WORKER ABSENTEEISM IN FOOD SUPPLY CHAINS

what does REMI say?

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Agenda

- Food Supply Chains
- Industry Overview
- Model Demonstration
- Conclusions

Introduction

- Example of absenteeism in food supply chains demonstrates the sensitivity of supply chains (down and upstream) and potential changes in consumer behavior
- Many industries may experience issues with absenteeism
  - Downstream supply/demand-side effects
  - Industries vary on where absenteeism and productivity impacts effect their production

Food Supply Chains

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Food Supply Chains (Supply-side)

- Food Supply networks are fine, generally
  - Nationally & internationally diversified
  - **But** have thin margins + fragile supplier/buyer relationships
- Food Service + Hospitality jobs at risk
  - Negative aggregate demand shock
    - Nearly 1/3 of spending on food occurs in restaurants in Canada
  - Upstream producers cannot reallocate sales to other sources easily (i.e. dairy to grocers instead of to coffee shops)

Food Supply Chains (Supply-side)

- Labor Risk
  - Risk of infection decreases the productivity of those who do work (who contract an illness during their employment) and decreases demand for these types of jobs
    - Labor intensive crops especially at risk
  - Robust safety protocol and logistics which mitigate unexpected shutdowns of workplaces necessary

Food Supply Chains (Supply-side)

- Trade compliance
  - Disruptions to international trade due to plant closures, transportation lags, international demand shocks
  - Import and export compliance programs being streamlined

Food Supply Chains (Demand-side)

- Long-term Implications
  - Uncertainty of future consumer demand and which channels it will come through
    - Long-term decrease in demand (as a function of lower incomes)
- Shifting consumption patterns
  - Shift to self-sufficiency (buying basic ingredients and cooking/baking at home) & grocery home delivery
  - Barriers to consumer uptake of technologies/new business models (online grocery ordering, home delivered meal prep) less important

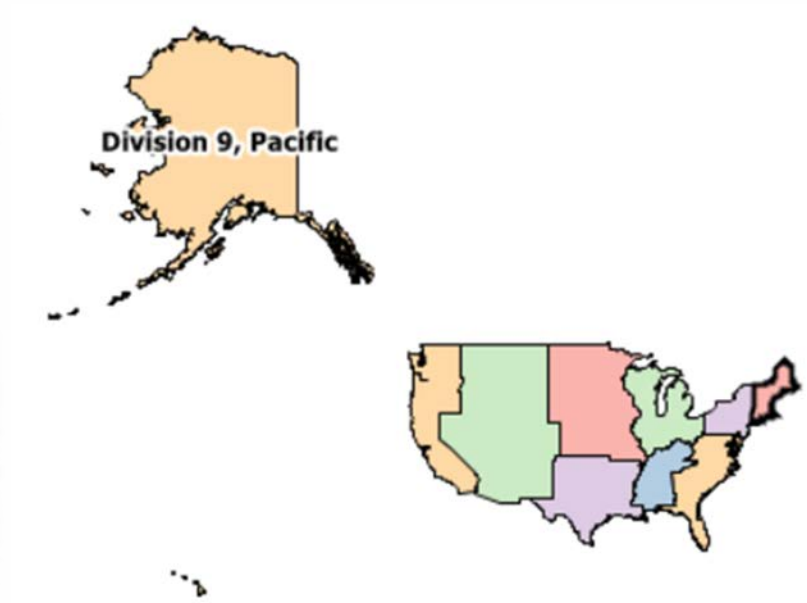
Model Demonstration

Model

- PI+ Model
- 9 Regions

(New England, Mid-Atlantic, East North Central, West North Central, South Atlantic, East South Central, West South Central, Mountain, Pacific)

- 160 Industry Sectors



Industry Overview

- Location Quotients
  - Region that contains North & South Dakota, Minnesota, Nebraska, Kansas, Iowa, and Missouri has the most intensive farm industry employment in the county
  - Region the contains Maine, New Hampshire, Vermont, Massachusetts, Connecticut, and Rhode Island has the least intensive farm industry employment in the country.
- Output & Employment
  - Nationally, the farm industry accounts for $477.5B in output; 2.6 million jobs
  - In the first region mentioned, the farming industry accounted for $107B in output and 435,000 jobs in 2018

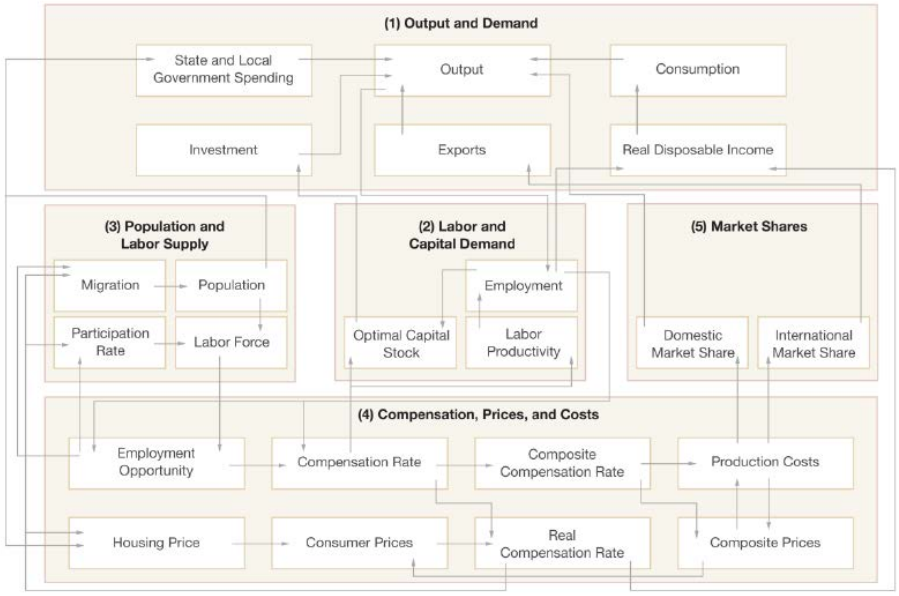
National GDP Assumption

- The model uses yearly national economy data from RSQE (Research Seminar in Quantitative Economics) at the University of Michigan to be the baseline level of national control

