

Presentation to PSRC Land Use Technical Advisory Committee:

Supporting Slides for Model Technical Overview and Example Scenarios

Regional Economic Models, Inc.

Agenda



Economic and Demographic Overview

Scenario: Employment Shock in Finance Sectors

Scenario: Housing Price Decrease

Scenario: Military Installations

Conclusion

REMI Overview



Regional Economic Models, Inc. (REMI) was founded in 1980 on a transformative idea: *decision-makers should test the economic effects of their policies before they're implemented.*

REMI is the leading provider of state, local, and national macroeconomic policy analysis models.

From the start, REMI's mission is to improve public policy through economic modeling software that informs policies impacting our day-to-day lives.

REMI models are built for any state, county, or combination of counties in the United States.



what does **REMI** say?sm

REMI is a *Bottom-Up/Top-Down* Methodology

BLS: I-O Tables projected 2031, Employment by Industry Projection 2031, Labor Force Participation Rates 2031

Census: Fertility rates, survival rates, international migration

RSQE: short-term (GDP, Personal Income, Employment) and long-term forecast (Congressional Budget Office (CBO) and Energy Information Administration (EIA))

"A place to live"

Population and demographics: age structure; amenities/quality of life; international migration; cost of living

"A place to work"

Employment/GDP: industry mix; growing, productive industries; strong industry clusters

Demographics: labor supply; Interacts with Employment: Labor Demand

Puget Sound Regional Outlook



Washington Counties (4 Regions)

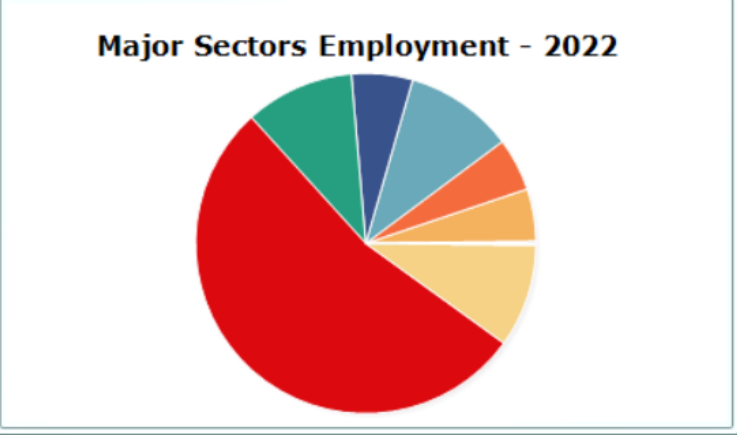


Regional Profiles

King County

Employment Location Quotients	
Industry	2022
Natural Resources	0.221
Construction	0.889
Manufacturing	0.790
Retail and Wholesale	0.837
Transportation and Public Utilities	1.021
Finance, Insurance & Real Estate	0.888
Services	1.191
Government	0.960

- Employment
- Population
- Work Profile
- Residence Profile
- Industry Profile
- Regional Layout



REMI PI+ v3.2 | 4 Region 70 Sectors | History 2001-2022 | Forecast 2023-2060

what does **REMI** say?sm

Puget Sound Economic Overview



Category	Units	2024	2034	% Change	National % Change
Total Employment	Thousands (Jobs)	3058.793	3375.558	10.36%	5.08%
Population	Thousands	4415.575	4835.378	9.51%	5.66%
Labor Force	Thousands	2394.235	2591.964	8.26%	5.44%
Gross Domestic Product	Billions of Fixed (2024) Dollars	558.683	743.794	33.13%	22.25%
Real Disposable Personal Income per Capita	Thousands of Fixed (2017) Dollars	65.915	78.693	19.39%	17.89%
PCE-Price Index	2017=100 (Nation)	132.682	163.532	23.25%	21.58%

