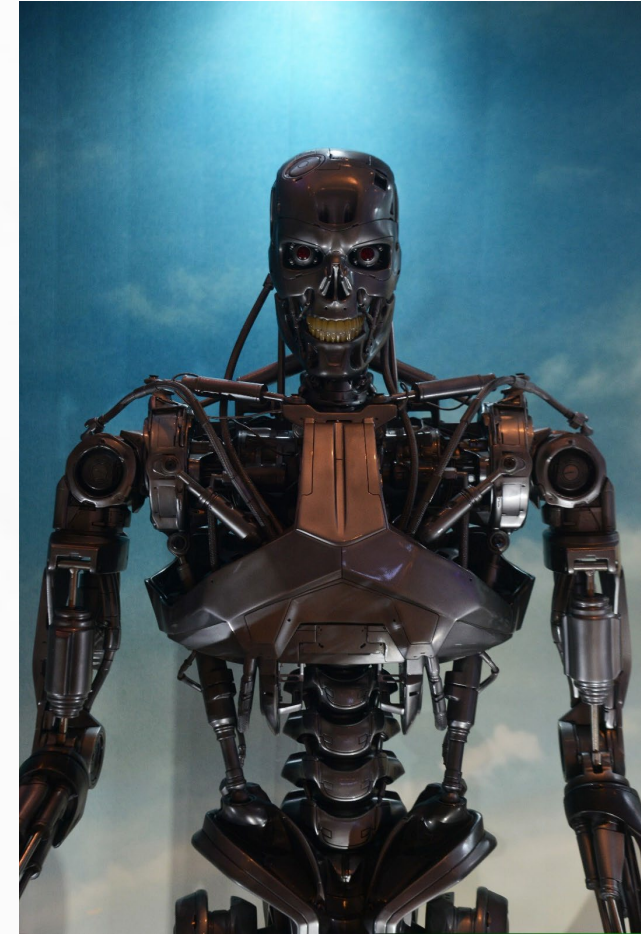
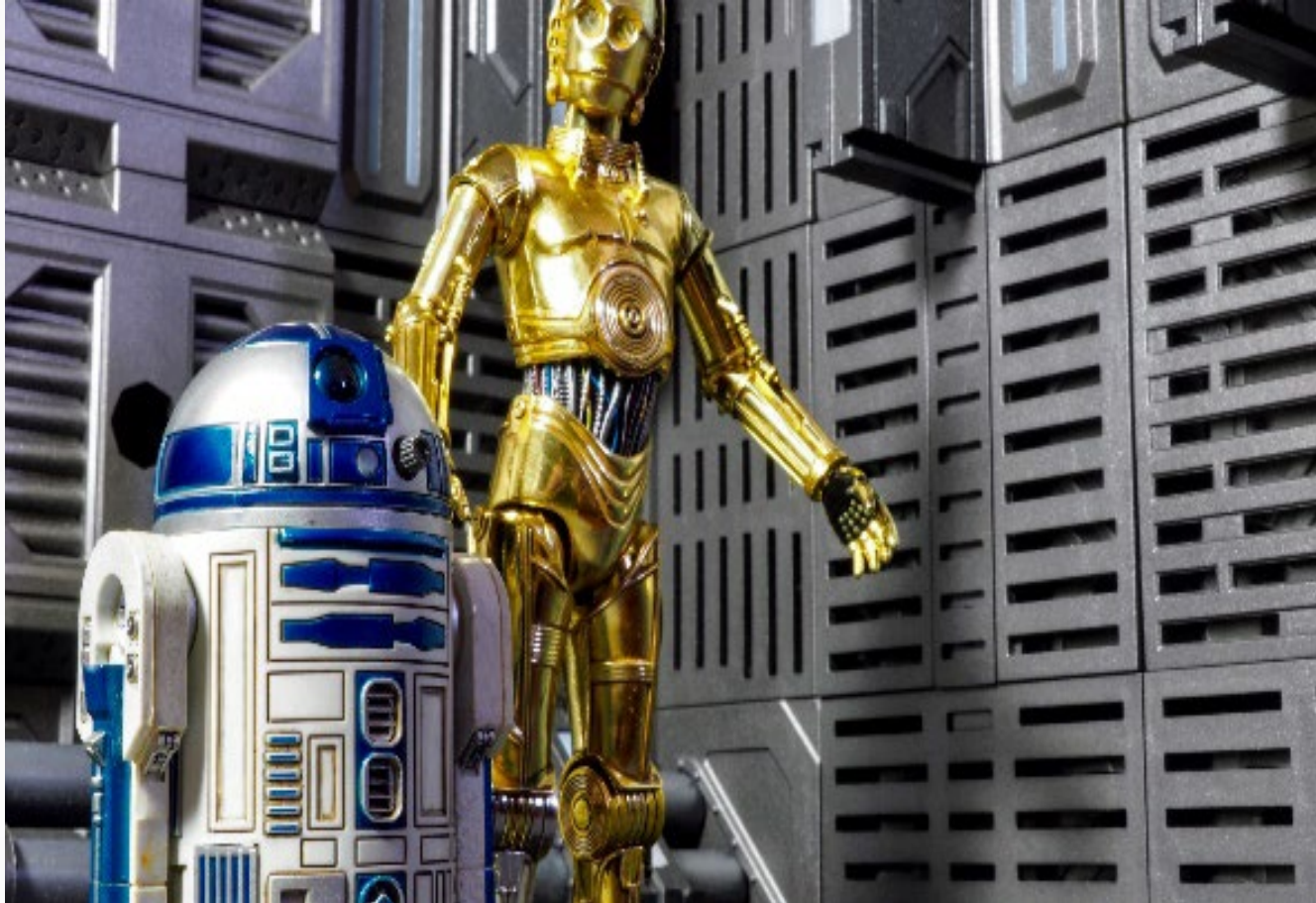


# ChatGPT for Economic Analysis

Regional Economic Models, Inc.

*what does REMI say?<sup>sm</sup>*

# AI: Friend or Foe?



what does **REMI** say?<sup>sm</sup>

# AI: Your New Best Frenemy



- The term "frenemy" is often used informally to describe complicated or ambivalent relationships, particularly among peers or acquaintances. It's important to note that frenemy relationships can be emotionally challenging and may not always be healthy or sustainable in the long term.
- AI can: answer your questions
  - But you need to know what questions to ask
- AI can: inform and misinform
  - But the key word is **Think**



what does **REMI** say?<sup>sm</sup>

# What does REMI say?



“REMI, which stands for Regional Economic Models, Inc., is an economic modeling and forecasting company. REMI develops and provides economic models and software tools that are used by governments, organizations, and businesses to analyze the potential impacts of policy changes, economic events, and other factors on regional and national economies.

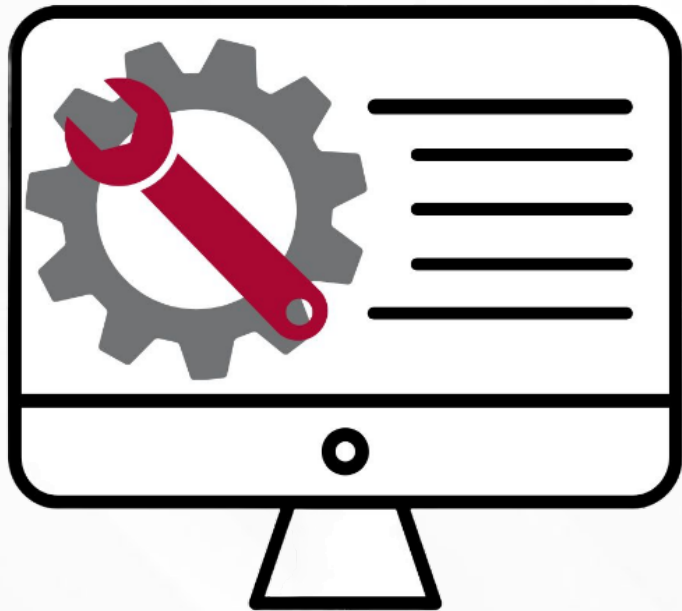
REMI's models incorporate a wide range of economic variables and factors to simulate how changes in policy, taxation, investment, and other factors can affect economic growth, employment, wages, and other economic indicators. These models are often used in the fields of economic development, public policy analysis, transportation planning, energy policy, and more.

