REGIONAL ECONOMIC IMPACT ANALYSIS

OF THE UNITED STATES COLD STORAGE READI 1.0 PROJECT

Purdue University
Center for Regional Development

Technical Report

Regional Economic Impact Analysis of the United States Cold Storage (USCS) READI 1.0 Project

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Abstract

The new United States Cold Storage (UCCS) facility, supported by READI 1.0 in Northwest Indiana (NWI) Region, significantly adds to the regional economy during construction, commencement of operations, and full operations and maintenance phases. The results reveal a sustained growth to the regional employment and demographics including millions of dollars added to the regional economy. The USCS Cold Storage facility, one of 400 projects supported by READI 1.0, has positively impacted the regional economy in the NWI Region, 7-county region of Northwest Indiana.

1.0 Introduction

This report presents a regional economic impact analysis of the United States Cold Storage (UCCS) facility located in Lake County, Indiana, by using a customized economic model provided by Regional Economic Models Inc. (REMI[1]). The analysis covers economic impacts of the construction in 2024, operation commencement in 2025, and a simulation of the full-scale operations and maintenance (O&M) from 2026 to 2030. The USCS facility in Lake County is part of the refrigerated supply chain and logistics infrastructure in the U.S. Midwest. The project has been funded under READI 1.0, Northwest Indiana Region (NWI)[2], quality of life initiative. The USCS is a major corporation from New Jersey serving the U.S. and North America for 125 years.[3] It is an industry leader in cold solutions, storage, and logistics in North America.[4] The total estimated cost of the USCS warehousing and cold storage project in Lake County was more than $125 million where 99% ($124 million[5]) of the investments came from private sources, and around 1% ($940,000) supported through READI funds.[6]

The USCS has a North American Industry Classification System (NAICS) 6-digit code of 493120, which is known as the refrigerated warehousing and storage industry sector. It is one of the four types of warehousing and storage industry sectors defined in the NAICS codes. The other three industry sectors include general warehousing and storage, farm product warehousing and storage, and other warehousing and storage. The refrigerated warehousing and storage sector provided 73,514 jobs during 2023 in the U.S.

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[1] www.remi.com
[2] Northwest Indiana (NWI) includes Lake, Porter, LaPorte, Newton, Jasper, Pulaski, and Starke counties.
[3] https://www.uscold.com/.
[4] Id.
[5] https://nwindianabusiness.com/community/economic-development/readi-update-u-s-cold-storage/60235/
[6] https://indianareadi.com/project/00269.

and observed 15% growth in jobs between 2018 and 2023.[7] This industry sector provided 2,192 jobs during 2023 in Indiana, and observed 8% growth in jobs from 2018 to 2023. Indiana had a total of 64,803 jobs in the four warehousing and storage industry sectors in 2023, and the refrigerated warehousing and storage provided only 3.4% of the total jobs in warehousing and storage industry sectors. The refrigerated warehousing and storage industry sector had average earnings of around $68,500 per job in 2023 in Indiana. This was nearly 15% higher than the average earnings in the general warehousing and storage industry sector. Hence, the construction and operation of the USCS facility enabled by the READI Project is an important contribution to the cold supply chain and logistics infrastructure and higher average earning jobs in Indiana.

It is anticipated that the demand for refrigerated warehousing will continue to surge in the U.S., especially due to the consumer needs and expectations of just-on-time delivery of fresh foods, fruits, and vegetables; pre-cooked meals; and medications.[8] Recent research attributes growth in the demand of refrigerated warehousing and cold supply chain to the long post-harvest period of semi-perishable and perishable agricultural products (He et al., 2023). This industry is a major consumer of energy using up to 35% of the entire energy consumption in the food industry (Accorsi et al., 2025; He et al., 2023). Hence, any growth in refrigerated warehousing industry would spillover to energy and other related industries as well. The market research revealed that the refrigerated storage in Indiana observed annual growth rates of 4% in establishments and 3.3% in revenues from 2020 to 2025 (IBIS World, 2025). This industry is expected to grow 1.9% annually in establishments and 1.8% annually in revenues in Indiana from 2025 to 2030 (IBIS World, 2025).

The USCS Cold Storage facility is located in Lake County within the NWI Region. The construction budget data were obtained from the READI, IEDC[9]. The project team conducted an informal interview with the USCS representatives toward the end of September 2025. The NWI regional leadership helped connecting with the industry representatives. The purpose was to verify the commencement of the operations in the facility and obtain estimates on full-time equivalent jobs and O&M expenditures from the industry representatives.

2.0 Methodology

This study uses REMI Policy Insight Plus (PI+) version 3.2.0 to assess the regional economic impacts of the new USCS facility in the NWI Region. The model includes 17

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[7] Analysis of NAICS 6-digit jobs based on Quarterly Census of Employment and Wages (QCEW) obtained from the Lightcast Analyst database.
[8] https://us.atoshipping.com/why-cold-storage-demand-is-surging-across-the-u-s-warehousing-sector/.
[9] Indiana Economic Development Corporation.

READI 1.0 regions and 70 industry sectors comprised of 3, 4, 5, and 6-digit NAICS codes. The REMI PI+ is a structural economic and policy analysis tool that uses methodologies from input-output (IO), computable general equilibrium (CGE), econometric, and economic geography disciplines.[10] Since, REMI is based on the CGE, it simulates economy-wide effects of policy changes such as changes in taxes, export policies, new facilities and projects, and programs. It is a comprehensive model and accounts for interdependencies between regional economic output[11] and demand; population and labor supply; labor and capital demand; compensations, prices and costs; and market shares inclusive of the domestic and international market shares.[12] Refer to the Appendix for a detailed documentation of the REMI Model.