what does *REMI* say?sm

Employment by Sector - Individuals



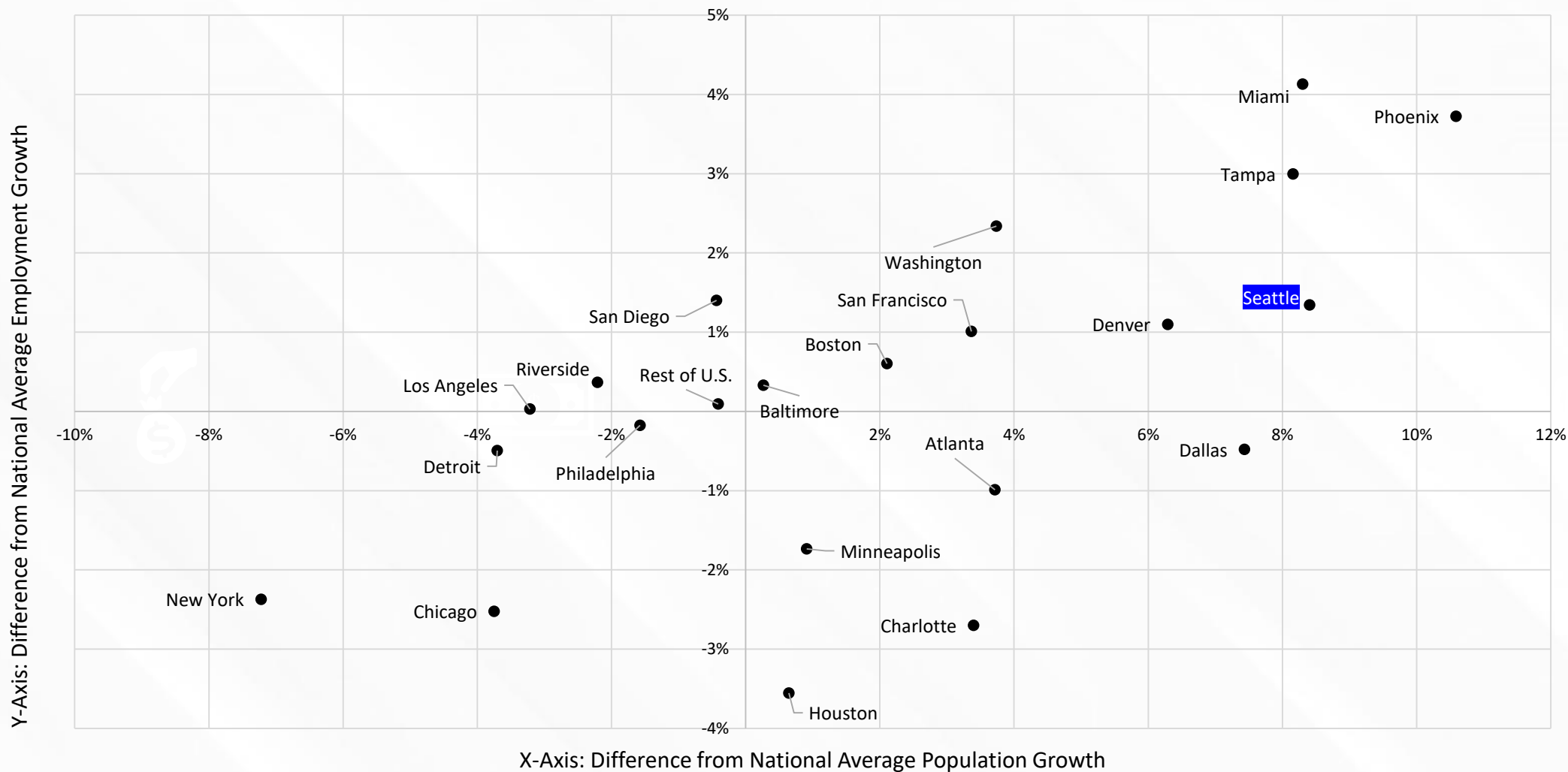
Industry	2024	2034	Total Change	Puget Sound% Change	National % Change	Location Quotient
All Industries	3058793	3375558	316764	10.36%	5.08%	
Forestry and Logging; Fishing, hunting and trapping	4806	4956	150	3.13%	-0.20%	1.611
Oil and gas extraction	1207	1240	33	2.71%	0.45%	0.171
Mining (except oil and gas)	1399	1534	135	9.65%	-5.56%	0.423
Utilities	3301	3387	86	2.61%	-1.37%	0.383
Construction	174609	199873	25264	14.47%	4.32%	1.026
Fabricated metal product manufacturing	11104	11929	825	7.43%	1.13%	0.52
Other transportation equipment manufacturing	75265	80754	5489	7.29%	3.57%	7.197
Miscellaneous manufacturing	11533	11998	465	4.03%	2.07%	1.07
Food manufacturing	14215	15312	1097	7.72%	5.54%	0.549
Wholesale trade	98524	101290	2766	2.81%	-0.66%	1.028
Retail trade	241431	243096	1665	0.69%	-3.29%	0.877
Warehousing and storage	25043	29502	4459	17.80%	14.30%	0.858
Data processing, hosting, and related services	60209	70157	9948	16.52%	14.40%	4.19
Real estate	158744	177980	19236	12.12%	6.26%	0.986
Administrative and support services	149294	167061	17767	11.90%	3.79%	0.832
Educational services; private	56285	63366	7081	12.58%	5.66%	0.796
Ambulatory health care services	131428	158901	27473	20.90%	12.84%	0.883
Performing arts, spectator sports, and related industries	49131	54608	5478	11.15%	6.94%	1.471
Food services and drinking places	157733	172551	14818	9.39%	4.91%	0.868
State and Local Government	269336	291445	22108	8.21%	2.68%	0.968
Federal Civilian	53895	53701	-194	-0.36%	-0.36%	1.299
Federal Military	52296	53487	1191	2.28%	2.28%	1.847
Farm	8401	8201	-200	-2.38%	-2.38%	0.231

Exports by Sector



Industry	Units	2024	2034	% Change
All Industries	Billions of Fixed (2024) Dollars	328.637	443.48	34.95%
Publishing industries, except Internet	Billions of Fixed (2024) Dollars	88.832	140.902	58.62%
Data processing, hosting, and related services; Other information services	Billions of Fixed (2024) Dollars	42.195	57.738	36.84%
Other transportation equipment manufacturing	Billions of Fixed (2024) Dollars	41.833	55.493	32.65%
Management of companies and enterprises	Billions of Fixed (2024) Dollars	31.327	39.874	27.28%
State and Local Government	Billions of Fixed (2024) Dollars	26.925	30.690	13.98%
Retail trade	Billions of Fixed (2024) Dollars	14.255	17.526	22.95%
Wholesale trade	Billions of Fixed (2024) Dollars	13.508	16.691	23.56%
Professional, scientific, and technical services	Billions of Fixed (2024) Dollars	9.353	13.066	39.70%
Telecommunications	Billions of Fixed (2024) Dollars	7.275	9.034	24.18%
Federal Civilian	Billions of Fixed (2024) Dollars	5.826	8.403	44.23%
Insurance carriers and related activities	Billions of Fixed (2024) Dollars	4.986	6.063	21.60%
Air transportation	Billions of Fixed (2024) Dollars	3.985	4.356	9.31%
Monetary authorities - central bank, credit intermediation, and related activities	Billions of Fixed (2024) Dollars	3.782	4.167	10.18%
Construction	Billions of Fixed (2024) Dollars	3.601	4.407	22.38%
Computer and electronic product manufacturing	Billions of Fixed (2024) Dollars	2.671	2.969	11.16%
Rental and leasing services; Lessors of nonfinancial intangible assets	Billions of Fixed (2024) Dollars	2.055	2.255	9.73%
Federal Military	Billions of Fixed (2024) Dollars	1.976	2.165	9.56%
Water transportation	Billions of Fixed (2024) Dollars	1.860	2.266	21.83%
Petroleum and coal products manufacturing	Billions of Fixed (2024) Dollars	1.850	2.101	13.57%
Securities, commodity contracts, investments, and funds and trusts	Billions of Fixed (2024) Dollars	1.528	1.532	0.26%
Chemical manufacturing	Billions of Fixed (2024) Dollars	1.379	1.453	5.37%
Farm	Billions of Fixed (2024) Dollars	1.370	1.536	12.12%
Hospitals	Billions of Fixed (2024) Dollars	1.078	1.226	13.73%

Metropolitan Growth Matrix: Population vs Employment Growth (2022-2032)