It's important to note that REMI itself does not express opinions or "say" anything. Rather, the company's economic models and software tools are used by analysts and researchers to generate insights and projections based on the input data and assumptions they provide.”

-ChatGPT

**what does *REMI* say?<sup>sm</sup>**





- Generative Pre-trained Transformers (GPTs) are an AI tool to help write and edit; to brainstorm about a topic area; to conduct research; to integrate with excel and other tools
- GPTs and other AIs do not replace (as of yet...) economic modeling, and it does not replace expert judgement.

# How to leverage ChatGPT for Economic Analysis

## ChatGPT Can:



**Write up an economic forecast or simulation**  
Look into key regional economic variable projections



**Brainstorm: List potential effects of a policy decision**  
ChatGPT outputs into REMI inputs



**Assist with research**  
Find potential solutions



**Integrate with Google Sheets**  
To leverage ChatGPT seamlessly



**Be Trained**  
Via specific tasks to give better results

Provide brief write-up on economic forecast or simulation results.

# Copy REMI National Baseline Data



Standard National Control

Default Settings | Export Results | Benefit-Cost Analysis

Select Inputs | Inputs List | Forecast Options | **Results**

Search for result visualizations

**Key Results**

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

---

- Key Results**
- Analytical Graphs
- Analytical Tools
- Economic Tables
- Demographic Tables
- Favorites

Menu Settings

### Economic Summary

Comparison Type

Levels

Category	Units	2023	2024	2025	2026	2027	2028	2029	2030	2031	2032	2033	2034	2035	2036
Total Employment	Millions (Jobs)	208.602	208.525	208.337	208.388	208.955	209.466	209.818	210.141	210.753	211.329	211.875	212.382	212.907	213.432
Private Non-Farm Employment	Millions (Jobs)	180.785	180.801	180.641	180.678	181.190	181.619	181.876	182.081	182.536	182.982	183.429	183.868	184.353	184.822
Population	Millions	334.816	336.610	338.398	340.171	341.922	343.646	345.335	346.987	348.598	350.166	351.689	353.166	354.597	356.022
Gross Domestic Product	Billions of Current Dollars	26570.524	27403.199	28206.906	29167.583	30240.885	31316.330	32426.833	33600.161	34871.409	36176.376	37523.878	38911.627	40339.206	41822.115
Output	Billions of Current Dollars	46566.744	47867.003	49092.115	50614.085	52310.014	53971.887	55667.538	57441.805	59389.698	61429.167	63605.264	65913.842	68370.943	70932.115
Personal Income	Billions of Current Dollars	23103.874	23822.045	24800.850	25824.414	26994.775	28353.446	29418.620	30821.838	32152.306	33450.859	34801.680	36206.738	37668.149	39188.115
Disposable Personal Income	Billions of Current Dollars	19940.316	20575.978	21419.710	22061.513	22899.751	24130.427	25044.029	26290.221	27451.837	28560.516	29713.832	30913.460	32161.215	33452.115



# Open ChatGPT, Inform Request and Insert REMI Data



**CH** The following chat will focus on reporting results from the REMI national macroeconomic forecast.

Sure, I can help you with reporting the results from the REMI national macroeconomic forecast. Please provide me with the specific information you would like to include in the report, such as the key findings, economic indicators, and any other relevant details.

**CH**

Category	Units	2023	2024	2025	2026	2027	2028	2029	2030	2031	2032
Total Employment	Millions (Jobs)	208.602	208.525	208.337	208.388	208.955	209.466	209.818	210.141	210.753	211.329
Private Non-Farm Employment	Millions (Jobs)	180.785	180.801	180.641	180.678	181.19	181.619	181.876	182.081	182.536	182.982
Population	Millions	334.816	336.61	338.398	340.171	341.922	343.646	345.335	346.987	348.598	350.166
Gross Domestic Product	Trillions of Current Dollars	26.570524	27.403199	28.206906	29.167583	30.240885	31.31633	32.426833	33.600161	34.871409	36.176376
Output	Trillions of Current Dollars	46.566744	47.867003	49.092115	50.614085	52.310014	53.971887	55.667538	57.441805	59.389698	61.429167
Personal Income	Trillions of Current Dollars	23.103874	23.822045	24.80085	25.824414	26.994775	28.353446	2.152306	33.450859		
Disposable Personal Income	Trillions of Current Dollars	19.940316	20.575978	21.41971							

Regenerate response

Send a message.

what does **REMI** say? <sup>sm</sup>

# ChatGPT Output



< 1/2 >  Thank you for providing the data from the REMI national macroeconomic forecast. Here is a   

summary of the key findings:

1. Total Employment (Millions of Jobs):

- 2023: 208.602 million
- 2024: 208.525 million
- 2025: 208.337 million
- 2026: 208.388 million
- 2027: 208.955 million
- 2028: 209.466 million
- 2029: 209.818 million
- 2030: 210.141 million
- 2031: 210.753 million
- 2032: 211.329 million

2. Private Non-Farm Employment (Millions of Jobs):

- 2023: 180.785 million
- 2024: 180.801 million
- 2025: 180.641 million
- 2026: 180.678 million
- 2027: 181.19 million
- 2028: 181.619 million
- 2029: 181.876 million

 Regenerate response

 Continue generating

Send a message.



**Then, asked to regenerate response**

# ChatGPT Output



< 2 / 2 >



Here are the key findings from the REMI national macroeconomic forecast:



1. Total employment is projected to remain relatively stable over the next decade, with a slight increase from 208.6 million jobs in 2023 to 211.3 million jobs in 2032.
2. Private non-farm employment is also expected to remain relatively stable, with a slight increase from 180.8 million jobs in 2024 to 182.9 million jobs in 2032.
3. The population is projected to continue to grow over the next decade, with an increase from 334.8 million people in 2023 to 350.2 million people in 2032.
4. Gross Domestic Product (GDP) is expected to experience steady growth, increasing from \$26.6 trillion in 2023 to \$36.2 trillion in 2032.
5. Output is projected to experience steady growth, increasing from \$46.6 trillion in 2023 to \$61.4 trillion in 2032.
6. Personal income is expected to increase from \$23.1 trillion in 2023 to \$33.5 trillion in 2032.
7. Disposable personal income is projected to increase from \$19.9 trillion in 2023 to \$28.6 trillion in 2032.

Overall, the REMI national macroeconomic forecast suggests a stable employment outlook, steady population growth, and steady economic growth across key indicators over the next decade.