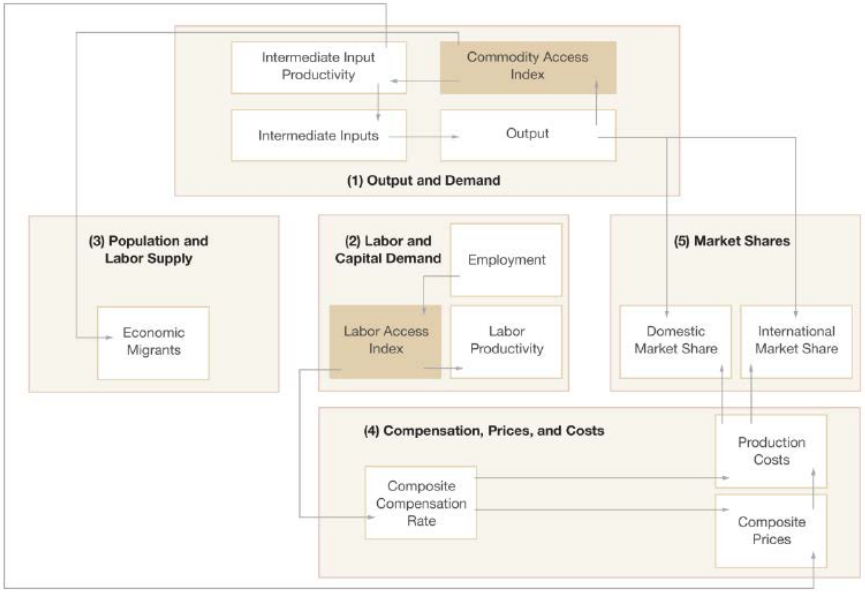
Model Linkages and Economic Geography

REMI

REMI Model Linkages (Excluding Economic Geography Linkages)



Economic Geography Linkages



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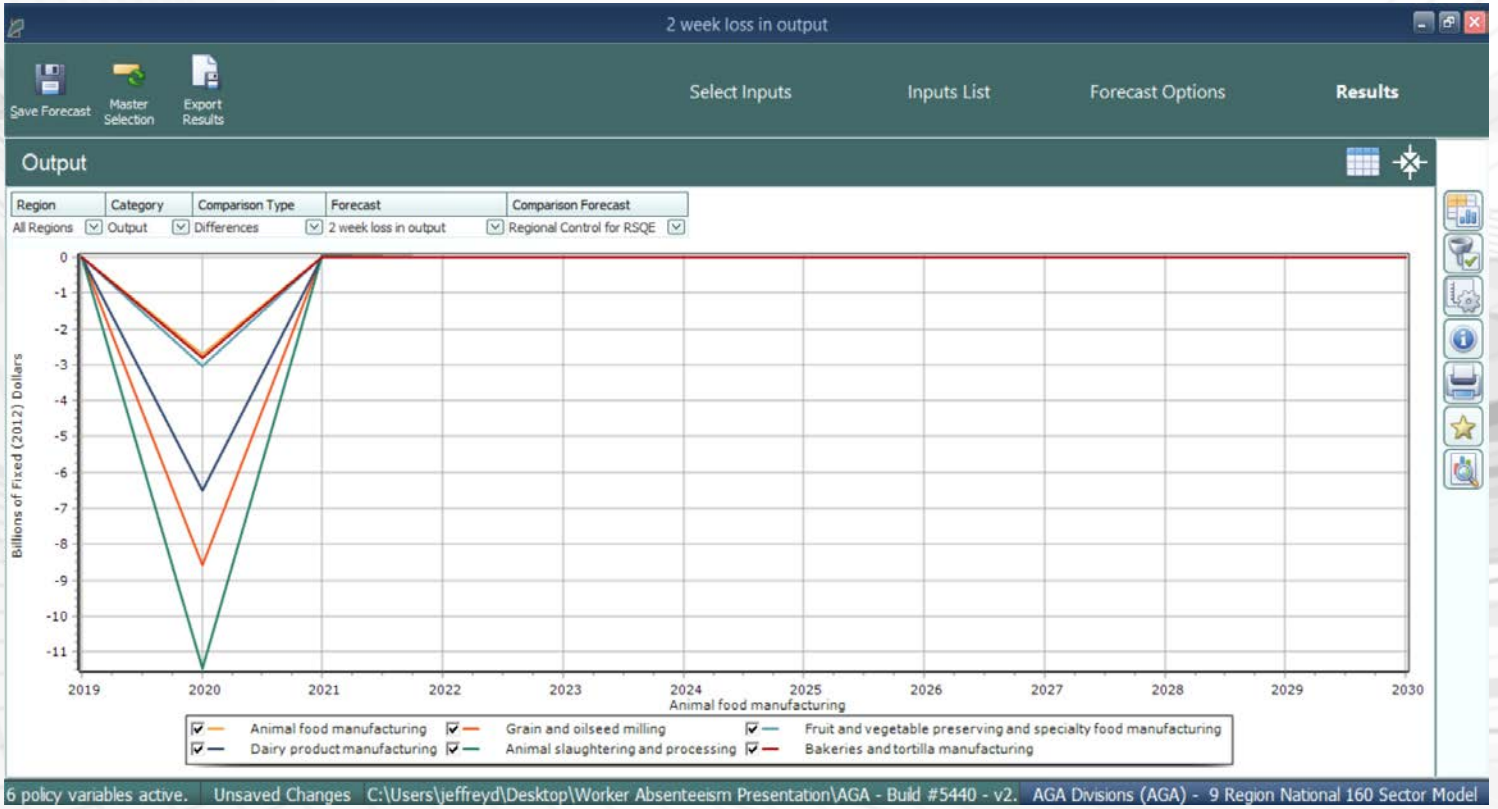
Output Decrease - Inputs

Policy Variable	Industry	Region	Units	2020
Industry Sales (Exog	Animal food manufacturin	Regions (9)	Proportion	-0.03846
Industry Sales (Exog	Grain and oilseed milling	Regions (9)	Proportion	-0.03846
Industry Sales (Exog	Fruit and vegetable preser	Regions (9)	Proportion	-0.03846
Industry Sales (Exog	Dairy product manufactur	Regions (9)	Proportion	-0.03846
Industry Sales (Exog	Animal slaughtering and p	Regions (9)	Proportion	-0.03846
Industry Sales (Exog	Bakeries and tortilla manu	Regions (9)	Proportion	-0.03846