Puget Sound Demographics



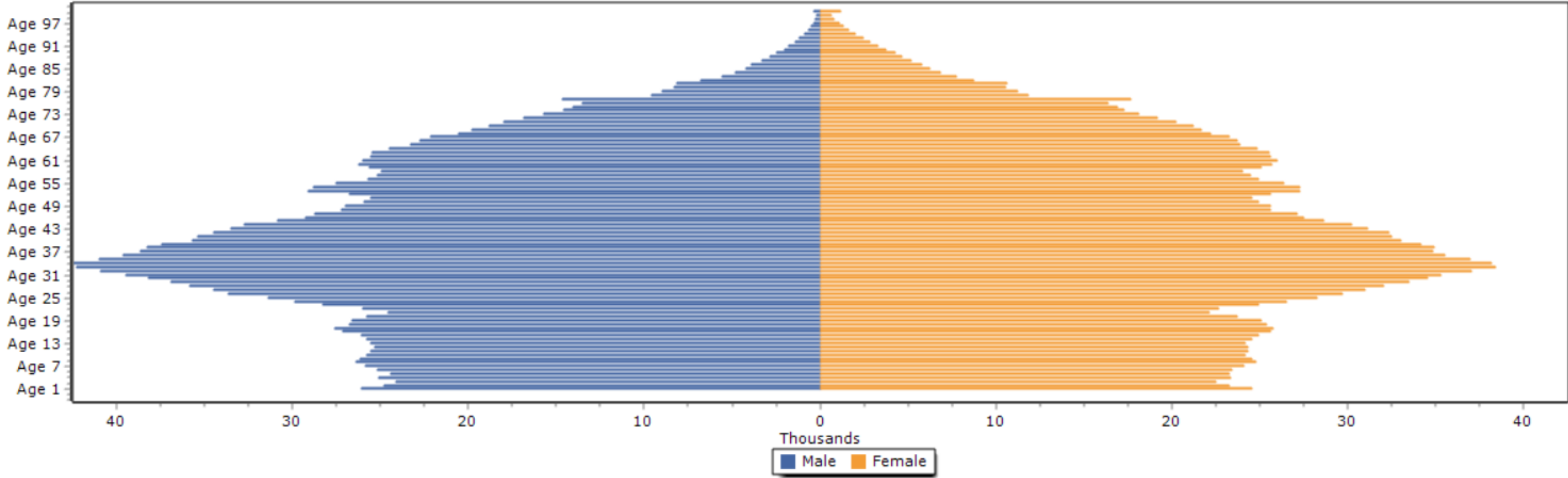
Population

Age	Units	2024	2034	% Change	Total Change
Ages 0-14	Thousands	742.4	779.587	5.01%	37.187
Ages 15-24	Thousands	515.473	550.658	6.83%	35.185
Ages 25-64	Thousands	2468.177	2621.146	6.20%	152.969
Ages 65+	Thousands	689.525	883.986	28.20%	194.461

Labor Force

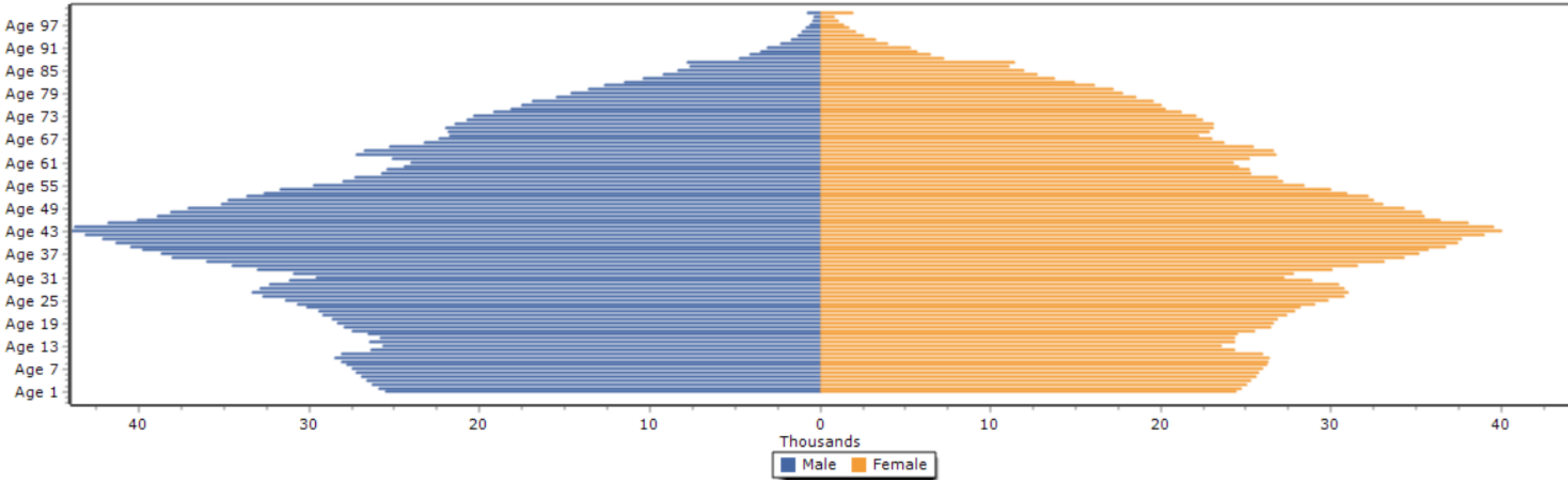
Age	Units	2024	2034	% Change	Total Change
Ages 16-24	Thousands	248.377	273.038	9.93%	24.661
Ages 25-64	Thousands	2001.252	2135.417	6.70%	134.165
Ages 65+	Thousands	144.607	183.509	26.90%	38.902

Puget Sound Population Pyramid (2024)



what does **REMI** say?sm

Puget Sound Population Pyramid (2034)