# Capability 2: Brainstorming

---



ChatGPT : list the potential regional macroeconomic impact of minimum wage

*what does **REMI** say?<sup>sm</sup>*

## ChatGPT



### Examples

"Explain quantum computing in simple terms" →

"Got any creative ideas for a 10 year old's birthday?" →

"How do I make an HTTP request in Javascript?" →



### Capabilities

Remembers what user said earlier in the conversation

Allows user to provide follow-up corrections

Trained to decline inappropriate requests



### Limitations

May occasionally generate incorrect information

May occasionally produce harmful instructions or biased content

Limited knowledge of world and events after 2021

list the potential regional macroeconomic impact of minimum wage



Free Research Preview. ChatGPT may produce inaccurate information about people, places, or facts. [ChatGPT May 12 Version](#)



# ChatGPT Output

LE list the potential regional macroeconomic impact of minimum wage



The potential regional macroeconomic impact of a minimum wage can vary depending on several factors, including the level of the minimum wage, the characteristics of the regional economy, and the existing labor market conditions. Here are some potential impacts:



1. **Labor market effects:** Increasing the minimum wage can lead to higher labor costs for businesses, especially those that rely heavily on low-wage workers. This can result in reduced employment opportunities, as businesses may cut back on hiring or even lay off workers to manage costs. However, the impact on employment levels can vary based on the elasticity of labor demand in different industries and regions.
2. **Income distribution:** A higher minimum wage can help reduce income inequality by providing low-wage workers with higher earnings. This can contribute to an increase in disposable income and potentially boost consumer spending, which can have a positive effect on regional economies. The extent of this impact will depend on the proportion of workers affected by the minimum wage and the degree of income disparity within the region.
3. **Inflationary pressures:** Increasing the minimum wage can lead to higher production costs for businesses, particularly in industries with a significant number of low-wage workers. These increased costs may be passed on to consumers in the form of higher prices for goods and services. If businesses are unable to absorb the additional costs or maintain productivity levels, this inflationary pressure could negatively impact regional economies.
4. **Poverty reduction:** A higher minimum wage can help lift workers out of poverty and reduce reliance on social welfare programs. By increasing the income of low-wage workers, the minimum wage can contribute to improved living standards, potentially reducing poverty rates within the region.
5. **Regional competitiveness:** High minimum wages can impact the competitiveness of certain regions, particularly if neighboring areas have lower wage levels. Businesses may

Regenerate response

Send a message.



# ChatGPT Response



The potential regional macroeconomic impact of a minimum wage can vary depending on several factors, including the level of the minimum wage, the characteristics of the regional economy, and the existing labor market conditions. Here are some potential impacts:

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3. **Inflationary pressures:** Increasing the minimum wage can lead to higher production costs for businesses, particularly in industries with a significant number of low-wage workers. These increased costs may be passed on to consumers in the form of higher prices for goods and services. If businesses are unable to absorb the additional costs or maintain productivity levels, this inflationary pressure could negatively impact regional economies.
4. **Poverty reduction:** A higher minimum wage can help lift workers out of poverty and reduce reliance on social welfare programs. By increasing the income of low-wage workers, the minimum wage can contribute to improved living standards, potentially reducing poverty rates within the region.
5. **Regional competitiveness:** Higher minimum wages may impact the competitiveness of certain regions, particularly if neighboring areas have lower wage levels. Businesses may choose to relocate or expand operations in regions with lower labor costs, leading to potential job losses and reduced economic activity in regions with higher minimum wages.
6. **Business profitability:** Some businesses, particularly small and medium-sized enterprises (SMEs), may face challenges in adjusting to higher labor costs associated with a higher minimum wage. This could potentially affect their profitability, leading to reduced investment, business closures, or a slowdown in economic growth within the region.

It's important to note that the actual impact of a minimum wage on a regional economy is complex and depends on various factors. Different studies and empirical evidence may provide conflicting results, and the specific context of each region should be considered when assessing the potential macroeconomic impact.

***what does REMI say? <sup>sm</sup>***

# Capability 3: Research Assisting

---



ChatGPT : what are examples of state or city programs to attract remote workers?

*what does **REMI** say?<sup>sm</sup>*

## ChatGPT



### Examples

"Explain quantum computing in simple terms" →

"Got any creative ideas for a 10 year old's birthday?" →

"How do I make an HTTP request in Javascript?" →



### Capabilities

Remembers what user said earlier in the conversation

Allows user to provide follow-up corrections

Trained to decline inappropriate requests



### Limitations

May occasionally generate incorrect information

May occasionally produce harmful instructions or biased content

Limited knowledge of world and events after 2021

what are examples of state or city programs to attract remote workers? ↗

Free Research Preview. ChatGPT may produce inaccurate information about people, places, or facts. [ChatGPT May 12 Version](#)

# ChatGPT Output



LE what are examples of state or city programs to attract remote workers?



As of my knowledge cutoff in September 2021, several state and city programs were being implemented to attract remote workers. Here are a few examples:



1. **Tulsa Remote (Tulsa, Oklahoma):** The Tulsa Remote program offers a \$10,000 grant to eligible remote workers who move to Tulsa for a year. It also provides additional benefits like co-working space, networking events, and a supportive community.
2. **Vermont Remote Worker Grant Program (Vermont, USA):** Vermont's program offers up to \$10,000 in grants to remote workers who relocate to the state. The grants are meant to cover relocation expenses, technology costs, and other work-related expenses.
3. **Kansas Rural Opportunity Zones (Kansas, USA):** This program targets individuals looking to move to rural counties in Kansas. It offers student loan repayment incentives and income tax waivers to new residents who meet the eligibility criteria.
4. **Savannah Technology Workforce Incentive (Savannah, Georgia):** This program aims to attract remote workers in the technology sector to Savannah. It provides a \$2,000 stipend to cover moving expenses and offers additional benefits like networking events and community engagement.
5. **Barcelona Digital Nomad Visa (Barcelona, Spain):** Barcelona has introduced a digital nomad visa to attract remote workers to the city. The visa allows individuals to reside in Barcelona while working remotely for companies outside of Spain.
6. **Estonia e-Residency Program (Estonia):** While not specific to remote workers, Estonia's e-Residency program allows entrepreneurs and digital nomads to establish and manage a location-independent business within the European Union.

It's worth noting that the availability and details of these programs may have changed since my last update in September 2021. It is recommended to visit the respective program websites or contact relevant authorities for the most up-to-date information.

Regenerate response

Send a message.



what does **REMI** say? <sup>sm</sup>



# ChatGPT Response



As of my knowledge cutoff in September 2021, several state and city programs were being implemented to attract remote workers. Here are a few examples:

- **Tulsa Remote (Tulsa, Oklahoma):** The Tulsa Remote program offers a \$10,000 grant to eligible remote workers who move to Tulsa for a year. It also provides additional benefits like co-working space, networking events, and a supportive community.
- **Vermont Remote Worker Grant Program (Vermont, USA):** Vermont's program offers up to \$10,000 in grants to remote workers who relocate to the state. The grants are meant to cover relocation expenses, technology costs, and other work-related expenses.
- **Kansas Rural Opportunity Zones (Kansas, USA):** This program targets individuals looking to move to rural counties in Kansas. It offers student loan repayment incentives and income tax waivers to new residents who meet the eligibility criteria.
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- **Estonia e-Residency Program (Estonia):** While not specific to remote workers, Estonia's e-Residency program allows entrepreneurs and digital nomads to establish and manage a location-independent business within the European Union.

It's worth noting that the availability and details of these programs may have changed since my last update in September 2021. It's advisable to visit the respective program websites or contact relevant authorities for the most up-to-date information.