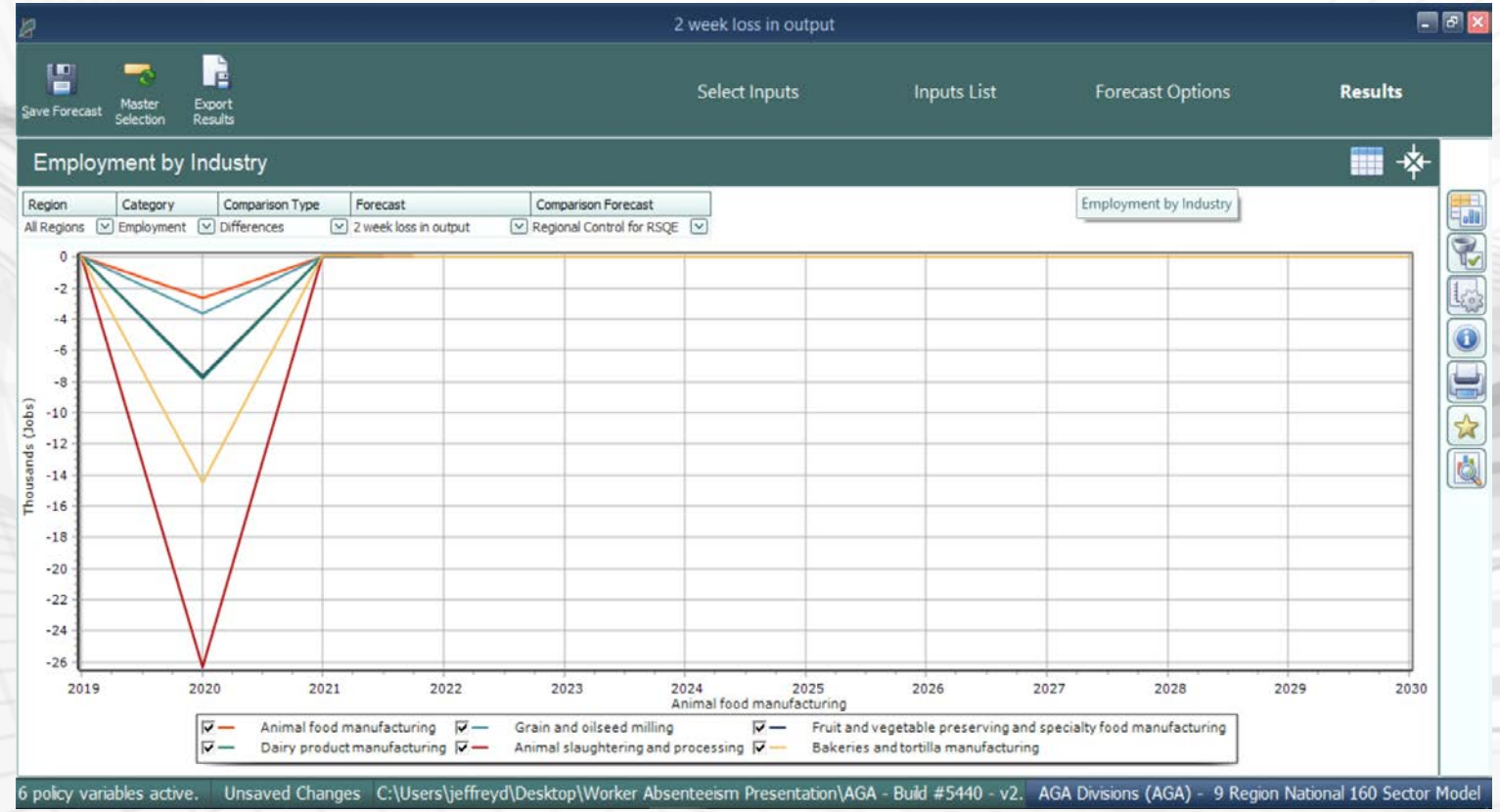
Output Decrease - Results

- Output Changes from Industries in Inputs



Output Decrease - Results

- Employment Changes from Industries in Inputs



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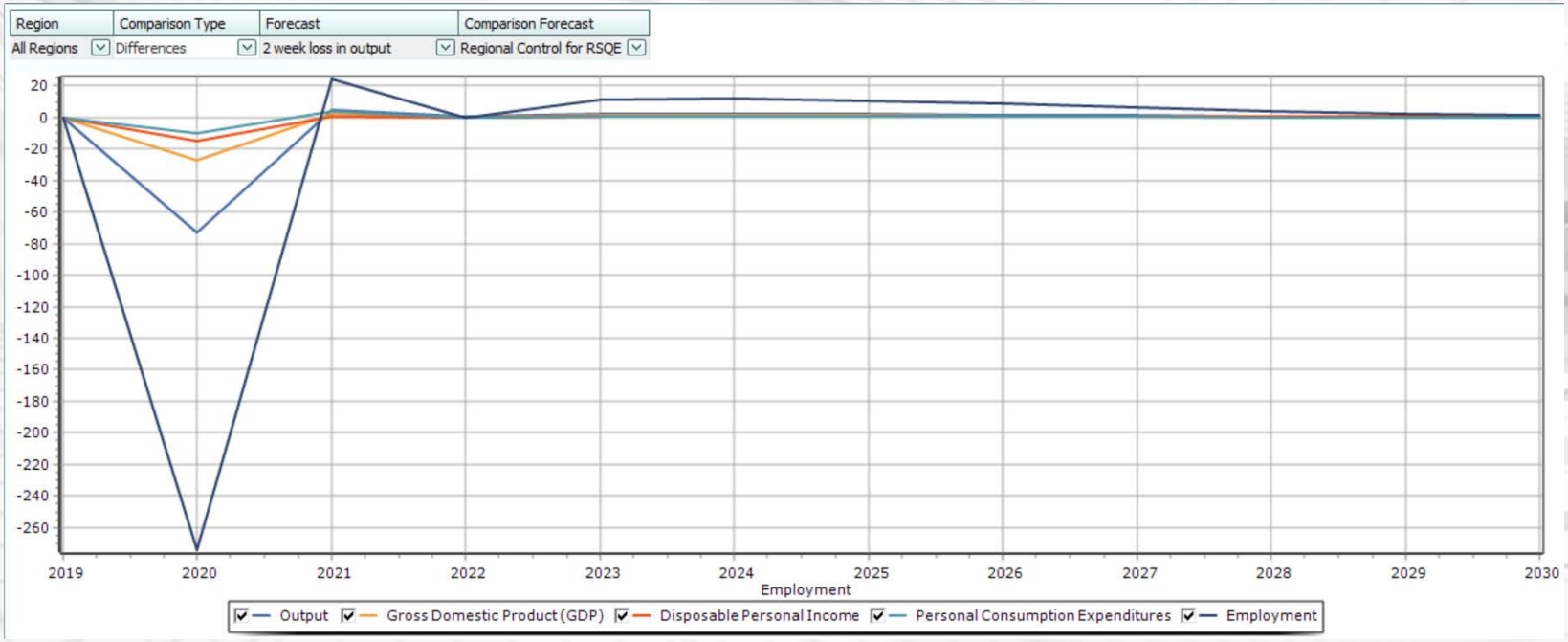
Output Decrease – Results (All Sectors)