The analysis has three parts. The first part is the economic impacts of construction of the USCS facility in 2024. The second part includes the economic impacts from commencement of the operations in the newly constructed facility in 2025 with only 20 full-time equivalent (FTE) jobs and $2 million annual expenditures in O&M. The third part is a simulation of economic impacts from 2026 to 2030 where the USCS facility operates in full capacity with 82 FTEs and $2 million annual O&M expenditures with 3% annualized growth to account for inflation.

The REMI model required some customization prior to running the economic effects of USCS facility on the READI 1.0 NWI facility. The refrigerated warehousing and storage industry sector has a small presence in the NWI Region; hence this particular industry sector is not available in the IO table. However, the general warehousing and storage industry sector is defined in the IO because of its large presence[13] in the region. REMI allows creation of the custom industry in the model. Hence, the IO linkages of the existing warehousing and storage industry sector were customized to incorporate the refrigerated warehousing and storage industry sector into the model. The main changes are made to increase the energy consumption in the inputs as the refrigerated warehousing and storage consumes more energy compared to the general warehousing and storage industry sector. Similarly, compensation and wages of the labor force was matched to Indiana's wages for the refrigerated warehousing and storage industry sector. As mentioned previously, this sector provides higher wages than the general warehousing and storage industry sector.

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[10] REMI Documentation, Model Equations 2024. https://www.remi.com/wp-content/uploads/2024/08/Model-Equations-v3_2.pdf.

[11] As per REMI's definition, output is the amount of production, including all intermediate goods purchased as well as value added (compensation and profit). It can also be thought of as sales or supply. The components of output are self-supply and exports (Multiregional, Rest of Nation, and Rest of World).

[12] REMI Documentation, Model Equations 2024, pp 3. https://www.remi.com/wp-content/uploads/2024/08/Model-Equations-v3_2.pdf.

[13] This sector provided 2,260 jobs in the NWI Region based on QCEW data obtained from the Lightcast.

The second customization was to create a new national and regional control baseline forecasts after incorporating the assumption of reduced international migration in the demographic block for 2025 and onward. Any anticipated policy changes affecting the domestic and international migration rates can impact the labor supply in the market. REMI allows for running the economic impacts separately with specific customizations for each of the three parts, construction, commencement of operation, and full-scale operation and maintenance. Note that the REMI model creates a new economic forecast including the impacts from the economic shocks and changes such as construction and operation of a new refrigerated warehousing and storage establishment in the region. The impacts are considered as the difference between the baseline and the alternative forecasts. The baseline forecasts, which simulates the regional economy without any shock or changes is the counterfactual or "as is" scenario without any intervention. The REMI model creates alternative scenario after incorporating the changes in policy variables due to the project or a program.

REMI is a multiregional economic simulation and policy analysis model, henceforth, the impacts can be observed on the recipient region, remainder of Indiana or specifically to the other 16 READI regions. This enables capturing the regional spillovers of the positive economic impacts in the recipient region.

3.0 Data Input

The expenditures in construction, jobs created and filled, and expenditures in O&M are the primary input for the economic impact analysis. The team received a detailed construction budget schedule from READI. The schedule contained READI and private fund distribution and expenditures on various activities for construction, such as lot development, site excavation, sewer and water infrastructure, power, building construction, etc. The schedule had activities and dollars allocated in three major areas of construction, design, and miscellaneous. The total estimated cost of the project was slightly more than $125 million. The activities were assigned NAICS 6-digit industry sectors based on the descriptions. Around $3.6 million for project contingency funds could not be assigned a relevant NAICS code. Hence, the economic impacts of construction are based on $121.7 million excluding the contingency funds. The team identified 13 different NAICS 6-digit codes based on descriptions and dollar expenditures, which were converted into relevant industry codes in the REMI Model.

The representatives shared that 2025 had 20 FTE, which would increase to 82 FTE in 2026 and onward. They shared that the O&M maintenance was around $2.1 million and its distribution into power, equipment maintenance, and ground maintenance.

4.0 Results

The results have three distinct parts which include construction only in 2024, commencement of operations in 2025, and operations with full-capacity from 2026-2030.

4.1 Economic Impacts of Construction

Table 4.1.1 shows select economic indicators for all the READI regions in Indiana and the NWI region in Indiana. The vales show "differences" which are impacts because of the project. The construction activities created a total of 841 jobs in Indiana in 2024. Out of 841 jobs, 802 jobs were created in the NWI Region. REMI is a multi-regional economic impact model, and hence it could estimate the spillover of the economic impacts (39 jobs) outside of the NWI Region. Out of the spillover of 39 jobs, 11 jobs were created in South Bend, nine jobs in White River, six jobs in Greater Lafayette, and four jobs in 180 Alliance and Northeast regions, respectively.