# Regenerate Response

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There are several state and city programs that have been launched to attract remote workers. Some examples include:

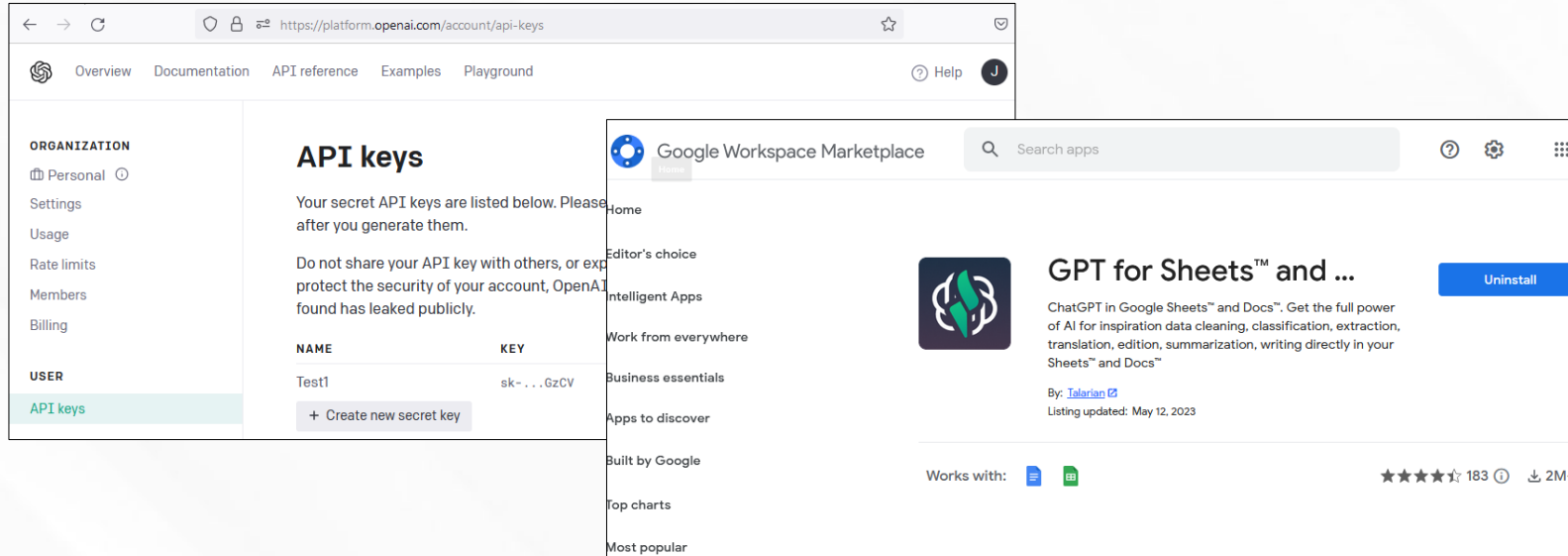
1. Vermont's Remote Worker Grant Program: Vermont launched this program in 2018 to encourage remote workers to move to the state. Under the program, eligible workers can receive up to \$10,000 in grants over two years to cover relocation and work-related expenses.
2. Tulsa Remote: Tulsa Remote is a program launched by the city of Tulsa, Oklahoma, to attract remote workers. The program offers a \$10,000 grant to eligible workers who move to Tulsa and work remotely for a year.
3. Northwest Arkansas Council's Life Works Here: The Northwest Arkansas Council launched this program to attract remote workers to the region. The program offers a \$10,000 incentive, a free mountain bike or membership to a local arts institution, and discounted access to co-working spaces.
4. Savannah's Creative Coast: The Creative Coast is a nonprofit organization in Savannah, Georgia, that aims to support and grow the city's tech and creative industries. The organization offers a range of programs and resources to support remote workers and entrepreneurs, including access to co-working spaces and networking events.
5. Hawaii's Movers and Shakas Program: Hawaii launched the Movers and Shakas program in 2021 to attract remote workers to the state. The program offers free round-trip tickets to eligible workers who move to Hawaii and work remotely for at least 30 days.

These are just a few examples of the many state and city programs that have been launched to attract remote workers. The specifics of each program may vary, but the overall goal is to attract talented professionals to the area and support the growth of local economies

# Capability 4: Google Sheets Plugin



- Google Sheets can be integrated with ChatGPT using the OpenAI API
- To do this, create an API key on the OpenAI website and download the "GPT for Sheets" plugin for your browser



- Through this integration, the "GPT" formula can be used within Google Sheets for analyzing spreadsheet data with ChatGPT

what does **REMI** say? <sup>sm</sup>

# Capability 4: Google Sheets Plugin: Analysis of the National Forecast



- Step 1: Copy national forecast data from the REMI Standard National Control into Google Sheets

The screenshot shows the 'Standard National Control' application window. The 'Industry Profile' window is open, displaying a table of national baseline employment by industry for the years 2021 through 2024. The table includes columns for 'Industry', 'Units', and the years 2021, 2022, 2023, and 2024. The 'All Industries' row is highlighted, showing a total of 196,957,041 units in 2021, 205,384,207 in 2022, 208,568,077 in 2023, and 208,481,753 in 2024. The interface also shows a sidebar with 'Economic Tables' and 'Key Results' sections.



National baseline employment by industry:						
Industry	Units	2021	2022	2023	2024	2028
All Industries	Thousands (Jobs)	196957.041	205384.207	208568.077	208481.753	20828
113-115 - Forestry, fishing, and hunting	Thousands (Jobs)	939.869	1028.17	1038.455	1026.79	101
21 - Mining	Thousands (Jobs)	912.171	968.381	1001.961	1001.027	99
22 - Utilities	Thousands (Jobs)	583.405	605.91	608.601	599.215	58
23 - Construction	Thousands (Jobs)	10745.272	10962.88	11303.363	11312.479	1128
31-33 - Manufacturing	Thousands (Jobs)	13318.965	14520.321	14415.245	14144.404	1385
42 - Wholesale trade	Thousands (Jobs)	6536.99	6622.694	6617.124	6545.005	647
44-45 - Retail trade	Thousands (Jobs)	19252.298	18986.812	18494.408	18071.092	1772
48,492-493 - Transportation and warehousing	Thousands (Jobs)	9606.841	10063.076	10288.252	10341.852	103
51 - Information	Thousands (Jobs)	3363.01	3494.304	3537.136	3510.443	348
52 - Finance and insurance	Thousands (Jobs)	10578.93	10955.543	11120.368	11067.595	1100
53 - Real estate and rental and leasing	Thousands (Jobs)	9016.747	9432.092	9607.979	9605.739	959
54 - Professional, scientific, and technical services	Thousands (Jobs)	14822.36	15564.992	15987.964	16068.125	1612
55 - Management of companies and enterprises	Thousands (Jobs)	2792.473	2916.029	2941.743	2917.293	288
56 - Administrative, support, waste management, and recycling	Thousands (Jobs)	12073.782	12652.405	12887.509	12900.128	1290
61 - Educational services; private	Thousands (Jobs)	4624.37	4917.609	5088.355	5145.124	519
62 - Health care and social assistance	Thousands (Jobs)	22655.822	23798.972	24476.781	24752.935	2500
71 - Arts, entertainment, and recreation	Thousands (Jobs)	3888.017	4341.057	4561.868	4711.253	484
72 - Accommodation and food services	Thousands (Jobs)	13847.799	14529.629	14934.539	15052.154	1514
81 - Other services (except public administration)	Thousands (Jobs)	10551.898	11459.753	11839.283	11987.322	1210
NA - State and Local Government	Thousands (Jobs)	19275.614	19811.025	20051.213	20068.402	2012
NA - Federal Civilian	Thousands (Jobs)	3063.919	3072.666	3093.545	3042.403	300
NA - Federal Military	Thousands (Jobs)	1865.449	1853.806	1860.184	1855.964	185
111, 112 - Farm	Thousands (Jobs)	2641.041	2826.084	2812.2	2755.007	270

what does **REMI** say?<sup>sm</sup>

# Capability 4: Google Sheets Plugin



- Within Google Sheets, enter the following formula: **=GPT("explain reasons for industry trends in a paragraph summary and what external factors could influence the forecast",A28:L32)**
  - The formula is structured where you first enter a prompt that would normally be entered into ChatGPT and then specify which cells in the spreadsheet to analyze