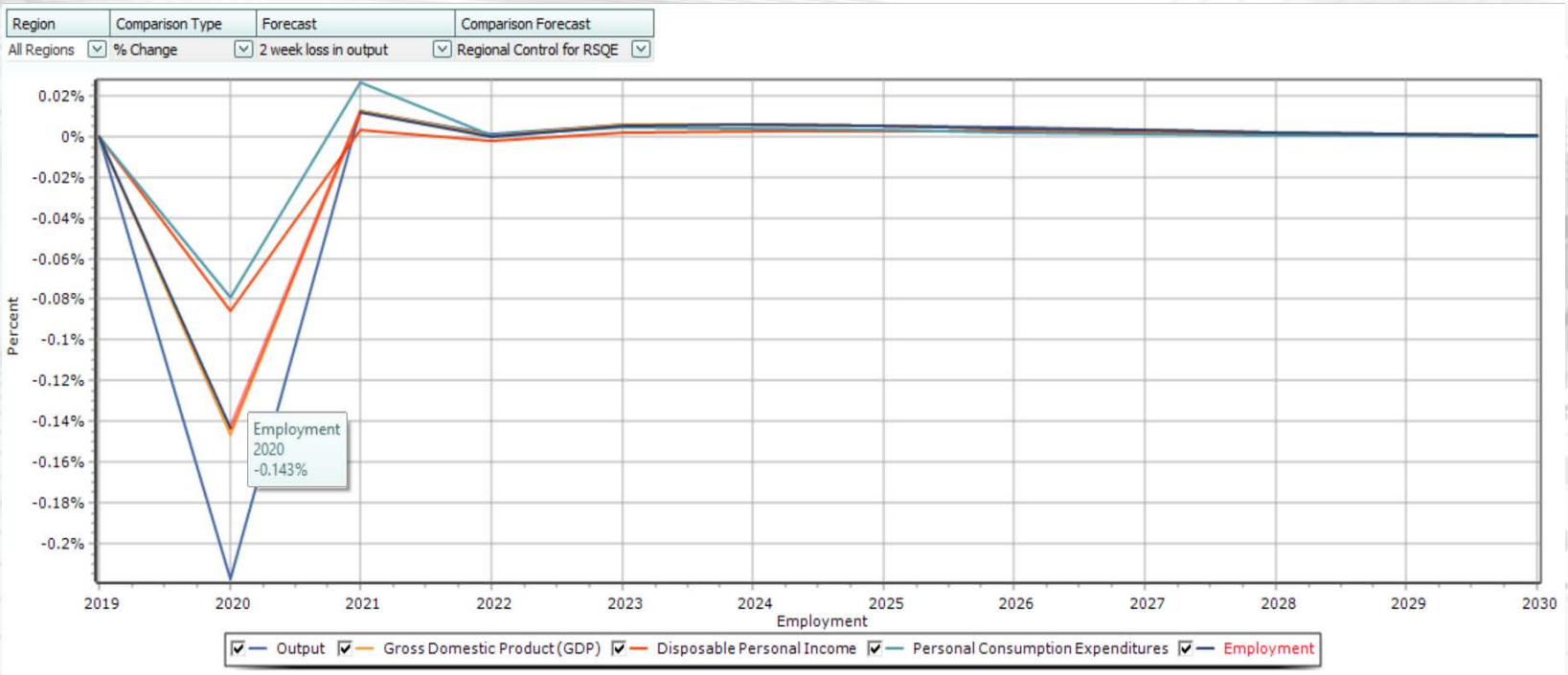
- Output, employment, disposable personal income, consumption, and GDP
- Units: billions of dollars for employment, disposable personal income, and consumption; thousands of jobs for employment



what does REMI say? sm

Output Decrease – Results (All Sectors)

- Output, employment, disposable personal income, consumption, and GDP
- Units: percentage change