what does **REMI** say?sm

REMI Model Framework

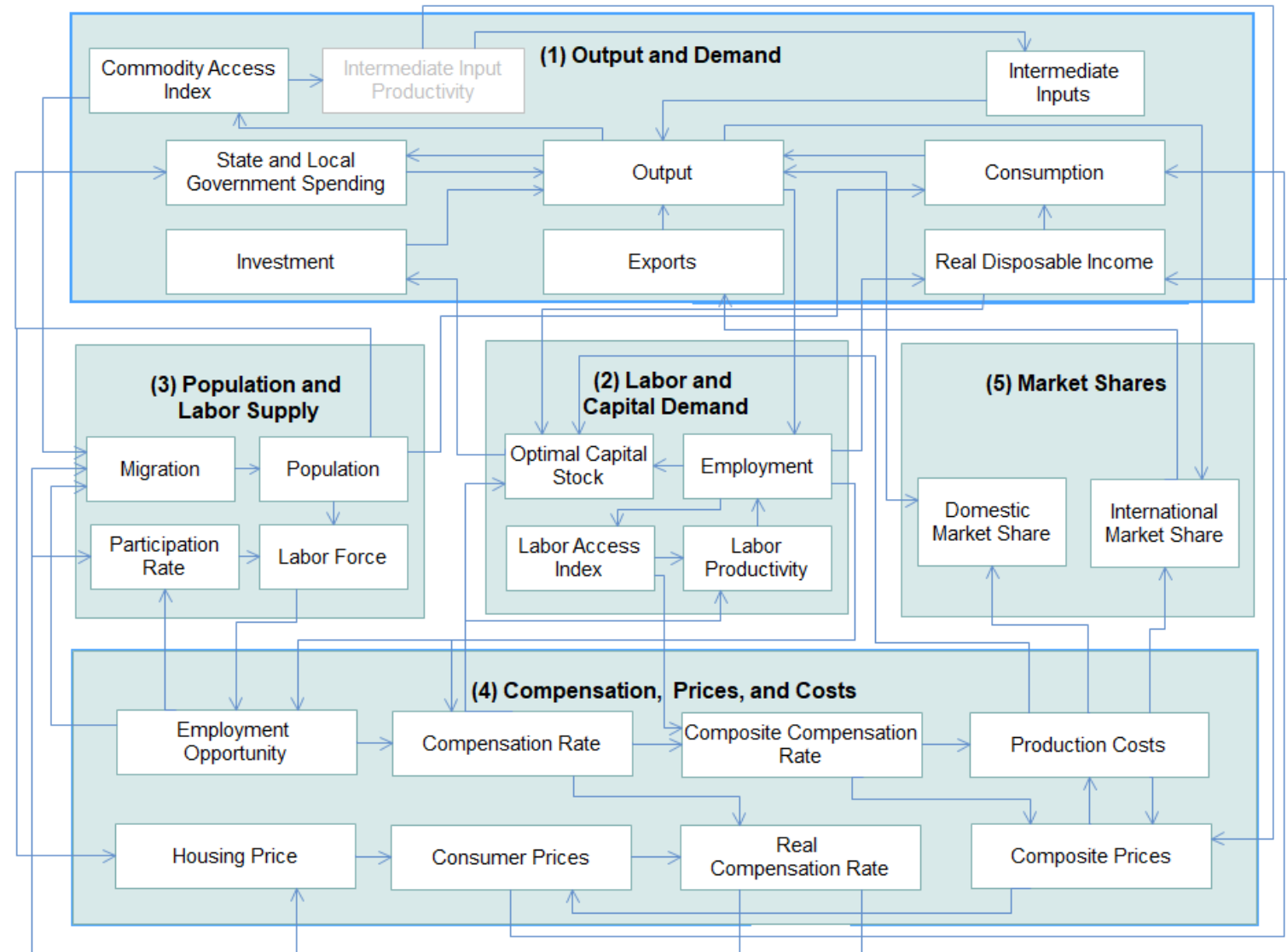


General Equilibrium

Input-Output

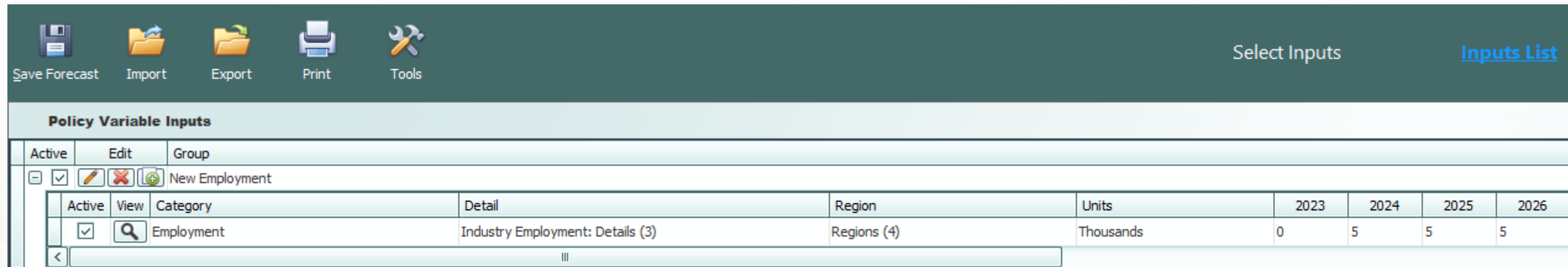
Econometrics

Economic Geography



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Scenario: Employment Shock in Finance Sectors



Active	Edit	Group	Category	Detail	Region	Units	2023	2024	2025	2026
<input checked="" type="checkbox"/>			Employment	Industry Employment: Details (3)	Regions (4)	Thousands	0	5	5	5

Details:

Monetary authorities - central bank; Credit intermediation and related activities
Securities, commodity contracts, other investments; Funds, trusts, other financial vehicles
Insurance carriers and related activities