25										
26	<b>National baseline employment by industry:</b>									
27										
28	Industry	Units	2021	2022	2023	2024	2025	2026		
29	All Industries	Thousands (Jobs)	196957.041	205384.207	208568.077	208481.753	208284.454	208328.806		
30	113-115 - Forestry, fishing, and hunting	Thousands (Jobs)	939.869	1028.17	1038.455	1026.79	1013.028	1016.109		
31	21 - Mining	Thousands (Jobs)	912.171	968.381	1001.961	1001.027	995.127	993.412		
32	22 - Utilities	Thousands (Jobs)	583.405	605.91	608.601	599.215	589.654	580.788		
33	23 - Construction	Thousands (Jobs)	10345.873	10889.88	11209.388	11219.478	11282.269	11281.262		
38	Information	Thousands (Jobs)	3363.01	3494.304	3537.136	3510.443	3483.864	3460.665		
39	Finance and insurance	Thousands (Jobs)	10578.93	10955.513	11120.368	11067.595	11003.774	10930.972		
40	<code>=gpt("explain reasons for industry trends in a paragraph summary and what external factors could influence the forecast",A28:L32)</code>									
41							9585.531	6472.106	6420.881	
42							16172.909	17726.817	17427.164	
43							2866.195			
44							12912.975			
45	62 - Health care and social assistance	Thousands (Jobs)	22655.822	23708.972	24476.781	24752.935	25006.134	25147.107		

what does **REMI** say?<sup>sm</sup>



# Capability 4: Google Sheets Plugin



=GPT("explain reasons for industry trends in a paragraph summary and what external factors could influence the forecast",A28:L32)

After entering the formula, Google Sheets uses the ChatGPT API to respond to the prompt and incorporate the data selected:

"Industry trends are largely determined by external factors such as economic growth, technological advances, and consumer demand. For example, the forestry, fishing, and hunting industry is expected to experience a steady increase in jobs over the next decade due to increased demand for natural resources. The mining industry is also expected to experience growth due to the increased demand for minerals and other resources. The utilities industry is expected to remain relatively stable, as the demand for energy is expected to remain steady. Other external factors such as government regulations, environmental concerns, and global competition can also influence industry trends and forecasts."

39	52 - Finance and insurance	Thousands (Jobs)	10578.93	10955.543	11120.368	11067.595	11003.774
40	53 - Real estate and rental and leasing	Thousands (Jobs)	9016.747	9432.092	9607.979	9605.739	9597.235
41	54 - Professional, scientific, and technical services	Thousands (Jobs)	14822.36	15564.992	15987.964	16068.125	16122.877
42	55 - Management of companies and enterprises	Thousands (Jobs)	2792.473	2916.029	2941.743	2917.293	2887.844
43	56 - Administrative, support, waste management, and recycling	Thousands (Jobs)	12073.782	12652.405	12887.509	12900.128	12900.636
44	61 - Educational services; private	Thousands (Jobs)	4624.37	4917.609	5088.355	5145.124	5191.193
45	62 - Health care and social assistance	Thousands (Jobs)	22655.822	23798.972	24476.781	24752.935	25006.434
46	71 - Arts, entertainment, and recreation	Thousands (Jobs)	3888.017	4341.057	4561.868	4711.253	4845.057
47	72 - Accommodation and food services	Thousands (Jobs)	13847.799	14529.629	14934.539	15052.154	15148.205
48	81 - Other services (except public administration)	Thousands (Jobs)	10551.898	11459.753	11839.283	11987.322	12106.282
49	NA - State and Local Government	Thousands (Jobs)	19275.614	19811.025	20051.213	20068.402	20126.149
50	NA - Federal Civilian	Thousands (Jobs)	3063.919	3072.666	3093.545	3042.403	3004.017
51	NA - Federal Military	Thousands (Jobs)	1865.449	1853.806	1860.184	1855.964	1857.231
52	111, 112 - Farm	Thousands (Jobs)	2641.041	2826.084	2812.2	2755.007	2704.391
53							
54	ChatGPT: "explain reasons for industry trends in a paragraph summary and what external factors could influence the forecast"						
55							
56	Industry trends are largely determined by external factors such as economic growth, technological advances, and consumer demand. For example, the forestry, fishing, and hunting industry is expected to experience a steady increase in jobs over the next decade due to increased demand for natural resources. The mining industry is also expected to experience growth due to the increased demand for minerals and other resources. The utilities industry is expected to remain relatively stable, as the demand for energy is expected to remain steady. Other external factors such as government regulations, environmental concerns, and global competition can also influence industry trends and forecasts.						
57							

what does **REMI** say? <sup>sm</sup>

# Capability 4: Google Sheets Plugin: Additional Features



- Aside from the regular “GPT” formula, the plugin has additional formulas that integrate ChatGPT for other specific purposes:
  - GPT\_ASK: allows to incorporate additional context
  - GPT\_CODE: generates code to accomplish a task
  - GPT\_LIST, GPT\_TREE, and more

64	Industry	Units	2021	2022	2023	2024
65	All Industries	Thousands of Fixed (2012) Dollars	177,733	178,644	180,236	181,923
66	113-115 - Forestry, fishing, and hunting	Thousands of Fixed (2012) Dollars	52,579	53,446	53,942	54,346
67	21 - Mining	Thousands of Fixed (2012) Dollars	777,844	785,928	798,433	809,024
68	22 - Utilities	Thousands of Fixed (2012) Dollars	781.3	782,361	791.13	801,581
69	23 - Construction	Thousands of Fixed (2012) Dollars	133,792	132,583	132,666	133,049
70	31-33 - Manufacturing	Thousands of Fixed (2012) Dollars	480,172	478,767	489,052	496,992
71	42 - Wholesale trade	Thousands of Fixed (2012) Dollars	314,483	318,038	324,763	332,379
72	44-45 - Retail trade	Thousands of Fixed (2012) Dollars	109,434	111,745	115,035	118,556
73	48-49-52 - Transportation and information	Thousands of Fixed (2012) Dollars	123,606	124.04	125,308	126,341
74	53-56 - Accommodation and food services	Thousands of Fixed (2012) Dollars	651.29	658,713	674,499	691,753
75	62 - Health care and social assistance	Thousands of Fixed (2012) Dollars	225,139	225,295	227,001	229,424
76	72 - Education and arts, recreation, and amusement	Thousands of Fixed (2012) Dollars	378,129	376,635	378,698	381,451
77	81 - Other services (except food services)	Thousands of Fixed (2012) Dollars	157,883	157,953	159,531	161,357
78	92 - Administrative and support and waste management and remediation services	Thousands of Fixed (2012) Dollars	172,674	171,625	172,244	173,258
79	99 - Unclassified	Thousands of Fixed (2012) Dollars	87,577	87.88	88,908	90,131
80		Thousands of Fixed (2012) Dollars	62,628	62,062	62,101	62,28
81		Thousands of Fixed (2012) Dollars	107,092	107,826	108,921	110,395
82		Thousands of Fixed (2012) Dollars	66,944	67,736	68,891	70,073
83		Thousands of Fixed (2012) Dollars	70,948	71,943	73,197	74,501
84		Thousands of Fixed (2012) Dollars	54,894	54,117	54,559	55,122
85		Thousands of Fixed (2012) Dollars	128.12	127,529	128,178	129,122
86		Thousands of Fixed (2012) Dollars	172,494	170,933	171,039	171,533
87		Thousands of Fixed (2012) Dollars	351,794	348,612	348,826	349,834
88		Thousands of Fixed (2012) Dollars	209,926	211,241	214,637	218,582
89						
90						
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100						

GPT  
Submits a prompt to GPT and returns the completion

GPT\_ASK

GPT\_MAP

GPT\_TAG

GPT\_CODE

GPT\_EDIT

GPT\_FILL

GPT\_LIST

GPT\_TREE

GPT\_EMBED

what does **REMI** say? <sup>sm</sup>

# Capability 4: Google Sheets Plugin: Additional Features



Example: GPT\_ASK formula for explaining trends in labor productivity: “Why is the labor productivity forecast so much higher for utilities and mining than for the other industries listed?”