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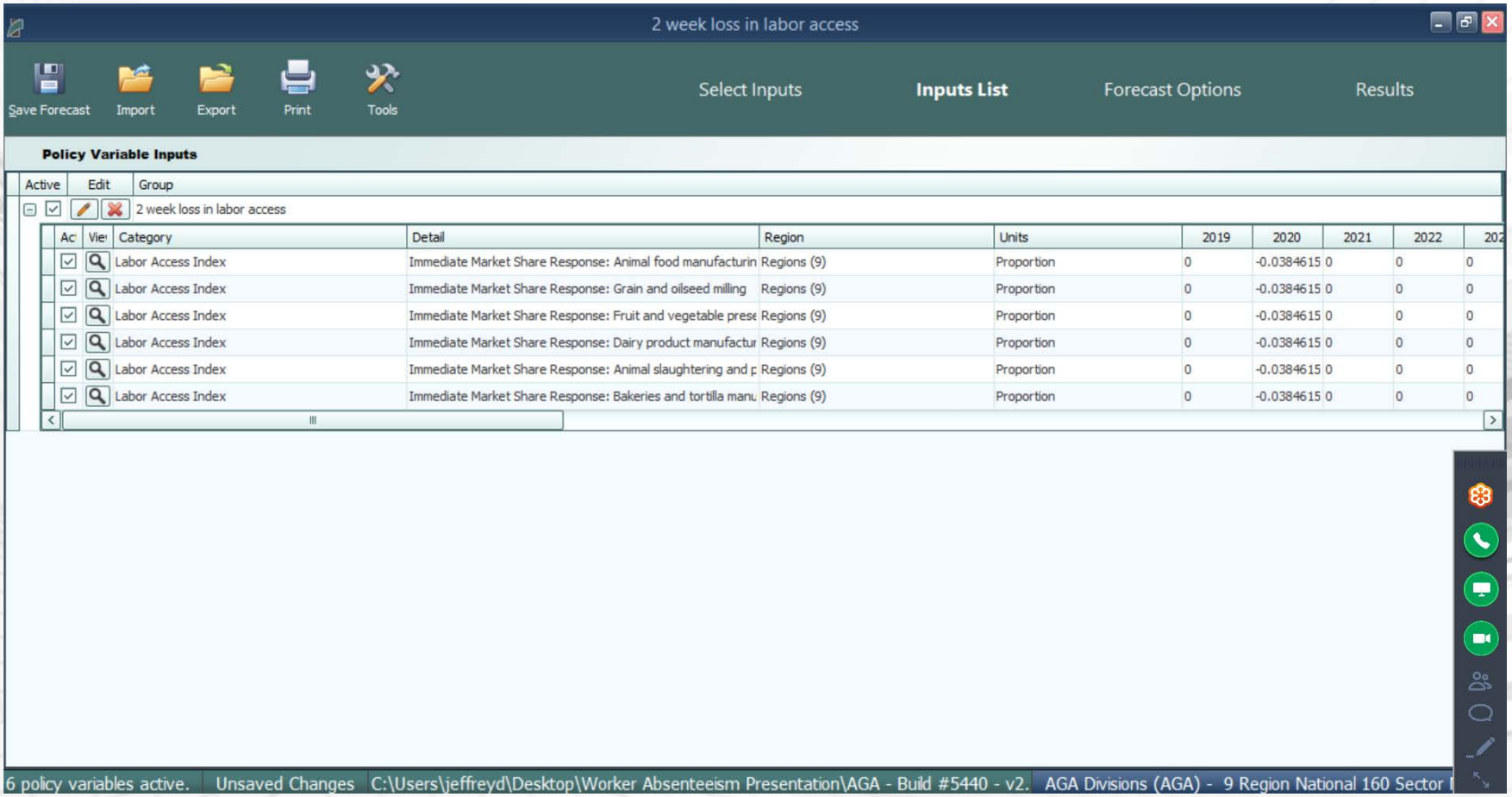
Labor Access - Inputs



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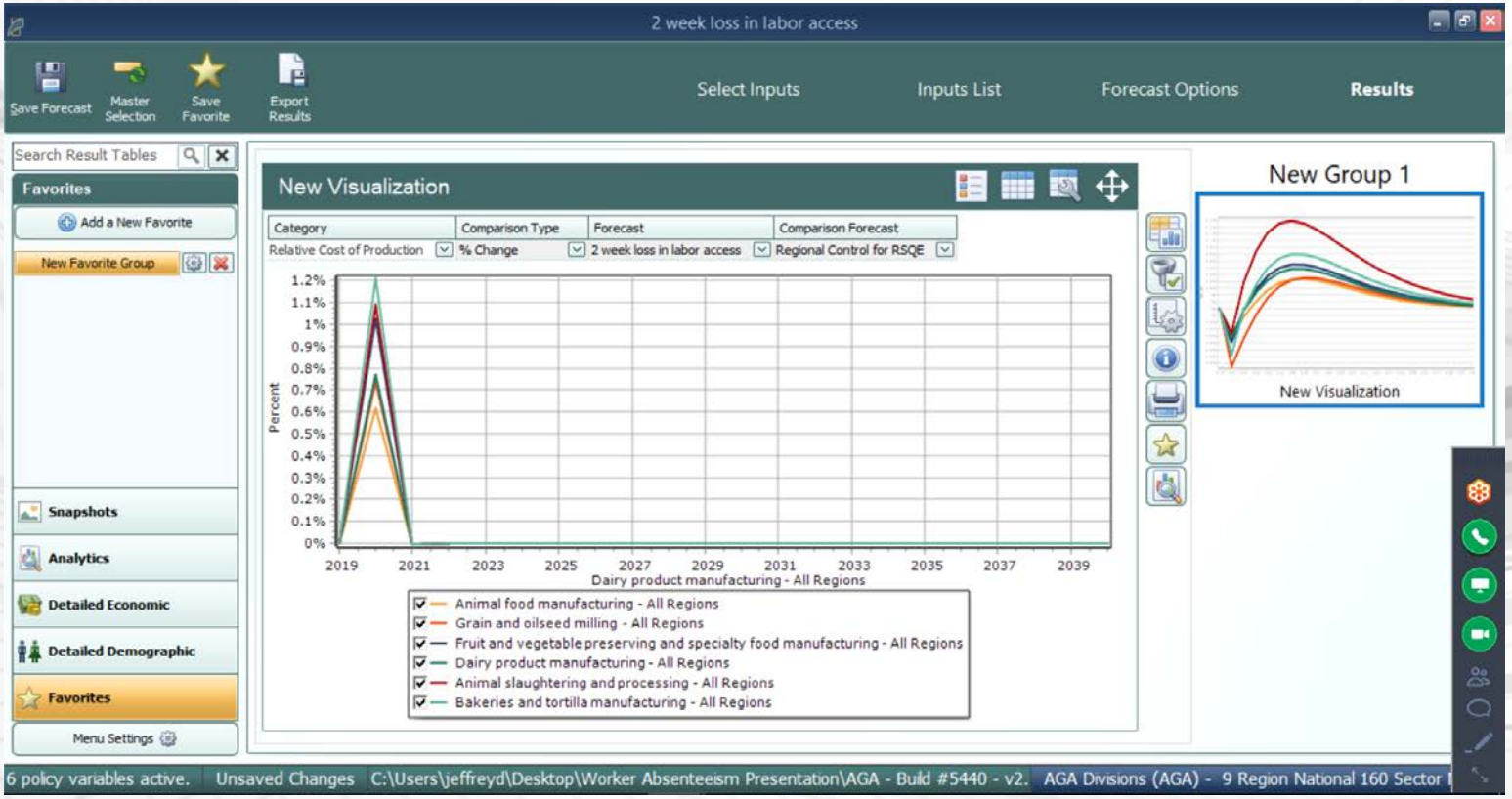
Labor Access - Results