Scenario: Employment Shock in Finance Sectors

Washington Counties

All Regions



Employment Shock in Finance Sectors - Economic Impact

All Regions

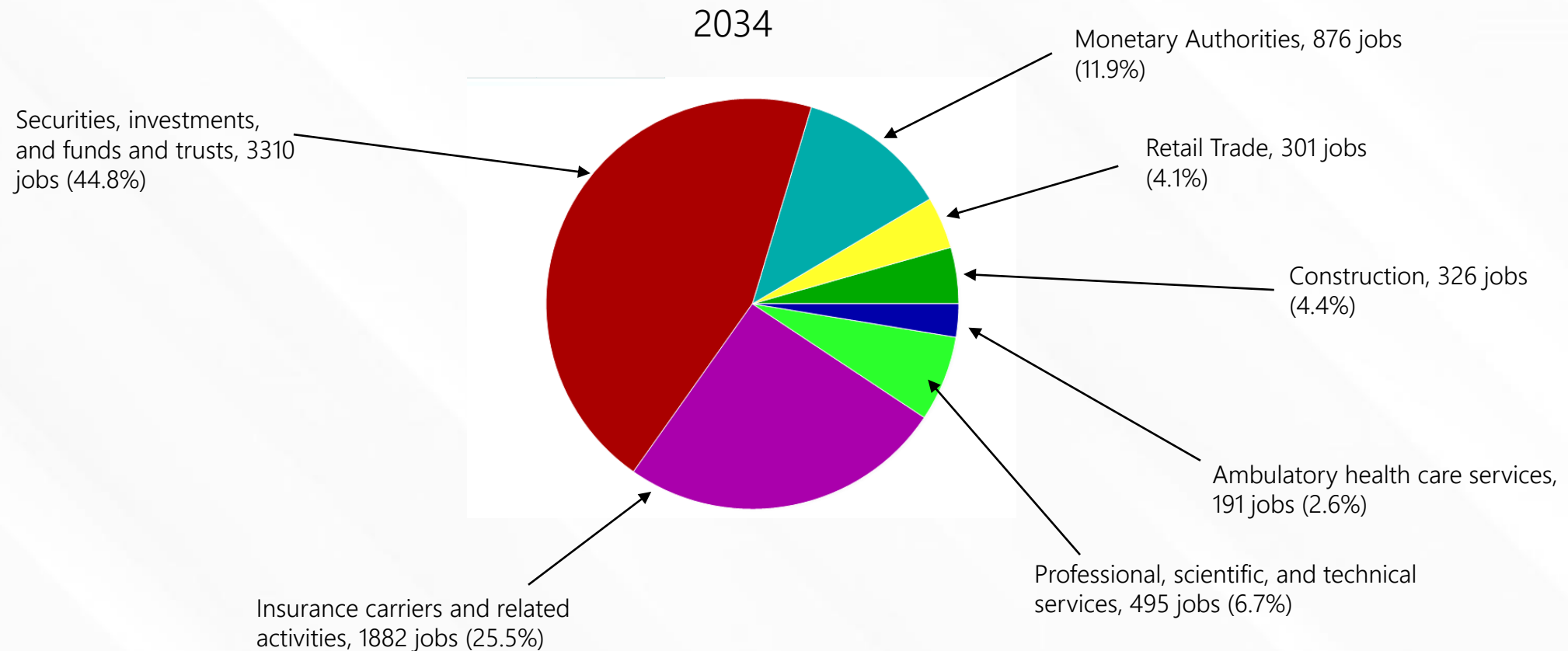
2024

Total Employment +12,557 Total Jobs	Gross Domestic Product +2,027 Million (current dollars)
Output +3,626 Million (current dollars)	Personal Income +1,162 Million (current dollars)
Population +3,881 Individuals	Labor Force +2,669 Individuals