The construction activities of USCS facility created 773 jobs in private non-farm sectors in NWI. The residence adjusted employment for NWI Region was 757 in 2024. It meant that 757 (94%) out of the total 802 jobs created in NWI were held by the NWI residents. Similarly, the impacts revealed gains of total 271 people and 252 laborers in Indiana, out of which 258 people and 238 laborers increased in NWI Region, the location of the project. Any new economic activity brings a positive economic shock creating or sustaining jobs and making the area attractive for economic migrants. The impact data revealed that the project had a positive impact in terms of attracting resident workers. There was also an addition of $79 million to the state[14] GDP in 2024, out of which $75 million (95%) were added to the gross regional product (GRP)[15] of the NWI Region. The real disposable personal income increased by $43 million (in 2017$) in the state. Out of $43 million, $40 million in real disposable personal income (in 2017$) increased in the NWI region, which was equivalent to $48 million in 2024. Hence, the construction of the USCS facility impacted various economic metrics of the NWI Region positively with spillovers to the rest of Indiana. Construction of large facility such as USCS might have created major impacts during the year of the construction, but there were some remaining impacts during 2025 as well. For example, REMI model revealed that there were 23 jobs, $2 million output, and $3 million disposable personal income as a result of 2024 construction activities, remaining in 2025 in NWI Region. This reveals that economic impact spillovers can happen over space as well as time.

[14] All READI regions make up the state of Indiana.
[15] The gross regional product is the GDP of the region.

Table 4.1.1 Total Economic Impacts of Construction in READI Regions (Differences)

Category	Units	Indiana Total 2024	NWI Region 2024	NWI Region 2024 (% of Indiana)
Total Employment	Jobs	841	802	95.4%
Private Non-Farm Employment	Jobs	811	773	95.3%
Residence Adjusted Employment	Jobs	810	757	93.5%
Population	Individuals	271	258	95.2%
Labor Force	Individuals	252	238	94.4%
Gross Domestic Product	Millions of Fixed (2017) Dollars	$79	$75	94.9%
Output	Millions of Fixed (2017) Dollars	$152	$146	96.1%
Value-Added	Millions of Fixed (2017) Dollars	$79	$75	94.9%
Personal Income	Millions of Current Dollars	$59	$55	93.2%
Disposable Personal Income	Millions of Current Dollars	$51	$48	94.1%
Real Disposable Personal Income	Millions of Fixed (2017) Dollars	43	40	93.0%

The construction activities increased total economic output in NWI Region by $198 million[16] in 2024. A variety of major industries observed growth in their economic outputs in 2024 due to construction of the USCS facility. The manufacturing sector increased its output by $74 million; construction by $60 million; services by $28 million; and few other sectors noted less than $10 million growth in their outputs. **Table 4.1.2** shows the economic outputs gained by different major industry sectors in the NWI Region.

[16] In $2014. CPI is used to change $2017 estimates for the year 2024 into $2024.

Table 4.1.2 2024 Economic Output by Major Industry Sectors in NWI Region (Differences)

Industry	2024 Output in $ Millions
All Industries	187
Manufacturing - 31-33	74
Construction - 23	60
Services - 51, 54-56, 61, 62, 71, 72, 81	28
Retail and Wholesale - 42, 44-45	9
Finance, Insurance & Real Estate - 52, 53	7
Government - NA	4
Transportation and Public Utilities - 22, 48, 492-493	3

It is mentioned previously that in addition to 802 jobs in the NWI Region, the following READI regions gained jobs because of the economic impact spillovers. These READI regions included South Bend gaining 11 jobs; White River gaining nine jobs; Greater Lafayette gaining six jobs; 180 Alliance and Northeast gaining four jobs each; North Central gaining two jobs; and East Central, Indiana Uplands, South Central, and Wabash River RDA gaining one job each. Similarly, in addition to an estimated gain of population of 258 people in the NWI Region, construction activities increased populations in South Bend by five and Greater Lafayette by three individuals. 180 Alliance, North Central, Northeast, and White River, each gained one person due to construction activities. The employment gain of 802 jobs in NWI in 2024 caused +0.2% change of employment in white non-Hispanic, +0.14% in black non-Hispanic, +0.16% in other non-Hispanic, and +0.2% in employment of the Hispanic population. Similarly, males had a change of +0.23% and females had +0.13% change in employment in the NWI Region. It is evident that employment changes as a result of construction, benefited diverse groups of populations. Refer to **Figures 4.1.1** and **4.1.2** for race and gender-based employment changes in the NWI Region.

The **Figure 4.1.3** includes economic impact values for the NWI Region for 2024 showing gains of 802 jobs, 258 individuals in the population, and 238 individuals in the labor force. The current dollar values show impact in $2024. The GDP increased by $100 million, output by $198 million, and personal income by $55 million in current or 2024 dollars.