- Relative Cost of Production by Industry



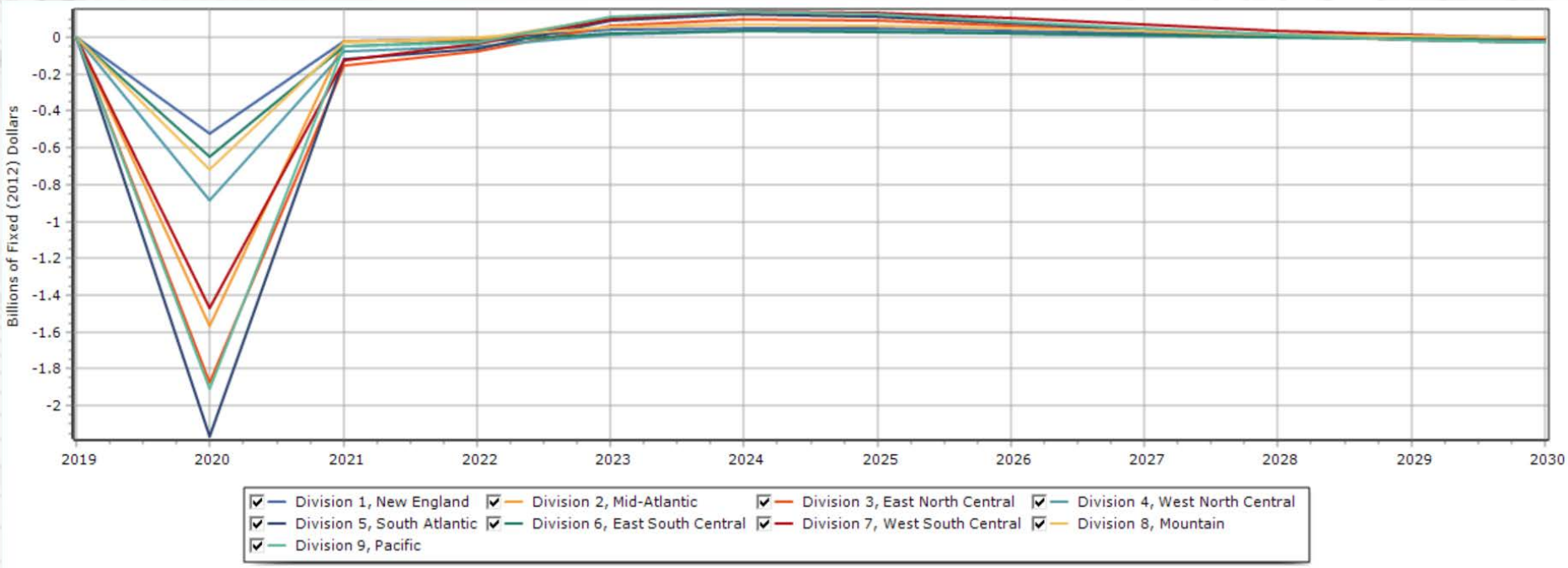
what does REMI say? [sm]

Labor Access - Results

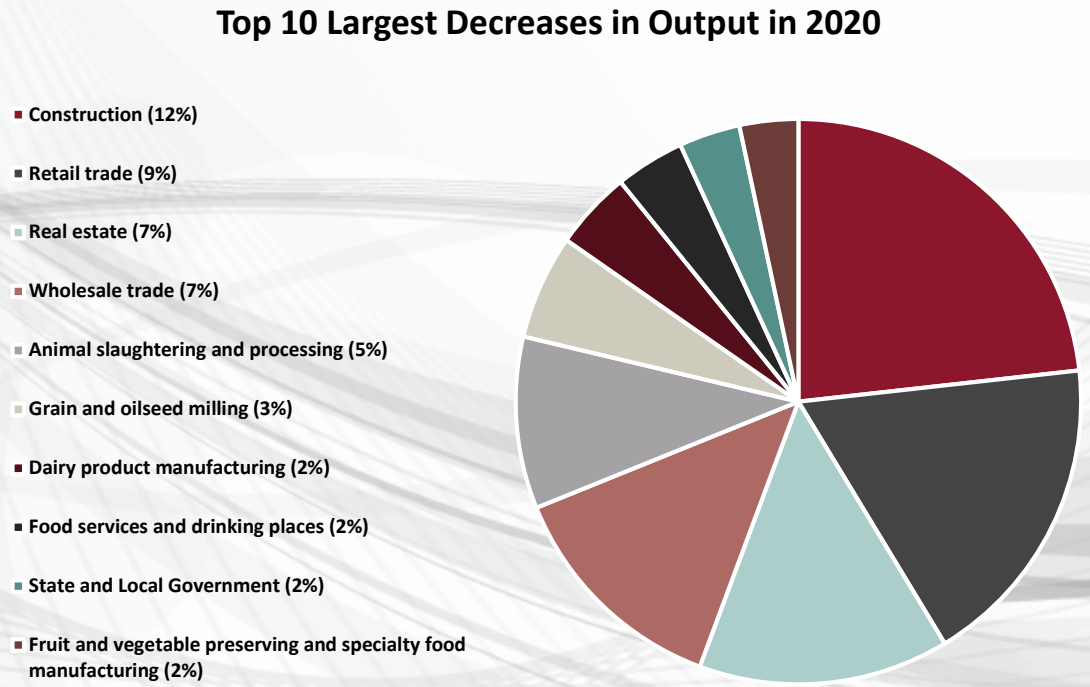
- Output by 6 Industries from Inputs

Labor Access – Results (All Sectors)

- Output by Region (differences from baseline)
- Units: billions of fixed (2012) dollars