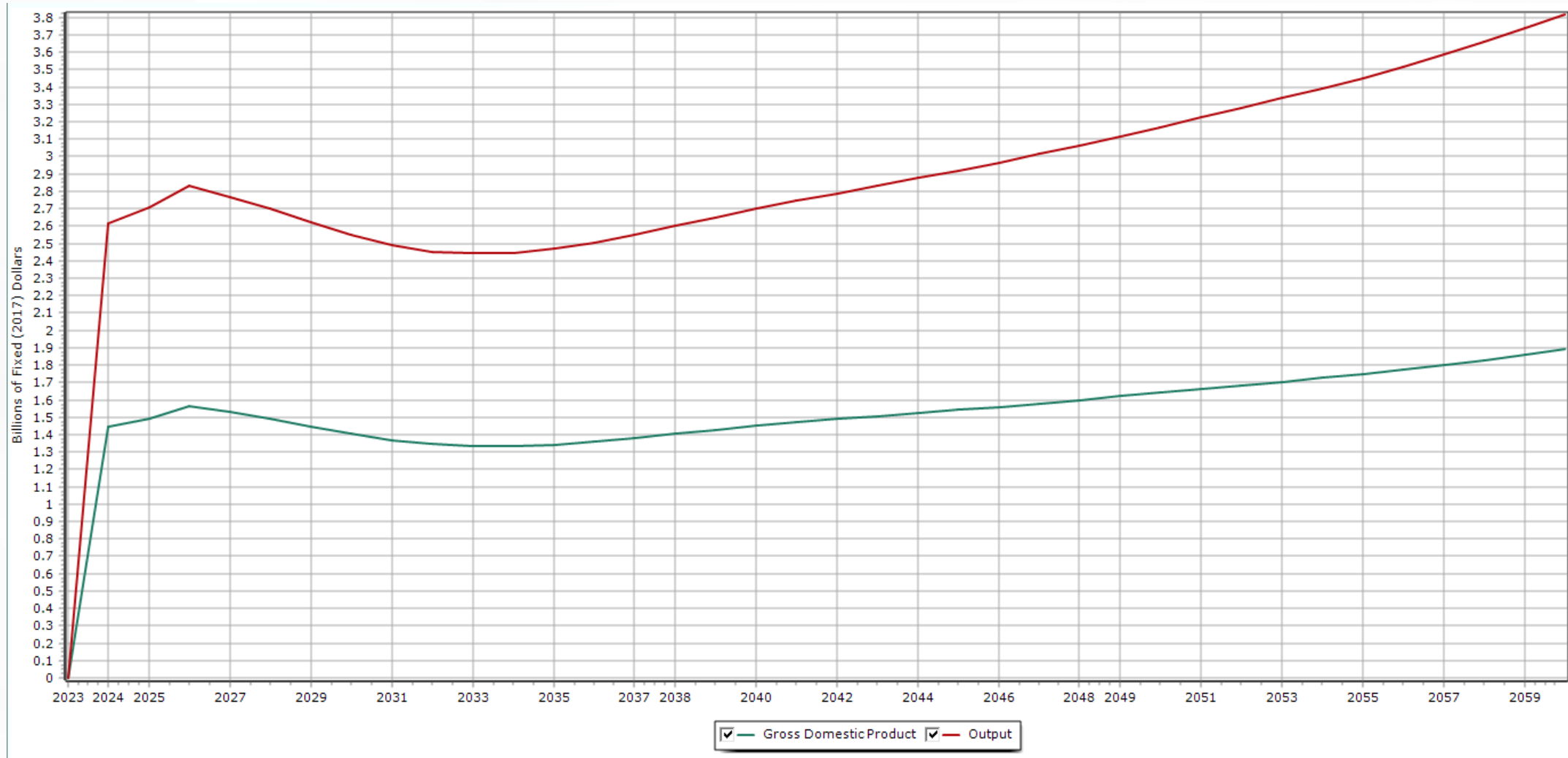


Show Input Data

Scenario: Employment Shock in Finance Sectors

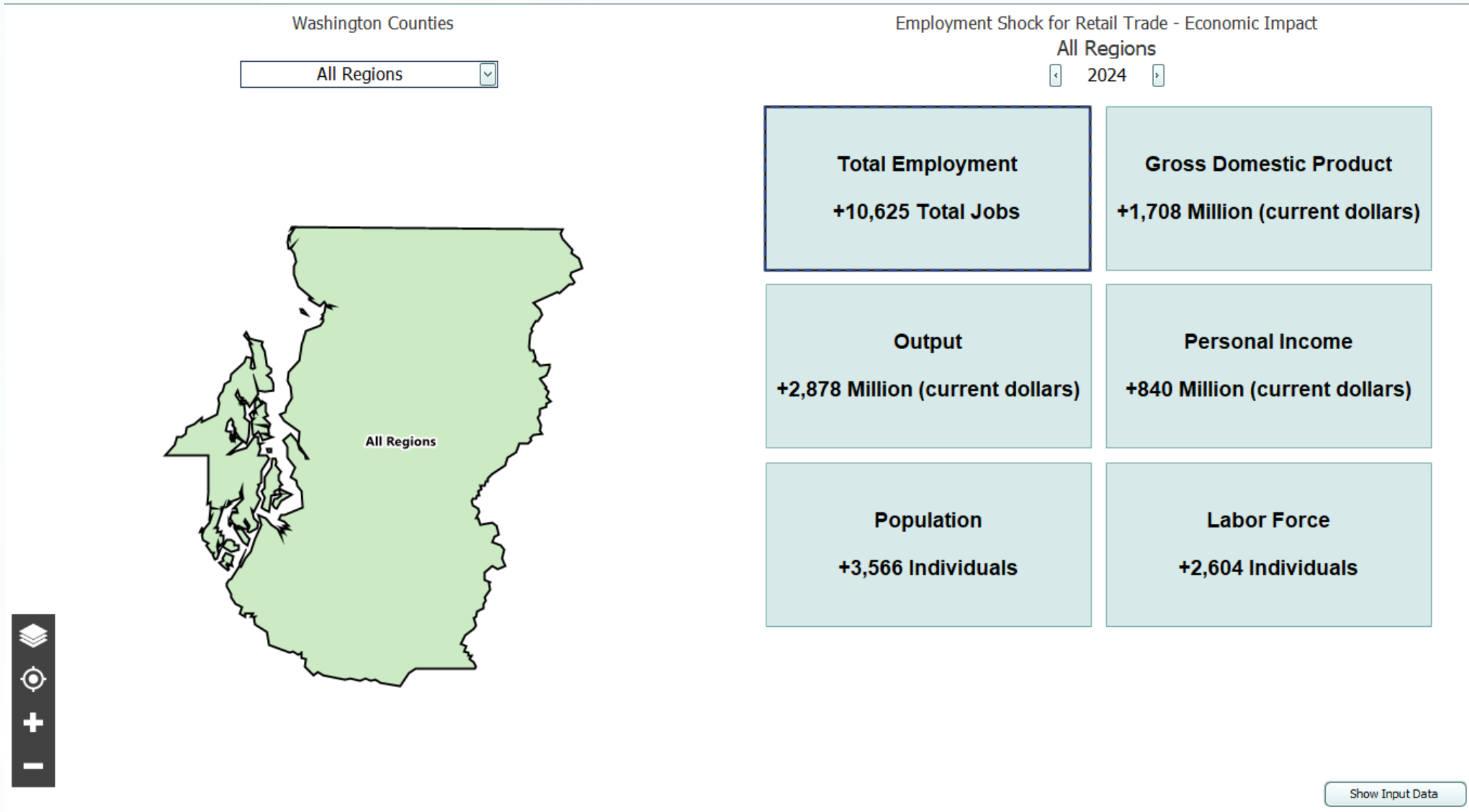


Scenario: Employment Shock in Finance Sectors

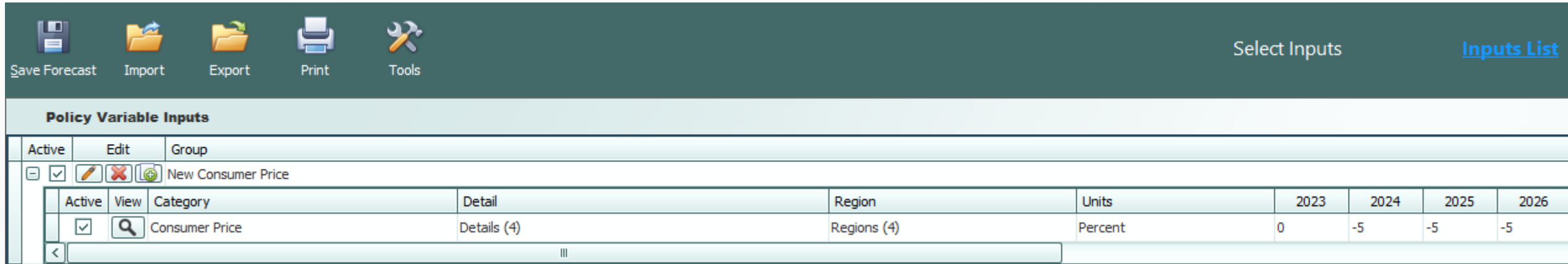


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Scenario: 5,000 Employment "Shock" in Retail Trade



Scenario: Housing Price Decrease



Save Forecast Import Export Print Tools Select Inputs [Inputs List](#)

Policy Variable Inputs

Active	Edit	Group	Category	Detail	Region	Units	2023	2024	2025	2026
<input checked="" type="checkbox"/>			New Consumer Price							
<input checked="" type="checkbox"/>			Consumer Price	Details (4)	Regions (4)	Percent	0	-5	-5	-5

Details:

Rental of tenant-occupied nonfarm housing
Imputed rental of owner-occupied nonfarm housing
Rental value of farm dwellings
Group housing

Scenario: Housing Price Decrease

Washington Counties

All Regions



Housing Price Decrease - Economic Impact

All Regions

2024

Total Employment +15,067 Total Jobs	Gross Domestic Product +3,069 Million (current dollars)
Output +4,997 Million (current dollars)	Personal Income +1,559 Million (current dollars)
Population +9,556 Individuals	Labor Force +7,388 Individuals

Show Input Data

Scenario: Housing Price Decrease



Example Study: King County Affordable Housing

King County Housing Problem

Housing Costs & Affordability Index for Buyers and Renters

Of all King County renters...



... 6 out of 13 renters pay rent that exceeds 30% of their income.