Figure 4.1.1 2024 Percent Change in Employment by Demographics in the NWI Region

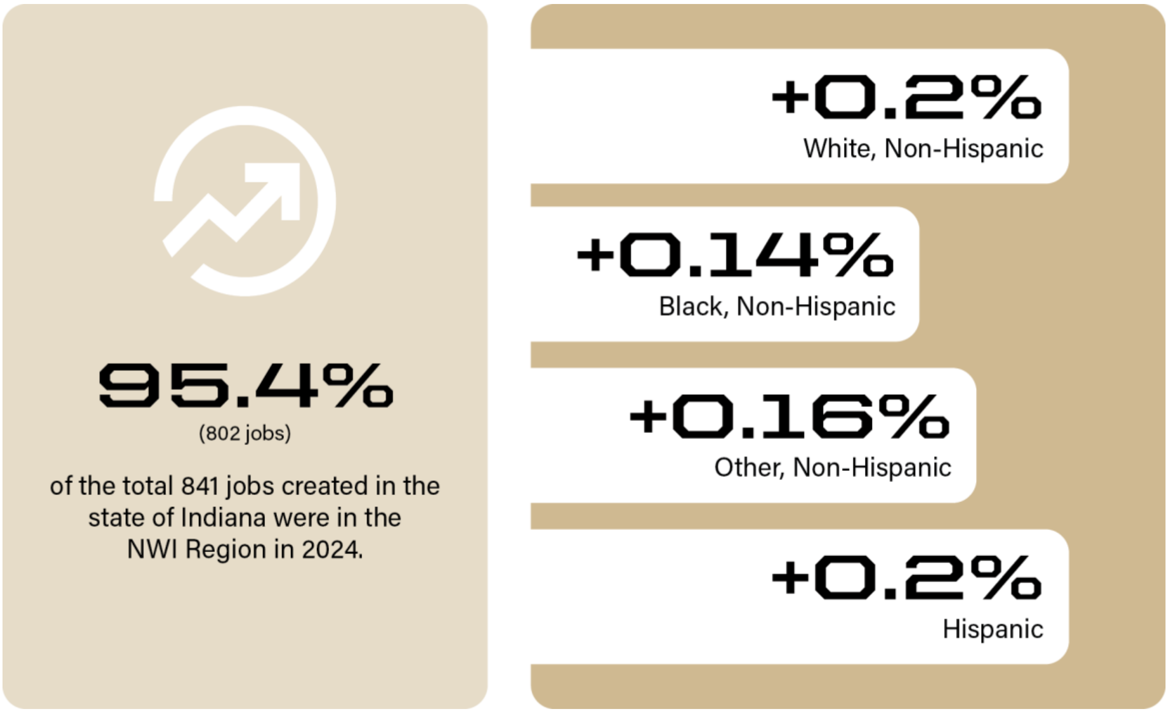

Figure 4.1.2 2024 Percent Change in Employment by Gender in the NWI Region

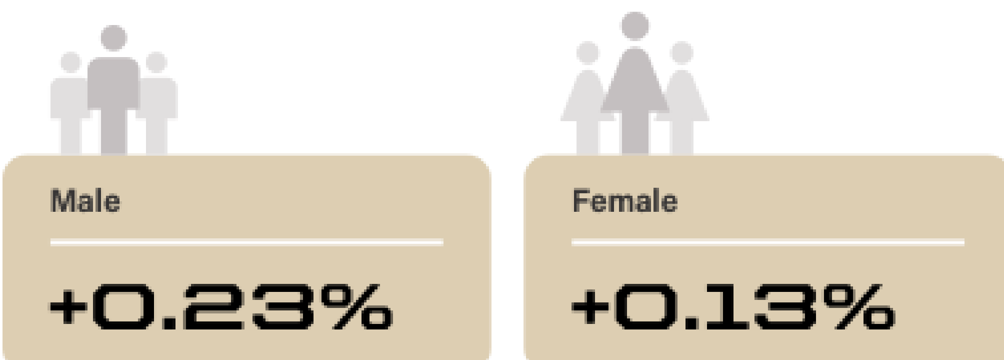

Figure 4.1.3 NWI 2024 Economic Impact Metrics in Current $

Economic Impact of United States Cold Storage

FEATURED READI REGION

Northwest Indiana
Lake, Porter, LaPorte, Newton, Jasper, Starke, and Pulaski Counties.

2024 CONSTRUCTION

The construction of the United States Cold Storage (USCS) facility in 2024 had economic impacts on the Northwest Indiana (NWI) Region and spillover to the surrounding READI regions. More than $125 million were invested in construction of the USCS facility. The construction created hundreds of new jobs, added close to $200 million in economic output, and increased gross domestic product or GDP by $100 million for the NWI Region. Resident population and labor force increased in the region. Such a large private investment, supported by READI, strengthened the refrigerated warehousing and storage industries in the region adding an asset to the transportation and logistics cluster of the NWI Region and Indiana. Refrigerated warehousing and cold storage establishment is an important component of the cold supply chain.

Total Employment
+802
Total Jobs

Gross Domestic Product
+100
Million (Current Dollars)

Population
+258
Individuals

Output
+198
Million (Current Dollars)

Labor Force
+238
Individuals

Personal Income
+55
Million (Current Dollars)

Purdue University Center for Regional Development

Indiana University Public Policy Institute

READI Regional Economic Acceleration & Development Initiative

4.2 Economic Impacts of Commencement of Operations

The operations commenced in the cold storage facility during 2025 with 20 FTE and annual O&M expenditures of $2 million distributed into four NAICS 6-digit industry sector codes related to the custom refrigerated warehousing and storage; electric power generation, transmission and distribution; commercial and industrial machinery equipment repair and maintenance; and landscaping services. The customization of industry sector is explained in the methodology section of this report. The second customization of developing an alternative national and regional control based on revised international migration assumptions is also explained in the methodology section. Since USCS is a new cold storage and warehousing establishment in the region, jobs and O&M expenditures are new job positions and capital expenditures to the regional economy.