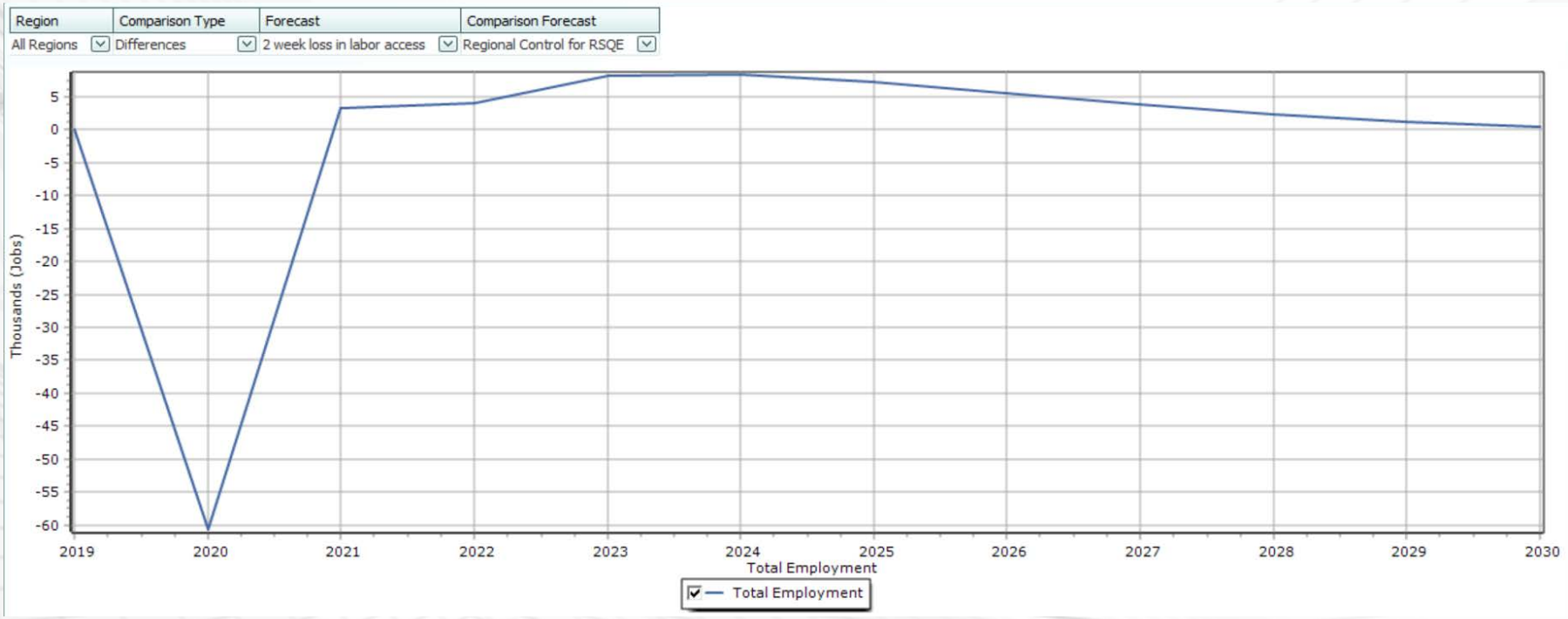
Labor Access - Results



Note: the percentages are calculated from the total change in output for all industries. The percentage for all other sectors is 49%.

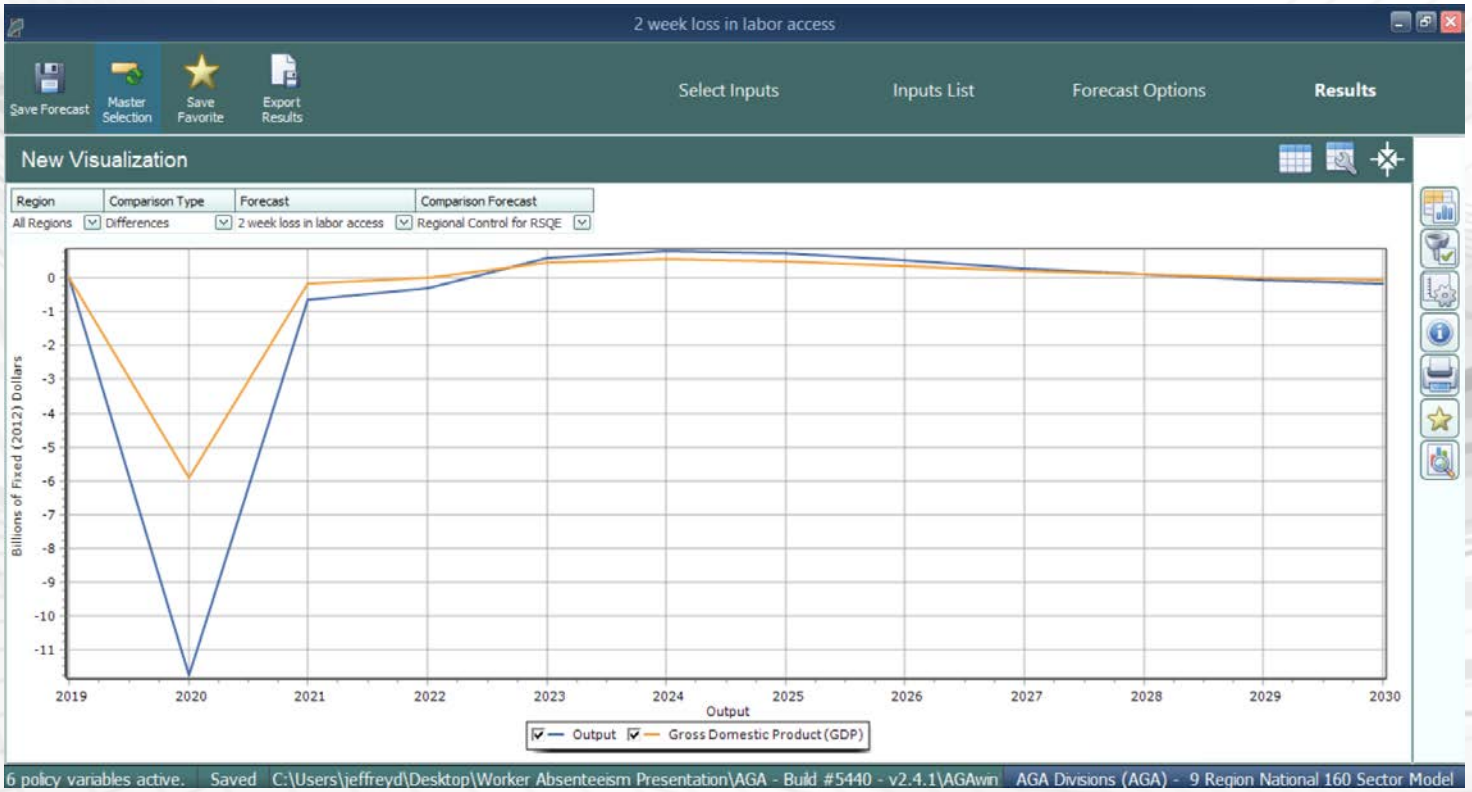
Labor Access – Results (All Sectors)

- Employment change



Labor Access – Results (All Sectors)