Source: US Census Bureau American Community Survey

Economic Impact – King County Investments in Affordable Housing, King County Office of Economic and Financial Analysis, 11/2024

Table 1: Key Housing Statistics – Past Decade

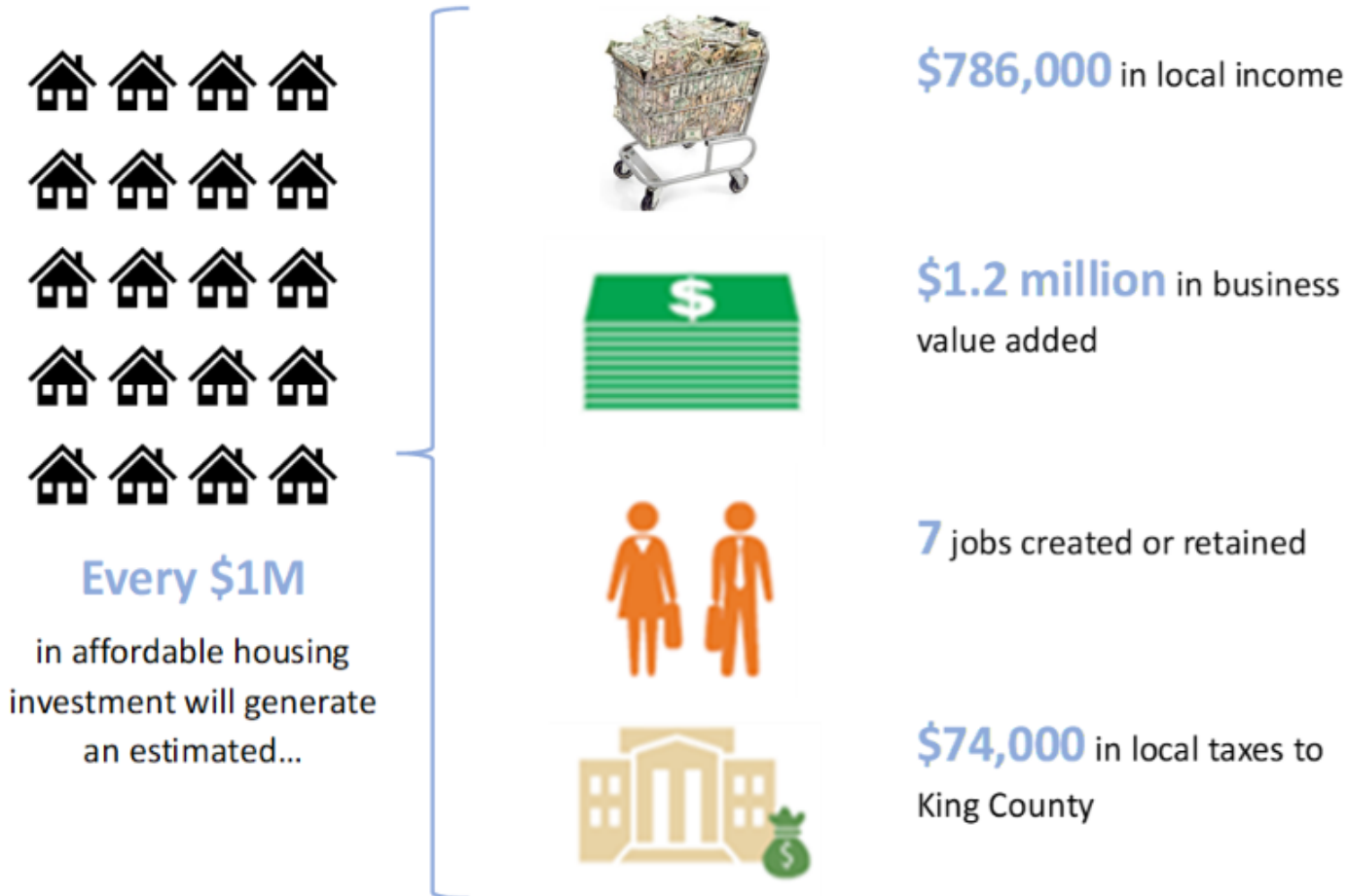
Key ACS Statistics	2023	2018	2014	Annual Avg Growth	Annual Avg. % Growth
Total Housing Units	1,021,711	952,597	880,488	14,122	1.6%
Owner Occupied Housing Units (%)	55.6%	56.0%	57.0%	-0.1%	-0.3%
Renter Occupied Housing Units (%)	44.4%	44.0%	43.0%	0.1%	0.3%
Median Housing Owner Costs with mortgage (\$)	\$3,125	\$2,544	\$2,144	\$98.10	4.6%
Median gross rent (\$)	\$2,043	\$1,674	\$1,227	\$81.60	6.7%

Source: US Census Bureau American Community Survey 1-year estimates for King County

Example Study: King County Affordable Housing

Figure 2: Summary Results Per \$1 Million Investment in Affordable Housing in King County

Economic Impacts of Affordable Housing Investment



Economic Impact – King County Investments in Affordable Housing, King County Office of Economic and Financial Analysis, 11/2024

This economic impact analysis simulates the “ideal” case of economic benefits if King County could address and meet the entire need for affordable housing units by 2044, without considering financial constraints. The study highlights the primary economic benefits from affordable housing, focusing on construction activities and reduced rent for households, which spurs additional spending in King County

Overview of Average Annual Impacts 2027 – 2044, by Component:

Includes reduction in government spending for in-region and in-state share of investment.

Economic Impact – King County Investments in Affordable Housing, King County Office of Economic and Financial Analysis, 11/2024

Table A.3 Economic Impact Results for King County and Washington— Long-term Impacts (2027-2044 A)

