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Modeling the Impacts of Reciprocal Tariffs on the 2025 Iowa Economy

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Executive Summary

In this analysis, researchers affiliated with the Iowa State University Center for Agricultural and Rural Development use historical trade patterns, elasticities, and revenue linkages to discern the potential 2025 tariffs' near-term impacts on the state of Iowa. We use partial-equilibrium modeling approaches that do not directly consider linkages among the markets and industries across the state of Iowa. The partial equilibrium techniques look specifically at the corn, soybean, hog, and ethanol markets along with industry, household, and government revenue impacts from changes in these markets. While there is a great deal of uncertainty about the duration of the trade disruptions and the impact these disruptions might have to long-held trade equilibria, the main results of the study are as follows.

- We examine three hypothetical tariff retaliations by trading nations. In this report, we assume all nations respond in-kind to US tariffs. We recognize that countries may not respond at all, however, at the date of this report, we are merely assessing possibilities.
    - Base10 Scenario: a global 10% tariff, with exceptions for Canada and Mexico;
    - Reciprocal Scenario: Base10 with the additional reciprocal tariffs announced between April 2, 2025 and July 11, 2025; and,
    - BRICS Scenario: Reciprocal scenario with additional tariff announcements for BRICS countries.
- Overall losses to Iowa's **Soybean** industry of $191 million in the Base10 Scenario to $1.49 billion in the BRICS Scenario; Iowa soybeans are a $5.8 billion industry.
- Overall losses to Iowa's **Corn** industry of $126 (Base10) to $528 million (BRICS); Iowa corn is an $11.7 billion industry.
- Overall losses to Iowa's **Hog** industry of $200 million (Base10) to $1.18 billion (BRICS); Iowa hog production is a $7.3 billion industry.
- Overall losses to Iowa's **Ethanol** industry of $40 (Base10) to $168 million (BRICS); Iowa ethanol is a $7.4 billion industry.
- Revenue losses in these industries translate into additional lost revenues in other industries and lost income, as well as impact the value added (GDP) of the state of Iowa. The ranges in this report reflect total output (revenue) losses to Iowa businesses from $813 million in the Base10 scenario to $4.9 billion in the BRICS scenario. Lost household income ranges from $164 million to $1 billion depending on the scenario. Value added (GDP) is reduced by $396 million in the Base10 scenario to $2.46 billion in the BRICS scenario.
- Tax revenue losses (local, state and federal) range from $56 million to $348 million depending on the scenario. The State of Iowa itself loses from $12 million to $76 million in tax receipts.

Introduction

Previous trade battles, such as the Russian Grain Embargo, the 2009 dispute with China (tires vs. chickens), and the trade disputes during President Trump's first term demonstrate that once trade market share is lost, it is difficult for markets to return to the previous relationships—exporting nations dominating markets in terms of price-setting behavior face more competition as new exporters show they're able to meet supplies once the purview of the dominant nation. Importers seek a larger portfolio of trading partners to mitigate riskier world trade. Trade flows adjust to avoid tariffs, embargoes, and other trade-distorting policies. Countries outside the disputes gain market share, as their products displace others that face trade barriers. The European Union gained much of the trade the United States lost from the Russian Grain Embargo. Brazil and the European Union replaced the United States for much of China's chicken trade after 2009. And, Brazil has grown soybean production to restock the trade lost by the United States following the 2017–2019 trade war and the short-lived Phase 1 trade deal.

The loss of market share and the resulting loss of farm income is a major concern for US agriculture given the current trade disruptions and ongoing market conditions. What the future looks like after either the disruptions end or the tariffs are made permanent is something no economist can accurately predict because analyses are based on historical trade and economic patterns. As researchers at the Center for Agricultural and Rural Development (CARD) pointed out in various analyses during and after the 2017–2019 trade war, markets are like living organisms—they move, they restructure, and they adapt after disruptions (Balistreri et al. 2018; Balistreri, Zhang, and Beghin 2020; Li, Zhang, and Hart 2018; Li, Balistreri, and Zhang 2018, 2019; Crespi and Chen 2019, Balistreri and McDaniel 2024; Chen, Crespi, and Ji 2021, 2025). Trade distortions cause market structures to evolve, often in unpredictable ways. Traditional trade relationships can no longer be counted upon; historical market dominance is shifting underneath our feet. What we are doing to examine these issues is applying what we know about *current* market relationships and use this to infer what possible impacts on the state of Iowa could be in the near term before more fundamental structural parameters change.

A Partial Equilibrium Examination of the Impacts on Iowa Corn, Soybean, Hog, and Ethanol Markets

We want to know the potential impacts of tariffs might be in the state of Iowa. Without knowing whether the trade market will restructure, we ask what the impact from the current disruption will be given what we know about the economic relationships as they currently exist. To estimate the loss in farm income due to current trade disputes, we estimate the share of tariff incidence based on US supply and major trading partner demand elasticities and trade market shares. We utilize supply and demand elasticities to compute the tariff incidence between the United States and its trade partners. We also estimate a trade-weighted average tariff rate by commodity. We do this for a range of tariff assumptions to produce a range of impact estimates.

