research findings and recommendations of Florida TaxWatch do not necessarily reflect the view of its members, staff, Executive Committee, or Board of Trustees; and are not influenced by the individuals or organizations who may have sponsored the research.

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