63	<b>Labor Productivity (National Control)</b>			
64				
65	Industry	Units	2021	2022
66	All Industries	Thousands of Fixed (2012) Dollars	177.733	178.644
67	113-115 - Forestry, fishing, and hunting	Thousands of Fixed (2012) Dollars	52.579	53.446
68	21 - Mining	Thousands of Fixed (2012) Dollars	777.844	785.928
69	A92 Utilities	Thousands of Fixed (2012) Dollars	781.3	782.361
70	<code>=GPT_ASK("why is the labor productivity forecast so much higher for utilities and mining than for the other industries listed",A65:H80,"this data is labor productivity by industry",,,,,500)</code>			
71				
72				
73	44-45 - Retail trade	Thousands of Fixed (2012) Dollars	109.434	111.745
74	48,492-493 - Transportation and warehousing	Thousands of Fixed (2012) Dollars	123.606	124.04
75	51 - Information	Thousands of Fixed (2012) Dollars	651.29	658.713
76	52 - Finance and insurance	Thousands of Fixed (2012) Dollars	225.139	225.295
77	53 - Real estate and rental and leasing	Thousands of Fixed (2012) Dollars	378.129	376.635
78	54 - Professional, scientific, and technical services	Thousands of Fixed (2012) Dollars	157.883	157.953

**Response generated from formula:** “The labor productivity forecast for utilities and mining is higher than for the other industries listed because these industries are typically more capital-intensive than other industries, meaning that they require more capital investments to produce goods and services. This allows them to produce more output with fewer labor inputs, resulting in higher labor productivity.”

**what does REMI say?**<sup>sm</sup>

# Capability 5: Training and Targeting



There are 2 Main ways of manipulating ChatGPT to give you better answers

## 1. Targeting

- Choosing the most appropriate model
- Selecting the "temperature" ( ie variability of responses)
- Directing tone or Word choice and length of response

## 2. Training

- Many of the more advanced GPT models put out by Open AI are trainable meaning if you give the program feedback it will learn to predict not only what would make sense to be said but also what you may want it to say

*what does **REMI** say?<sup>sm</sup>*

# Capability 5: Example of targeting



We used two different OpenAI chat models:

- "Ada" a simple more affordable GPT that is not trainable
- "Davinci" A more complex GPT Model that is both more expensive and trainable.

We gave both models the same input:

- "What to name a magic dragon with seven heads?" and adjusted the temperature

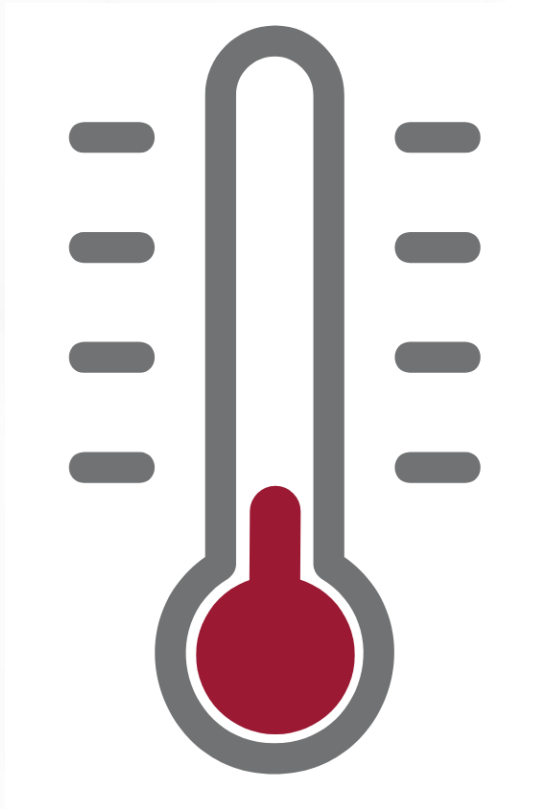


what does **REMI** say?<sup>sm</sup>



# Capability 5: Example of targeting

Temperature = 0



Ada:

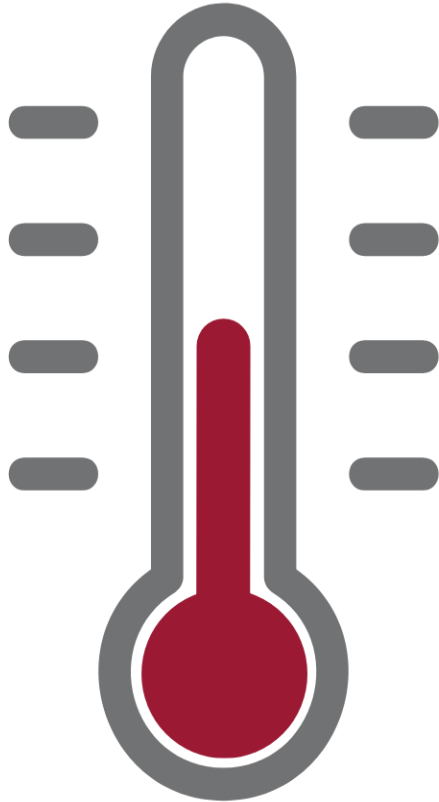
- "The magic dragon has seven heads"

DaVinci:

- "Seven-Headed Spectral Dragon"

# Capability 5: Example of targeting

Temperature = 1



## Ada:

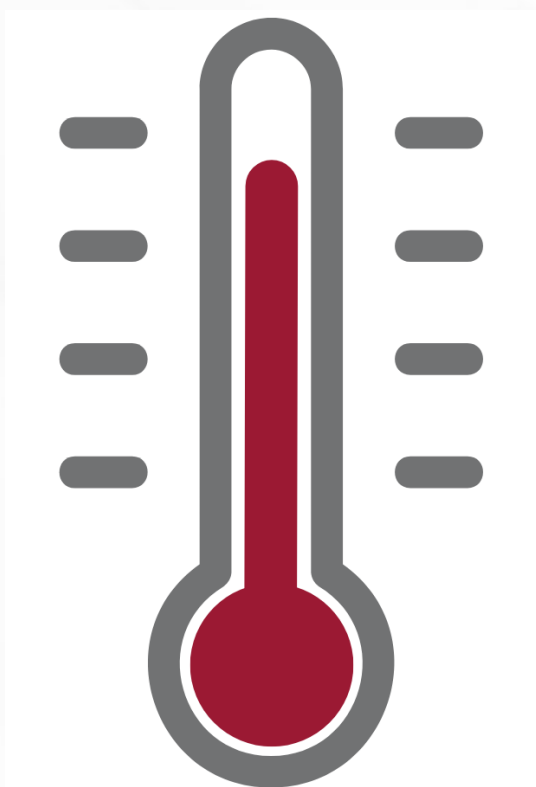
- "Some similar animals to have seven heads are dogs with seven Roosevelt Mermaid masks on their heads. Other notable lizards with seven heads include the 757 stationaire ttenanini, the 1975 Forbidden Lizardsée – TsTs, and the 1922 opening scene in of Ezekiel's tower."