- Output and GDP



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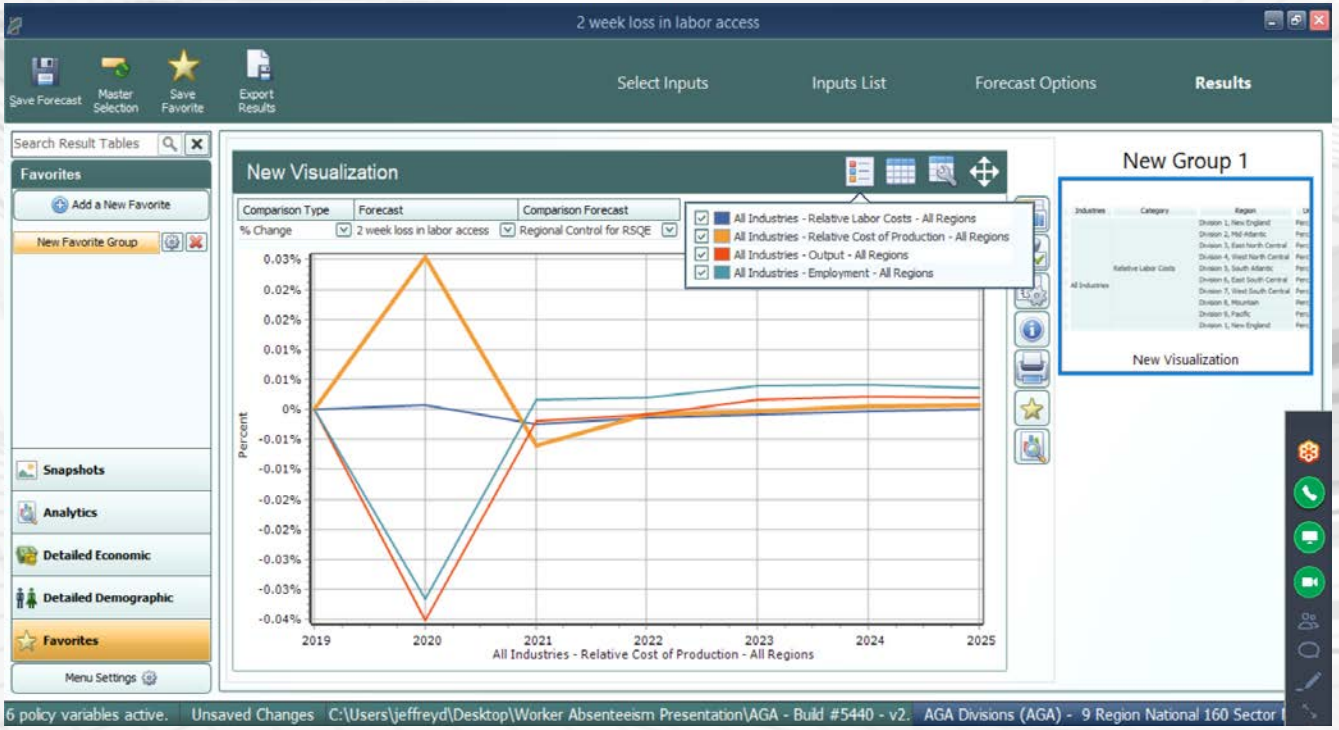
Labor Access - Results

- Labor Costs, Relative Cost of Production, Output, and Employment



Results Summary: Comparison of Output and Labor Access Scenarios

- The scenario with the two week loss in output resulted in a more negative impact to the economy than the scenario with the two week loss in labor access

Economic Summary for Output Loss Scenario

Category	Units	2020	2021	2022	2023	2024	2025	2026	2027	2028	2029	2030
Total Emplo	Thousand	-273.991	24.253	0.096	11.19	11.79	10.691	8.472	6.13	4.048	2.475	1.303
Population	Thousand	-0.017	-0.047	-0.071	-0.089	-0.101	-0.108	-0.11	-0.108	-0.102	-0.092	-0.079
Gross Dome	Billions of	-27.319	2.451	0.138	1.17	1.217	1.107	0.888	0.654	0.442	0.279	0.156
Output	Billions of	-72.775	4.263	0.34	2.17	2.255	2.047	1.642	1.213	0.827	0.53	0.306
Disposable	Billions of	-14.609	0.509	-0.401	0.354	0.531	0.571	0.506	0.405	0.298	0.208	0.132

Economic Summary for Labor Access Scenario

Category	Units	2020	2021	2022	2023	2024	2025	2026	2027	2028	2029	2030
Total Emplo	Thousand	-60.641	3.257	3.985	8.126	8.391	7.247	5.514	3.771	2.27	1.161	0.365
Population	Thousand	0	-0.001	-0.001	0	0.001	0.002	0.004	0.006	0.007	0.009	0.01
Gross Dome	Billions of	-5.904	-0.148	-0.003	0.466	0.555	0.497	0.369	0.23	0.105	0.014	-0.049
Output	Billions of	-11.755	-0.661	-0.296	0.596	0.8	0.728	0.527	0.299	0.096	-0.049	-0.149
Disposable	Billions of	-3.041	-0.064	0.085	0.39	0.472	0.453	0.375	0.279	0.187	0.112	0.051

Output Loss Less Labor Access Scenario

Category	Units	2020	2021	2022	2023	2024	2025	2026	2027	2028	2029	2030
Total Emplo	Thousand	-213.35	20.996	-3.889	3.064	3.399	3.444	2.958	2.359	1.778	1.314	0.938
Population	Thousand	-0.017	-0.046	-0.07	-0.089	-0.102	-0.11	-0.114	-0.114	-0.109	-0.101	-0.089
Gross Dome	Billions of	-21.415	2.599	0.141	0.704	0.662	0.61	0.519	0.424	0.337	0.265	0.205
Output	Billions of	-61.02	4.924	0.636	1.574	1.455	1.319	1.115	0.914	0.731	0.579	0.455
Disposable	Billions of	-11.568	0.573	-0.486	-0.036	0.059	0.118	0.131	0.126	0.111	0.096	0.081

Conclusion

- Out of the hands of policymakers; can preempt the causes of/mitigate effects of supply chain disruptions
- Sick workers → lower productivity → disproportionately harm labor intensive industries + crops
- Long-term changes to consumer behavior are still indeterminate
  - Short-term trends indicate a greater uptake of food service technologies

Questions?

References

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