Table 4.2.1 Economic Impacts of USCS Cold Storage Facility Operations' Commencement in the NWI Region (differences)

Category	**Units**	**2025**
Total Employment	Jobs	53
Private Non-Farm Employment	Jobs	51
Residence Adjusted Employment	Jobs	50
Population	Individuals	17
Labor Force	Individuals	16
Gross Domestic Product	Millions of Fixed (2017) Dollars	$4
Output	Millions of Fixed (2017) Dollars	$6
Value-Added	Millions of Fixed (2017) Dollars	$4
Personal Income	Millions of Current Dollars	$3
Disposable Personal Income	Millions of Current Dollars	$3
Real Disposable Personal Income	Millions of Fixed (2017) Dollars	$2

The 20 FTE new jobs in the refrigerated warehousing and storage sector plus infusion of $2 million in different O&M sectors in 2025 created a total employment change of 53 jobs in the NWI Region. Population increased by 17 and labor force increased by 16 individuals as estimated by the REMI Model. The GDP increased by $4 million in fixed $2017. The personal income increased by $3 million in current dollars. The commencement of the operations in a new establishment caused positive economic changes to the regional economy. The Type I[17] and Type II[18] output multipliers estimated by REMI model for 2025 were 1.20 and 1.94, respectively. The Type I and Type II employment multipliers estimated by REMI model were 1.14 and 1.76, respectively. Note that the total employment impact figure of 53 jobs include full-time and part-time jobs. The total economic out of $6 million (in $2017) is distributed into major industry sectors such as $3 million for transportation and public utilities and $2 million for services. Infographic 4.2.1 shows the key economic impact numbers and values in current dollars. The NWI Region gained $5 million in GDP, $9 million in output, and $3 million in personal income in current 2025$.

4.3 Economic Impacts of Full-scale Operations and Maintenance

The full operation of the USCS facility will commence from 2026 with 82 FTE and annual O&M expenditures of $2 million. A year-over-year simulation is run from 2026 to 2030. The assumption is that 82 FTE will remain the same over the years, but O&M expenditures would increase by 3% every year to account for inflation. The previous two customizations of the REMI model to develop a custom industry sector and revised national and regional forecast considering policy changes in international migration prevail. Note that the facility commenced operations in 2025, henceforth, the O&M expenditures are not new expenditure dollars to the regional economy. The third consideration is that capital investments induced by industry sales due to O&M expenditures are nullified from 2026 to 2030 to account for the prior existence and presence of the USCS facility in the NWI Region. REMI model provides annual forecasts from 2026 to 2030. **Table 4.3.1** shows key economic indicators averaged over the time period for the NWI Region. Since the facility is already operating, the economic metrics show how much the facility would be sustaining and maintaining per year in the NWI regional economy.

The USCS facility would maintain and sustain on average of 125 jobs per year in the region. This includes jobs within the USCS facility and other indirect and induced jobs sustained because of expenditures by workers in the facility and O&M annual

[17] Type I multiplier is a ratio of direct plus indirect divided by direct.
[18] Type II multiplier is a ratio of direct plus indirect and induced divided by direct.

expenditures. The residence adjusted employment shows that on average 120 jobs per year would be sustained by the NWI resident population. The facility would be sustaining 92 individuals in population and 71 individuals per year in the labor force. It shows that USCS will be adding more than 90 residents to NWI's population. The annual operations would add and sustain $8 million per year to the GRP and $13 million per year to the output of the NWI Region in real $2017. The real disposable personal income in $2017s would increase by $5 million in the region and be sustained per year from 2026 to 2030. This shows that operations of the USCS facility would increase populations, jobs, and economic output permanently in the NWI Region. The Type I and Type II average output multipliers estimated by the REMI model for 2026 to 2030 are 1.24 and 1.76, respectively. The Type I and Type II average employment multipliers estimated by the REMI model for 2026 to 2030 are 1.14 and 1.53, respectively. The $13 million ($2017) of total annual average output from 2026 to 2030 is distributed into major industry sectors such as $8 million annually for transportation and public utilities and $1 million annually for services, construction, retail and wholesale, finance insurance and real estate, and government, respectively. **Figures 4.3.1** to **4.3.5** show the annual infographics from 2026 to 2030 of key metrics in current dollar values.

Table 4.2.1 Economic Impacts of USCS Cold Storage Facility Operations' Commencement in the NWI Region (differences)

Category	**Units**	**Average 2026-2030**
Total Employment	Jobs	125
Private Non-Farm Employment	Jobs	120
Residence Adjusted Employment	Jobs	120
Population	Individuals	92
Labor Force	Individuals	71
Gross Domestic Product	Millions of Fixed (2017) Dollars	$8
Output	Millions of Fixed (2017) Dollars	$13
Value-Added	Millions of Fixed (2017) Dollars	$8
Real Disposable Personal Income	Millions of Fixed (2017) Dollars	$5

5.0 Conclusions

The READI support of the USCS facility added a new $125 million establishment in the NWI Region in Indiana. This was an addition of a new refrigerated warehousing and storage establishment, a relatively high paying new industry sector to the regional economy. The economic impacts of construction in 2024 estimates benefits of more than 800 new jobs in the region. The impact estimates of full operation show creation and sustenance of on average 125 jobs per year and more than 90 resident populations in the region during the period 2026 to 2030. Another way to state this would be creation and maintenance of 125 jobs per-year in the NWI regional economy in perpetuity dependent on the life cycle of the new facility. Additionally, the full operations would add and sustain on average $8 million per year to the regional economy or the GRP. The distribution of output reveals that major industry sectors such as transportation and public utilities, services, construction, etc., would increase their annual outputs in the NWI Region. This shows a permanent increase to the regional demographics and economy by a single READI 1.0 project in the NWI Region.

6.0 References

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7.0 Appendices

Appendix 1: Additional Infographics on the Key Economic Impacts in the NWI Region

Figure 4.2.1 NWI 2025 Economic Impact Metrics in Current $

Economic Impact of United States Cold Storage

FEATURED READI REGION

Northwest Indiana
Lake, Porter, LaPorte, Newton, Jasper, Starke, and Pulaski Counties.