## DaVinci:

- "Seven-Headed Magusdragus"
- "Mylos the Magnificent Seven-Headed Dragon"
- "Draco Septemcapitus"
- "Seven-Headed (Mighty) MagiDraco."

# Capability 5: Example of targeting

Temperature = 1.8



**Ada:**

- Given Ada's challenges with the task my we did not continue the test at this temperature

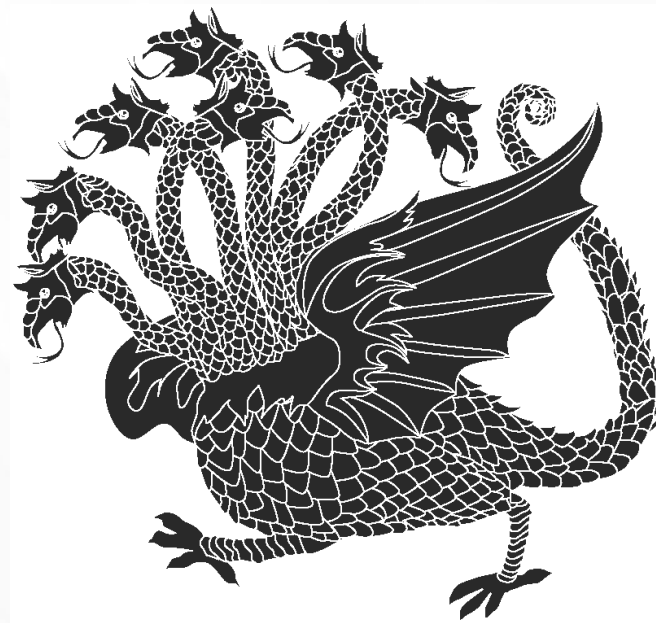
**DaVinci:**

- "Septius Dragaskidia"
- "Hyevaksjhaedrasamdracotris."
- "Firespeaker Sevenstars"
- "Spark Leviathan"
- "Washingtonemiswuullyxusbahirdklampuscuffingsmcgloopitude VII"

# Capability 5: Conclusion

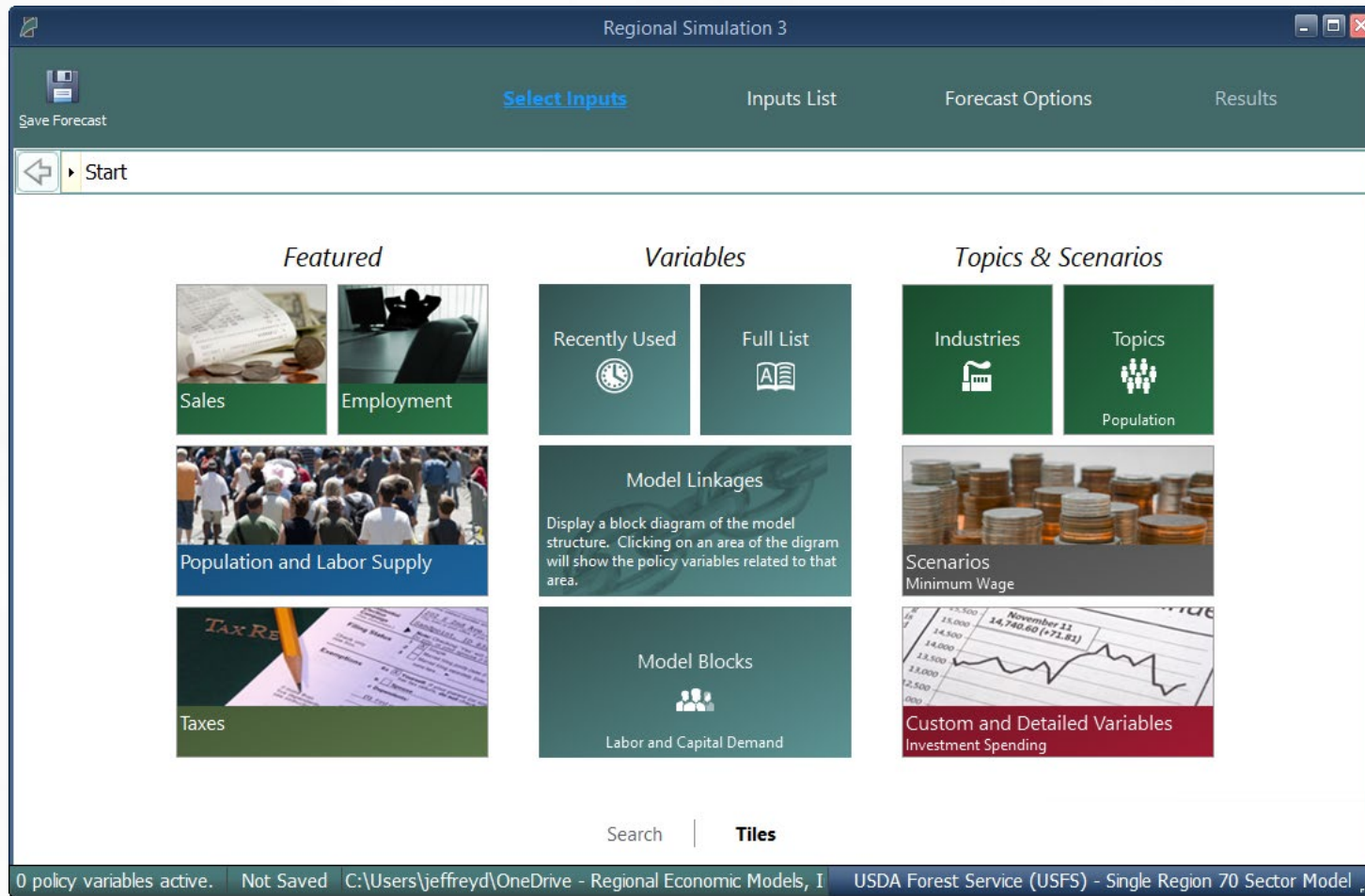
- **Ada** is more appropriate for simpler tasks, like parsing text, simple classification, address correction, keywords.
- **DeVinci** at temperature 1 was most appropriate for this task as it yielded our favorite name while 0 provided a boring answer and 1.8 generated names that were a bit too complex and creative.

Presenting.....