Key Statistics	Avg King County Net Impacts	Avg State Net Impacts
Affordable Housing Investment – Construction Activities		
Total Employment (jobs)	1,428	1,722
Population (individuals)	2,187	3,188
Labor Force (individuals)	1,306	1,848
Gross Domestic Product (\$ millions)	\$296	\$362
Value-Added (\$ millions)	\$296	\$359
Personal Income (\$ millions)	\$283	\$353
Rent Reduction – Increase Spending by Residents		
Total Employment (jobs)	1,253	1,107
Population (individuals)	2,836	2,185
Labor Force (individuals)	1,705	1,321
Gross Domestic Product (\$ millions)	\$409	\$416
Value-Added (\$ millions)	\$409	\$405
Personal Income (\$ millions)	\$389	\$237
Reduction in Government Spending on Other Activities		
Total Employment (jobs)	-268	-362
Population (individuals)	-267	-449
Labor Force (individuals)	-159	-264
Gross Domestic Product (\$ millions)	(\$139)	(\$159)
Value-Added (\$ millions)	(\$139)	(\$159)
Personal Income (\$ millions)	(\$48)	(\$69)
Overall Impacts Combined		
Total Employment (jobs)	2,414	2,467
Population (individuals)	4,756	4,925
Labor Force (individuals)	2,853	2,905
Gross Domestic Product (\$ millions)	\$566	\$619
Value-Added (\$ millions)	\$566	\$605
Personal Income (\$ millions)	\$624	\$521
Consumer Price Index for Housing (% change)	-0.75%	-0.35%
Increase in Taxes (\$ millions)	\$44	\$67



what does **REMI** say? sm

Military Economic Impact Studies – Data Collection

Data to Collect for Military Installations Contribution Study:

The minimal data required is employment or total base spending, but all additional data will help to make the analysis more precise. When data is limited, the REMI model will use available data to estimate where the economic activity is likely to occur.

- All active military employment
 - Include all living on and off the base
- Military members in training
 - Spreadsheet included conversion factor
- Federal civilian employment
- Contract civilian employment – if directly employed by base, located on or near base
- Average compensation for on-site and near-site directly related military and civilian staff
- Total annual or average annual spending on materials, services and other investment
 - Breakout of spending that was awarded in-state and out-of-state
 - Out-of-state only necessary if you wish to show rest of nation impact
- Any proposed or planned expansions in the near-future?
 - Similar data as before, but know construction vs equipment spending would be ideal.
- Related information on other in-state military VA hospitals, military equipment manufactures and other in-state contractors

Military Economic Sample Studies

Recent Sample Military Economic Impact Studies:

[Dayton Development Coalition – Federal Installations Economic Impact, 2024](#)

[Military Economic Impact on North Carolina, 2022](#)

[Economic Impact of U.S. Military in Texas, 2022](#)

[Utah’s Defense Economy: Economic Impacts and Industry Trends, 2021](#)

EXHIBIT 1: ECONOMIC IMPACT OF U.S. MILITARY BASES IN TEXAS, 2021					
ESTIMATED CONTRIBUTION					
	DIRECT EMPLOYMENT	TOTAL EMPLOYMENT (Direct and Indirect Employment)	OUTPUT (in thousands)	GROSS DOMESTIC PRODUCT (in thousands)	DISPOSABLE PERSONAL INCOME (in thousands)
Army Futures Command	833	2,201	\$371,423	\$224,300	\$156,737
Corpus Christi Army Depot	3,191	9,344	\$1,404,507	\$845,791	\$641,597
Dyess Air Force Base	5,533	16,098	\$3,040,516	\$1,792,594	\$1,148,538
Ellington Field Joint Reserve Base	414	1,203	\$217,681	\$128,750	\$85,043
Fort Bliss	46,971	120,799	\$22,944,253	\$13,557,057	\$7,969,926
Fort Hood	55,374	160,933	\$28,886,145	\$16,967,542	\$11,224,637
Goodfellow Air Force Base	9,690	23,897	\$4,744,642	\$2,801,133	\$1,533,659
Joint Base San Antonio	82,639	211,213	\$39,168,304	\$23,315,990	\$14,403,968
Laughlin Air Force Base	3,290	8,694	\$1,592,240	\$946,857	\$595,740
Naval Air Station Corpus Christi	8,395	19,815	\$3,356,238	\$2,010,506	\$1,311,338
Naval Air Station Kingsville	1,647	4,442	\$751,525	\$450,613	\$295,946
Naval Air Station Joint Reserve Base Fort Worth	5,199	15,164	\$2,696,550	\$1,589,164	\$1,068,397
Red River Army Depot	3,370	9,059	\$1,343,386	\$812,263	\$619,407
Sheppard Air Force Base	8,638	19,928	\$3,675,309	\$2,183,933	\$1,236,660
STATEWIDE TOTALS	235,184	622,790	\$114,192,719	\$67,626,493	\$42,291,593

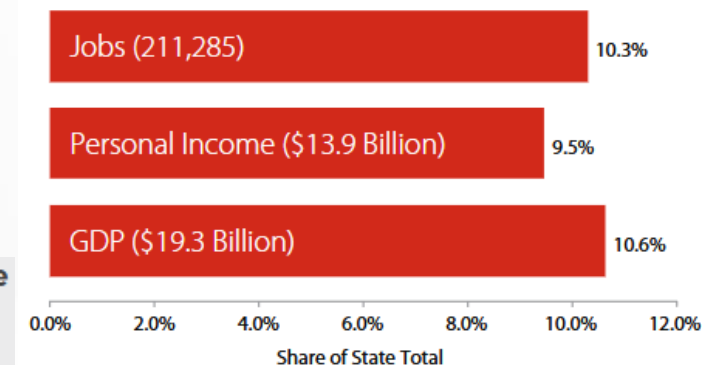
The Dayton Region installations:

- Generate \$40 Billion in economic impact.
- Create 380,000 jobs. Account for 6% of Ohio's economy.
- Generate \$69 billion in total economic activity across the state.

Table X: Economic Impact on Gross State Product and Personal Income

RESULTS CATEGORY	GROSS STATE PRODUCT	PERSONAL INCOME
General Defense (\$)	\$65.6 billion	\$36.0 billion
General Defense (%)	10.4% of total	6.5% of total
Veteran Expenditures (\$)	\$14.2 billion	\$13.2 billion
Veteran Expenditures (%)	2.2% of total	2.4% of total
Combined (\$)	\$79.7 billion	\$49.1 billion
Combined (%)	12.7% of total	8.9% of total

Defense Sector Economic Impact Summary, 2019



Source: Kem C. Gardner Policy Institute analysis using the REMI PI+ model

- **GDP**—Utah’s defense sector contributed \$19.3 billion to the state’s GDP, 10.6% of the total.
- **Fiscal Impacts**—Defense-related activity generated net fiscal impacts of \$244.3 million for the state.

Conclusion

REMI provides an economic model which is a framework for forecasting potential future outcomes and testing policy and planning scenarios; the default forecast presented today represents a potential outcome based on data, model structure and economic assumptions.

REMI models are applied by similar types of organizations to understand the changes in the integrated underlining economic and demographic structure of regional and national economy and for specific “what if” scenario analysis.