Given the supply and demand estimates, the tariff incidence indicates roughly 40% of the corn price impact and 60% of the soybean price impact is due to trade disruptions. This is higher for hogs. As elasticities were not available for ethanol, we use half of the corn percentage impact estimate for ethanol. With the wealth of uncertainty in trade policy at the current moment, we have outlined three tariff scenarios. In all cases, we are assuming other countries respond to US tariffs with matching tariffs. In the first scenario (labeled Base10), we examine the impact of a global 10% tariff, with the exceptions of Canada and Mexico (which are covered by the USMCA agreement). In the second scenario (labeled Reciprocal), we add to Base10 with the additional reciprocal tariffs announced between April 2, 2025, and July 11, 2025, including additional tariffs for Canada and Mexico and tariffs based on Venezuelan oil imports. In the third scenario (labeled BRICS), we build on the Reciprocal scenario, adding the tariff announcements for

BRICS countries, which raises tariffs to 100% for those countries.[1] The trade-weighted average tariff rates are determined with weights from the July 10, 2025, US Export Sales report (https://apps.fas.usda.gov/export-sales/esrd1.html). Table 1 outlines the trade-weighted average tariff rates for corn, soybeans, and hogs under the three scenarios.

Table 1. Trade-Weighted Average Tariff Rate

Average Tariff Rate	Base10	Reciprocal	BRICS
Corn	6.56%	24.19%	27.56%
Soybeans	8.94%	29.77%	69.78%
Hogs	5.55%	25.80%	33.07%

To create base values for Iowa's corn, soybean, hog, and ethanol production before the tariff uncertainty, we utilized the production totals from 2024 and the Iowa average cash prices from January 31, 2025 (the day before the first executive order for new tariffs during the second Trump administration on February 1, 2025; Agricultural Marketing Service report IDs 2850, 2675, and 2805). The US Department of Agriculture estimates cash receipts utilizing prices throughout a year. Our values differ as we are using the daily commodity prices closest to the first tariff announcement to estimate the production value on that date as the price we are choosing for our base price reflects the market prior to the announcements. Hence, price declines in our models are relative to this base on January 31, 2025. We then applied the trade-weighted average tariffs to estimate the damages to the Iowa corn, soybean, hog, and ethanol markets. Table 2 outlines those estimates.

Table 2. Production Values and Estimated Damages from Tariffs

	Production Value	Scenario		
		Base10	Reciprocal	BRICS
		($ billion)		
Corn	11.742	0.126	0.464	0.528
Soybeans	5.821	0.191	0.635	1.490
Hogs	7.343	0.200	0.928	1.189
Ethanol	7.452	0.040	0.147	0.168

Given the 2024 production values for Iowa corn, soybean, hog, and ethanol production, these tariff scenarios translate to a $126–$528 million drop in corn revenues, $191–$1,490 million drop in soybean revenues, $200–$1,189 million drop in hogs, and $40–$168 million drop in ethanol revenues. Combined, that is a $556 million to $3.375 billion decline to Iowa's agriculture.

[1] BRICS consists of the following nations as of July 21, 2025: Brazil, Russia, India, China, South Africa, Saudi Arabia, Egypt, United Arab Emirates, Ethiopia, Indonesia, and Iran.

Economic Impacts Due to Revenue Reductions in the Corn, Soybean, Hog, and Ethanol Sectors of the Iowa Economy

In this section, we take the revenue impacts calculated above and assess the impact on the rest of the Iowa economy using an input-output model of interconnected value chains to determine how these impacts are felt in other sectors of the Iowa economy. This section should be considered a "best guess" assumption of short-run consequences of revenue reductions associated with trade actions potentially affecting Iowa's agricultural sector and its ethanol manufacturing firms.

The specific input-output software employed in this study is the IMPLAN® Model (2025, hereafter "IMPLAN") which is available via a license to the Center for Agricultural and Rural Development at Iowa State University.[2]

An input-output (I-O) model is best thought of as a matrix equation of production relations connecting all industries in an economy. IMPLAN accounts for the regional absorption of the commodities across the Iowa economy (essentially, what percentage is sourced locally, however "local" is defined) based on previous data collection of that nature, thus presenting IMPLAN's first limitation, namely, the model presumes that firms will interact as they have generally done in the past. For our study, we examine the Iowa economy as the region of interest.