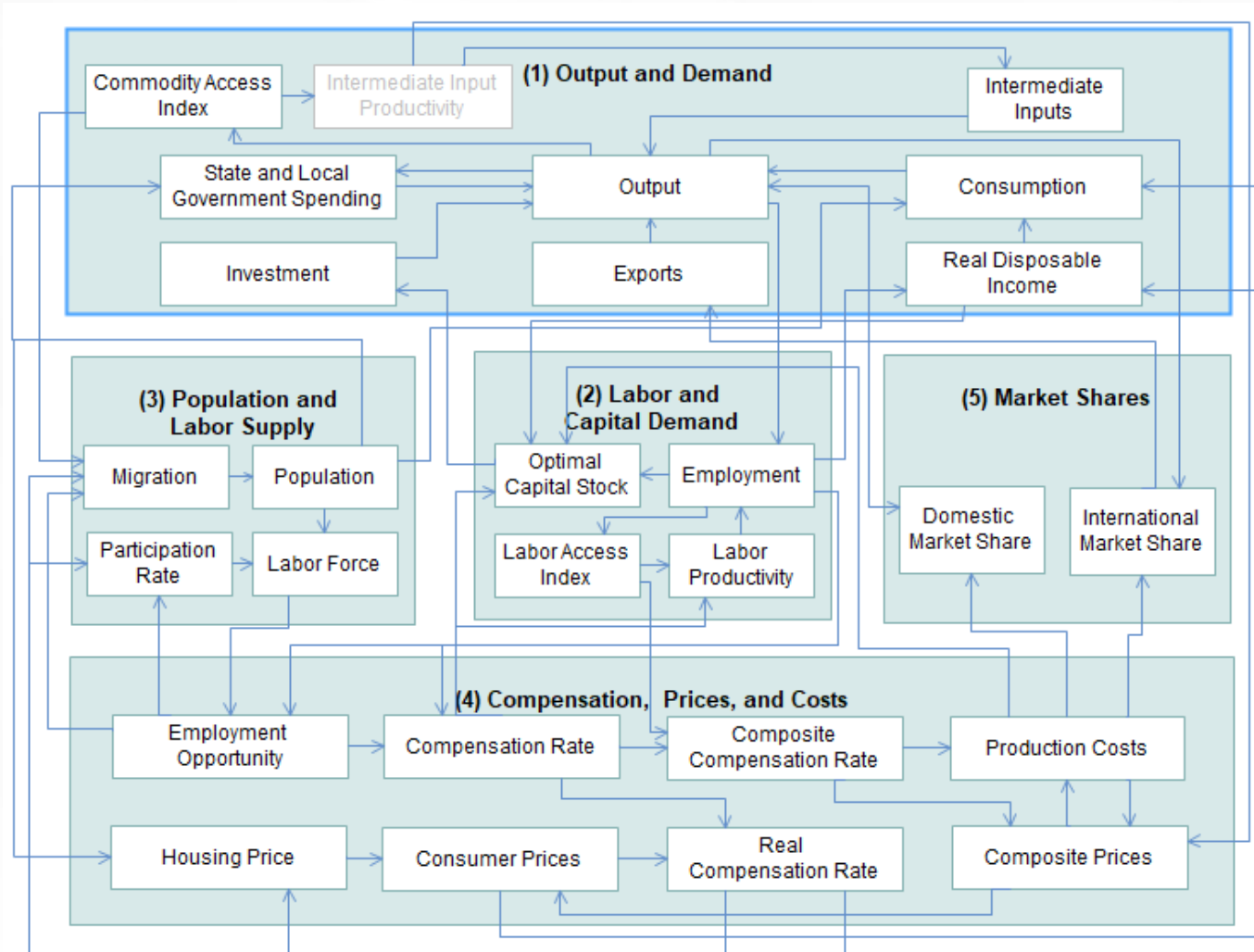
The Seven-Headed Magusdragus

# Evolution of REMI PI+ Model User Interface: Tiles



what does **REMI** say?<sup>sm</sup>

# REMI PI+ Interface: Linkages



what does **REMI** say? <sup>sm</sup>



# REMI PI+ Interface: Search



Regional Simulation 3

Save Forecast | Select Inputs | Inputs List | Forecast Options | Results

Search for policy variables, details, and more

Recent Searches

- Government Demand — "government demand"
- Federal Civilian Government Spending — "federal civilian"
- State and Local Government Output — "government output"
- Government — "government output"

REMI Suggestions

- All Variables
- Model Linkages
- Government Demand
- Consumer Spending

Your Top Variables

- GD
- CS
- E
- FCG

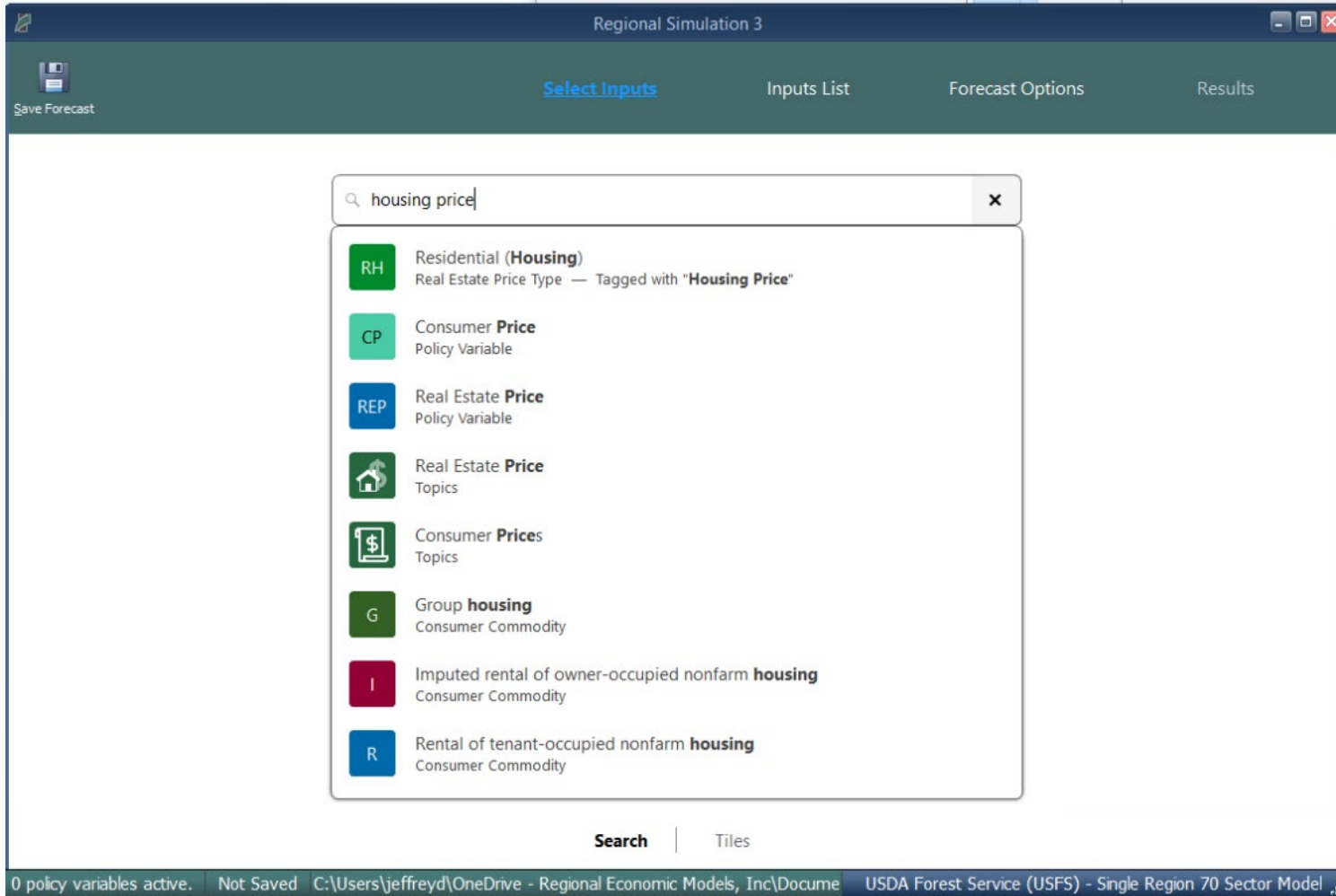
Employment | Sales | Employment | Federal Civilian Government

Search | Tiles

0 policy variables active. | Not Saved | C:\Users\jeffreyd\OneDrive - Regional Economic Models, Inc\Docume | USDA Forest Service (USFS) - Single Region 70 Sector Model

what does **REMI** say?<sup>sm</sup>

# REMI PI+ Interface: Search Example



what does **REMI** say?<sup>sm</sup>

# Conclusion: AI Capabilities

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1. Write-up
2. Brainstorming
3. Research Assisting
4. Google Sheets (or Excel) Plug-In
5. Training and Targeting
6. REMI models' future User Interface development

# Agenda



Introduction

Overview of ChatGPT's Capabilities

Examples

Conclusion

Q&A

*what does **REMI** say?<sup>sm</sup>*

# Thank you for attending!

For more information, please contact  
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