2025 OPERATIONS & MAINTENANCE

The commencement of operations in 2025 with 20 FTE new jobs in the refrigerated warehousing and storage sector plus $2 million in different O&M expenditures created a total employment change of 53 jobs in the NWI Region. Population increased by 17 and labor force increased by 16 individuals as estimated by the REMI Model.

- The Type I and Type II employment multipliers estimated by the REMI model were 1.14 and 1.76, respectively.
- The Type I[1] and Type II[2] output multipliers estimated by the REMI model for 2025 were 1.20 and 1.94, respectively.

[1] Type I multiplier is a ratio of direct plus indirect divided by direct.
[2] Type II multiplier is a ratio of direct plus indirect and induced divided by direct.

Total Employment
+53
Total Jobs

Gross Domestic Product
+5
Million (Current Dollars)

Population
+17
Individuals

Output
+9
Million (Current Dollars)

Labor Force
+16
Individuals

Personal Income
+3
Million (Current Dollars)

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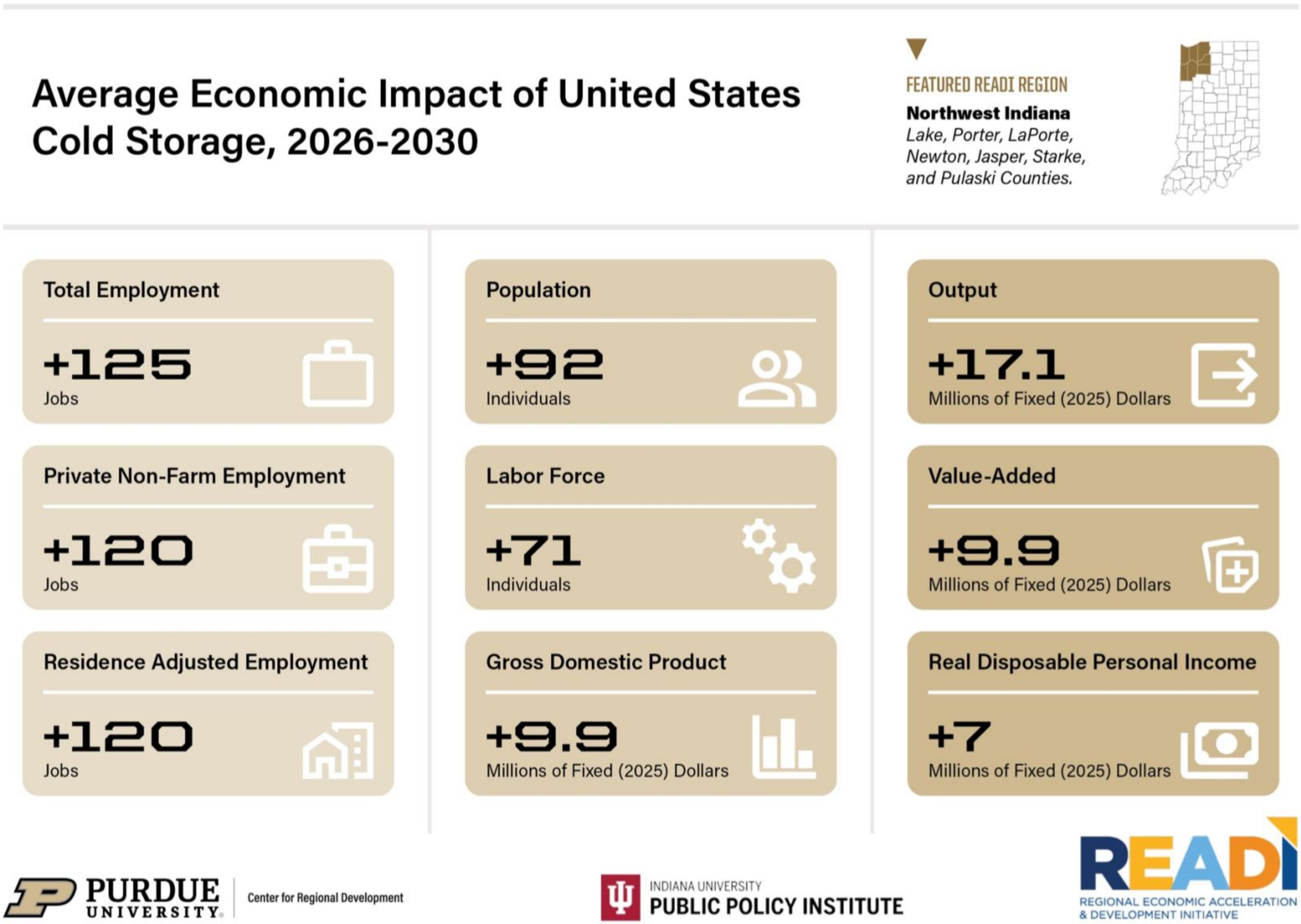
READI REGIONAL ECONOMIC ACCELERATION & DEVELOPMENT INITIATIVE

Figure 4.3.1 NWI 2026-2030 Economic Impact Metrics in Current $



Appendix 2: REMI Model Framework

The following core framework applies to all REMI model builds. The model 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