In an I-O framework, the total demand for the commodities must equal the amount produced, and the equation that converts supply into demand via a calibrated I-O multiplier (also called a "technology") matrix is known as the Leontief Production Function (Leontief 1986). In this analysis we fixed the outputs of corn, soybean, hogs, and ethanol to their most recent production values (table 2) and reduced revenues in each industry based on the three scenarios: Base10, Reciprocal and BRICS, and then the model adjusts the inputs and outputs of the other industries to accommodate the changes.[3] The values in the matrix are based on data gathered by a variety of entities, most notably, but not entirely, the US Bureau of Economic Analysis (BEA) and the US Department of Agriculture (USDA). IMPLAN is the most widely used I-O model in the United States and has been used in countless analyses. IMPLAN uses publicly available data along with its own data acquisitions and calculations to relate all purchasing and expenditure relationships between and among industries in an economy.[4] Although the revenues for all of the commodities were as in table 2, the remainder of the base data in this report was from 2022 (the latest IMPLAN data available for the industries in our analysis). IMPLAN adjusted the 2022 data for inflation to 2025 dollars. There are known drawbacks of I-O studies in general and IMPLAN in particular as noted by Crespi (2024).

IMPLAN's Economic Impact Variables

For this report, we present the three main economic impact variables defined below, as well as tax revenue losses.

[2] Some of the discussion and language in this section is taken directly from Crespi and Dumortier (2025).

[3] Note that the industries in IMPLAN are often aggregated from other industries. IMPLAN does not specifically have corn or soybean industries, it has, respectively "grains" and "oilseeds" which were the industries used and in Iowa are mostly corn and soybeans. Further, ethanol is not its own industry in IMPLAN, it is aggregated in the "other organic chemicals" industry. Like corn and soybeans, in Iowa much of that industry data would have been gathered from the ethanol industry. Because we replaced IMPLAN's output numbers with the revenue numbers from table 2, the impacts from the tariffs can be taken as impacts from these industries, but these caveats are to be noted.

[4] For more information, see IMPLAN Data Sources (2025); IMPLAN Farm Data Procedures (2025).

I. Output: Output is generally the revenues generated in a year although it also includes inventory in IMPLAN. In this case, we replaced IMPLAN's output for the corn, soybean, hog, and ethanol industries with the revenues in table 2 and then adjusted for the losses for the tariffs.

II. Labor Income: This is wage, salary and benefits to workers and employers. Following Balistreri et al. (2018), we treat the reduction in labor income as the impact on profits from the tariffs. For corn, soybeans, and hogs, this is likely entirely or mostly in the state of Iowa. Ethanol plants are owned by both Iowa and non-Iowa investors; hence, this impact is not restricted to Iowa's borders. Nonetheless this is both the reduction in owner and employee income and compensation based upon the estimated output losses.[5]

III. Value Added: This is the regional equivalent to an industry's addition to gross domestic product (GDP). It is the difference between output and the costs of the inputs used for the creation of that output including the labor costs as well as the taxes on production and any imports. It can be thought of as that portion of profit that does not include the capital expenses. Value added is what gets added on net to the economy.

Economic Impact Effects
For each of the above economic impact variables, IMPLAN generates three economic impact effects:

1. Direct Effects: These are the changes to an economy's final demand directly from the hypothesized change to the industry under examination. So, this would be changes to the Iowa economy's final demand from the hypothetical values of output (revenue) provided for corn, soybean, hog, and ethanol production.

2. Indirect Effects: These occur through industry-to-industry (business-to-business) purchases within and across industrial supply chains.

3. Induced Effects: When employees are subtracted from an industry, they spend less money on goods produced in other industries, and, in turn, those industries produce less and hire fewer employees who also have less to spend and less to pay in taxes, etc. These are the induced effects from the economic impact along the supply chain.

We make one further change in our modeling assumption. We restrict buybacks in the supply chains just as we did in the related 2018 report. We are measuring the contribution to revenue losses of the industries, and buybacks in such a context are a form of double counting (see Lucas 2019; Miller and Blair 2022, ch. 7).

[5] Jobs impacts: IMPLAN also uses the labor income losses to impute employment losses. We do not report these, choosing to follow the Balistreri et al. (2018) report and our assertion that at least in the short run, the tariffs are impacting prices and not quantities. Thus, the same bushels of corn, for example, are harvested, needing the same workers as without the tariffs—the price is what has declined. However, especially over a longer term, one should expect that not all profit losses will remain in reduced work hours or income. Job losses can and should be calculated. For a longer run impact, the labor income decline reported here should be seen as a mixture of both lower incomes and job losses.

Economic Impact Effects
The final economic losses for the three scenarios are shown in tables 3, 4 and 5. The tax revenue losses are shown in table 6.