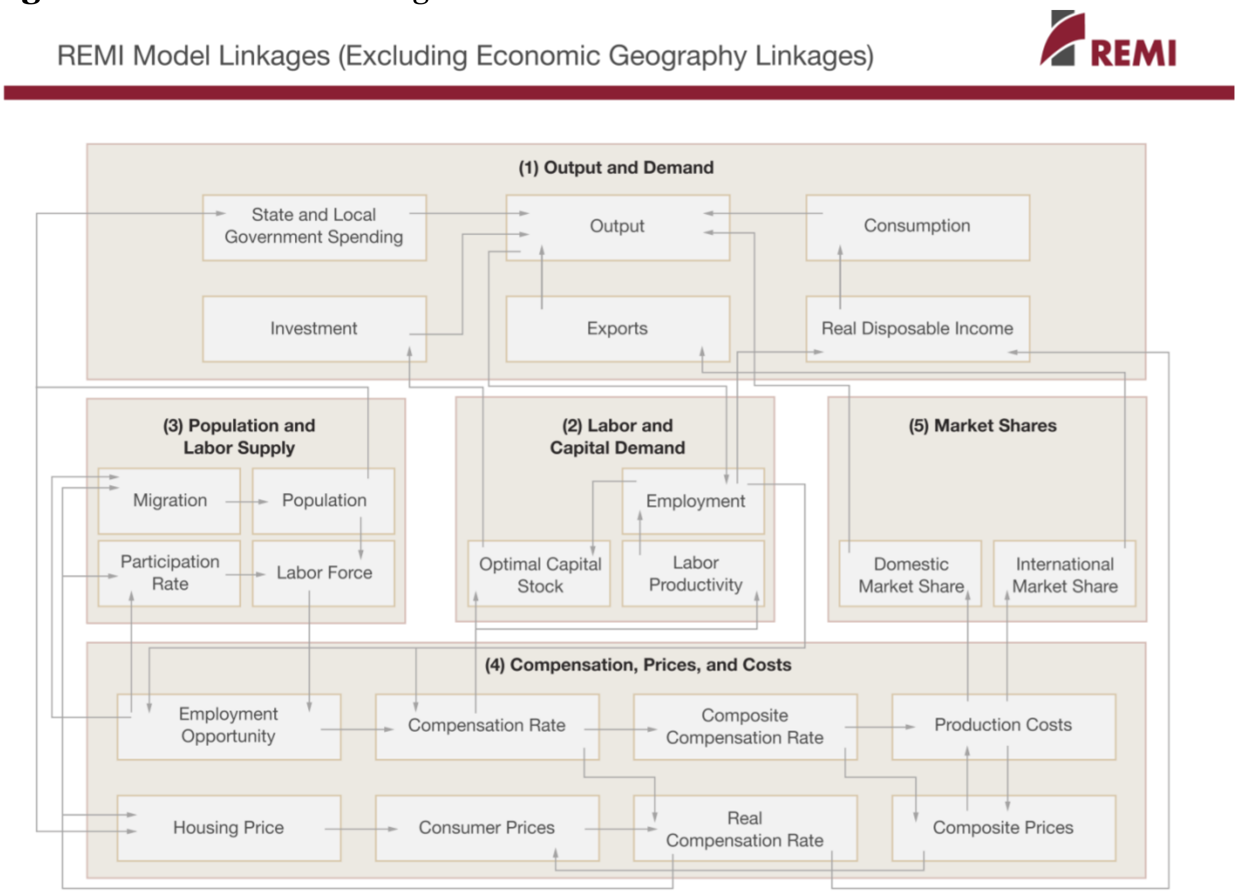
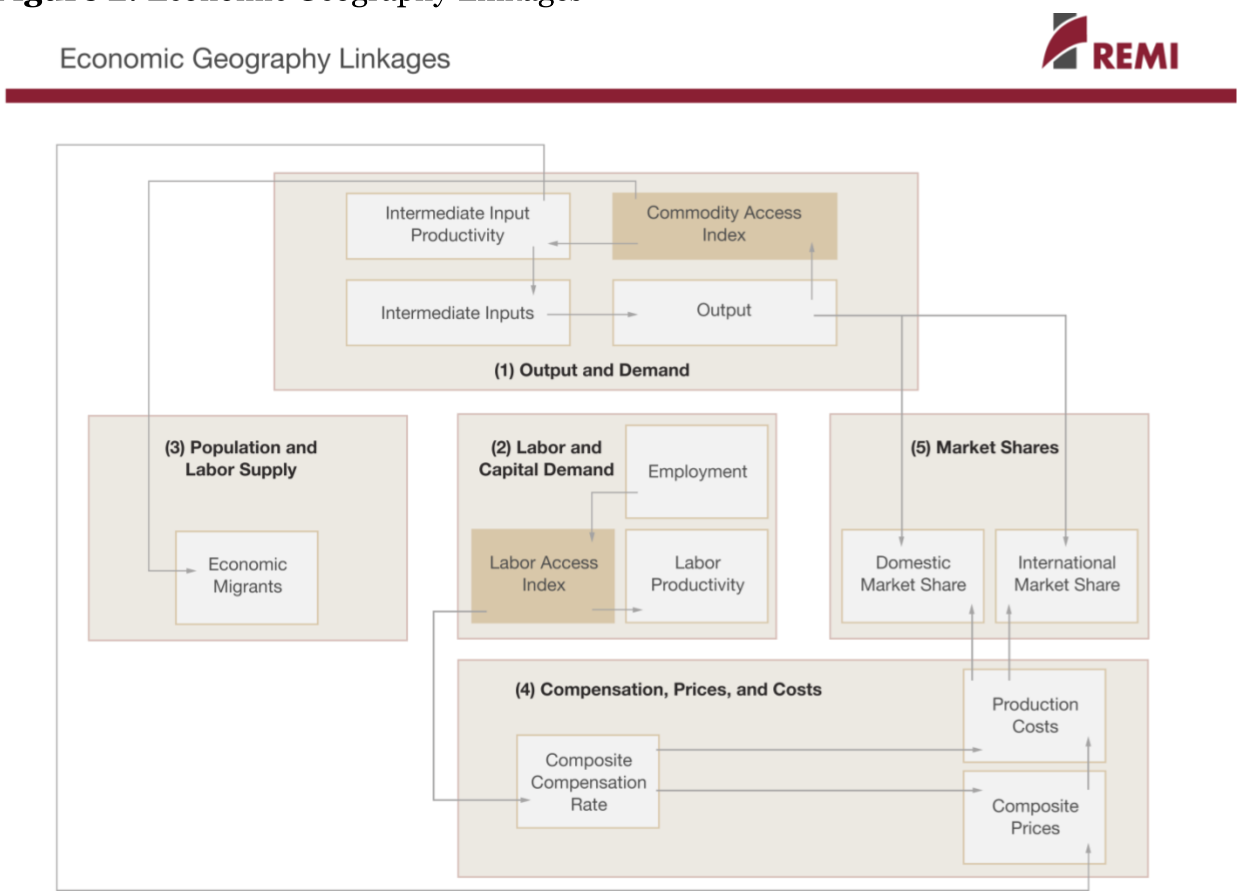