In terms of total losses in each scenario, the output column in the "Direct" results row for each commodity shows the revenue losses per commodity (as given earlier in table 2) for each scenario. The other losses come from the supply chain (Indirect) and household spending in Iowa (Induced). The Base10 Scenario shown in table 3 generated the lowest total economic output losses of $813 million and the BRICS Scenario shown in table 5 generated the highest losses of $4.9 billion. Likewise, income losses range from $164 million in the Base10 scenario to $1 billion in the BRICS scenario. In many ways the most important economic variable reported in the tables is the Value Added effect as this is reflecting how each industry's revenue losses impact Iowa's GDP. Iowa's GDP in 2025 is roughly $201 billion.[6] We see in the Base10 scenario, a total value added loss of $396 million rising to almost $1.6 billion in the Reciprocal Scenario and nearly $2.5 billion in the BRICS scenario. These are important economic impacts that represent not just profits, but the added value that the state would receive in the absence of the tariffs.

Table 6 encapsulates all of the tax revenue losses expected throughout the state from sub-county revenues (e.g., school and special districts), to the county, state, and federal levels. The total loss in taxes ranges from about $56 million in the Base10 Scenario to $348 million in the BRICS Scenario. The State of Iowa itself would lose between $12 million and $76 million in tax revenues depending on the scenario.

[6] Iowa Open Data, https://data.iowa.gov/stories/s/Iowa-s-Gross-Domestic-Product/ubgu-5xaq/, last accessed July 21, 2025.

Table 3. Losses to the State of Iowa, Base10 Scenario

	Impact	Labor Income	Value Added	Output
			($ millions)	
Corn	Direct	15	30	126
	Indirect	14	28	59
	Induced	6	11	19
	Total Corn	35	69	205
Soybeans	Direct	31	98	191
	Indirect	13	26	54
	Induced	9	17	29
	Total Soy	53	140	274
Hogs	Direct	50	131	200
	Indirect	9	17	41
	Induced	12	23	41
	Total Hogs	71	172	282
Ethanol	Direct	3	9	40
	Indirect	2	4	9
	Induced	1	2	3
	Total Ethanol	6	15	52
Total	Direct	98	268	557
	Indirect	39	76	163
	Induced	27	53	93
	Total All	164	396	813

Table 4. Losses to the State of Iowa, Reciprocal Scenario

	Impact	Labor Income	Value Added	Output
			($ millions)	
Corn	Direct	54	110	464
	Indirect	53	104	218
	Induced	21	41	71
	Total Corn	127	255	753
Soybeans	Direct	102	325	635
	Indirect	44	86	179
	Induced	29	56	98
	Total Soy	175	467	912
Hogs	Direct	231	609	928
	Indirect	44	80	191
	Induced	56	108	190
	Total Hogs	331	797	1,309
Ethanol	Direct	10	32	147
	Indirect	8	16	32
	Induced	4	7	12
	Total Ethanol	21	54	191
Total	Direct	396	1,076	2,174
	Indirect	148	286	620
	Induced	109	211	370
	Total All	654	1,573	3,165

Table 5. Losses to the State of Iowa, BRICS Scenario

	Impact	Labor Income	Value Added	Output
			($ millions)	
Corn	Direct	61	125	528
	Indirect	60	119	248
	Induced	24	46	81
	Total Corn	145	290	857
Soybeans	Direct	240	763	1,490
	Indirect	102	201	420
	Induced	68	131	229
	Total Soy	410	1,095	2,139
Hogs	Direct	296	780	1,189
	Indirect	56	103	245
	Induced	72	139	243
	Total Hogs	424	1,022	1,677
Ethanol	Direct	11	36	168
	Indirect	9	18	37
	Induced	4	8	14
	Total Ethanol	24	62	218
Total	Direct	608	1,705	3,375
	Indirect	228	441	950
	Induced	167	324	567
	Total All	1,003	2,469	4,892

Table 6. Tax Revenue Losses

	Sub Co and Special Dist	County	State	Federal	Total
			($ million)		
Base10 Scenario					
Corn	0.4	0.1	1.7	7.7	9.8
Soybeans	1.8	0.5	4.4	12.3	19.0
Hogs	2.1	0.6	5.4	16.6	24.7
Ethanol	0.4	0.1	0.7	1.5	2.8
Total	4.6	1.4	12.2	38.2	56.3
Reciprocal Scenario					
Corn	1.3	0.4	6.2	28.4	36.2
Soybeans	5.9	1.7	14.5	41.1	63.2
Hogs	9.6	2.8	25.2	77.2	114.8
Ethanol	1.5	0.4	2.6	5.6	10.1
Total	18.4	5.4	48.4	152.2	224.4
BRICS Scenario					
Corn	1.5	0.4	7.0	32.3	41.2
Soybeans	13.9	4.1	34.0	96.3	148.4
Hogs	12.3	3.6	32.2	98.9	147.1
Ethanol	1.7	0.5	3.0	6.4	11.6
Total	29.4	8.7	76.3	233.9	348.2

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