Figure 2: Economic Geography Linkages



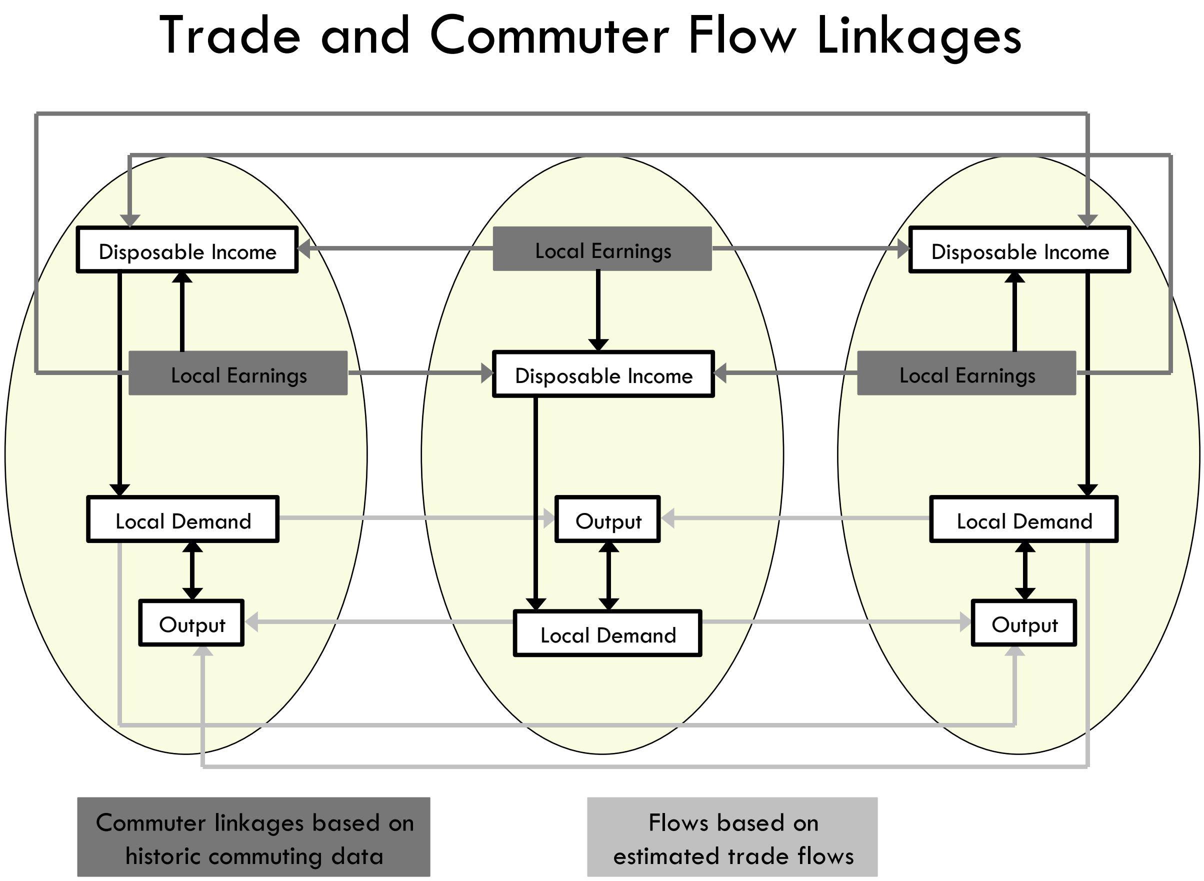
The Output and Demand block consists of output, demand, consumption, investment, government spending, exports, and imports, as well as feedback from output change due to the change in the productivity of intermediate inputs. The Labor and Capital Demand block includes labor intensity and productivity 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 4.

Figure 3: 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 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 race, 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 incomers, 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.

Source: REMI Documentation

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