# The state-level burden of the trade war: interactions between the Market Facilitation Program and tariffs

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# Outline


1. Overview
2. The N+1 Model
3. Results
4. New Project (COVID-19: China Regional Model)

# US Agriculture: collateral damage from the trade war

- Lerner (1936) Symmetry: Import Tariff = Export Tax
- China's retaliation
- Ag states bear a disproportionate burden
- USDA Market Facilitation Program (MFP): cash payments to compensate farmers

# The MFP

- 2019 MFP payments:
  county-specific cash payment per acre of planted eligible crops

**Example:**

- Story County, IA: $64 per acre planted
- Soybean prices
  - 2017 avg: $9.78/bu
  - 2019 avg: $8.93/bu
  - Change: let's say -$1/bu (or about -10%)
- Story-county soybean yield: 50 bu per acre
- First-order price impact of the trade war -$50 per acre
- MFP + Trade War = +$14 per acre net gain for Story County Farmers

# Research question and method:

How is the distribution of state-level welfare changes impacted by adding MFP payments to the trade war?

- WiNDC based (N+1) state-level modeling system
- Trade war terms-of-trade impacts from a GTAPinGAMS MRT
- Tariff revenue distributed lump sum in proportion to state income
- State-level MFP payments (Glauber, 2019, AEI report)
- MFP funded lump sum in proportional to state income

# An extensible N+1 strategy

- While we can run 50-state static models and report state-level impacts, having this level of geographic resolution can limit anticipated extensions.
  - Neoclassical dynamics
  - Increased commodity resolution
  - Alternative market structures (non-convexities)
- Solution strategies (Rutherford)
  - Multi-region national model with 50 different state SOEs
  - Multi-region national model with a given focus state (the plus 1) broken out.
- We have 7 regions + 1 (or not)
- What is the quantitative nature of inconsistency introduced by having 50 different regional aggregations of the data?

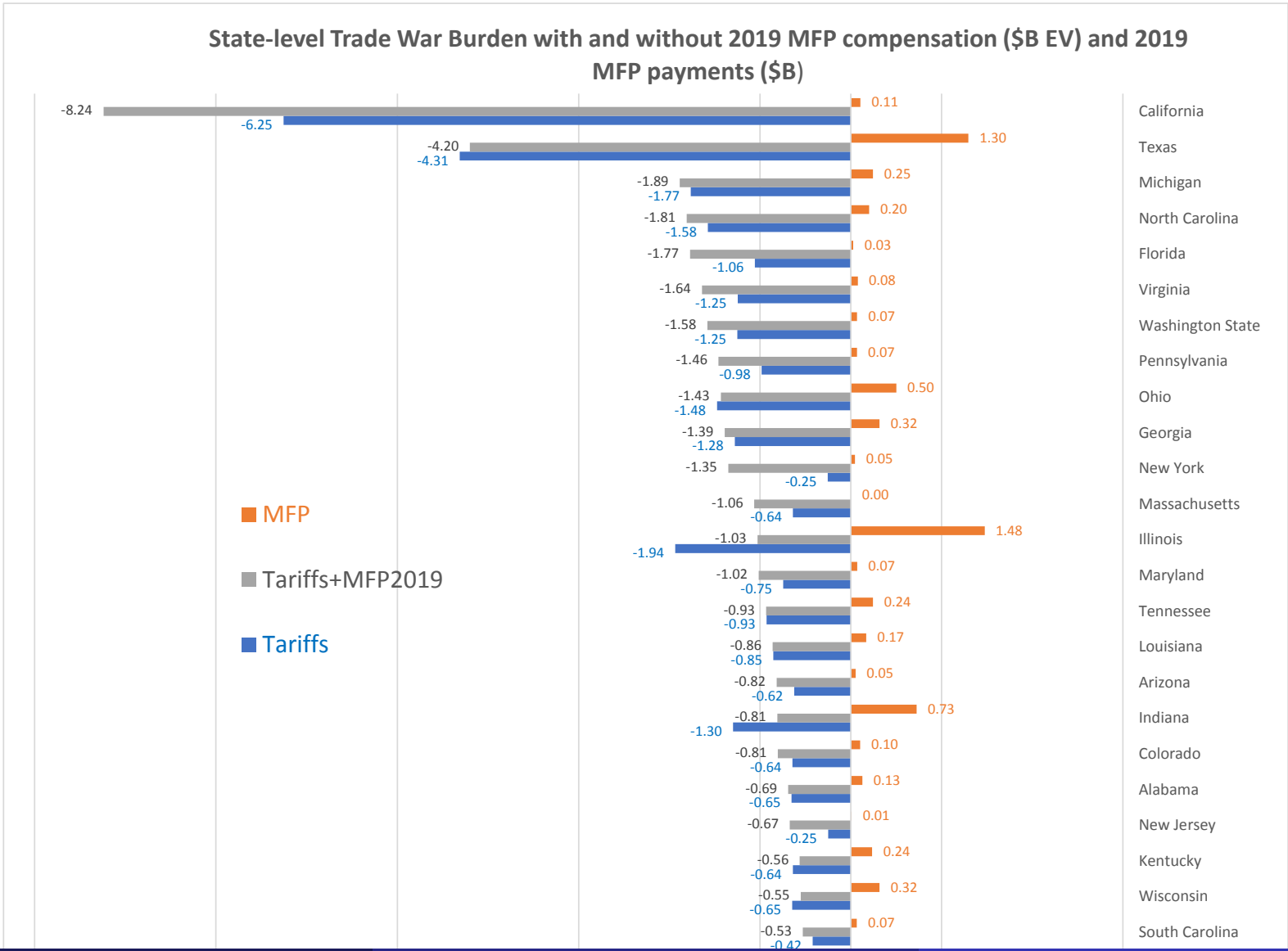
# Trade-war impacts: introduced inconsistency is minor

| | Trade-war Welfare Impact (EV$B) for Different Datasets | | | |
|---|---|---|---|---|
| **Region** | N+0 | N+CO | N+IA | N+WI |
| Colorado | | -0.643 | | |
| Iowa | | | -0.558 | |
| Wisconsin | | | | -0.647 |
| **Great Lakes** | -6.473 | -6.473 | -6.474 | -6.474 |
| **Midwest** | -3.676 | -3.676 | **-3.119** | **-3.029** |
| **Mountain** | -2.387 | **-1.744** | -2.387 | -2.387 |
| **North East** | -3.582 | -3.583 | -3.583 | -3.583 |
| **Pacific** | -8.226 | -8.226 | -8.225 | -8.225 |
| **South Central** | -4.768 | -4.768 | -4.768 | -4.768 |
| **South** | -8.947 | -8.947 | -8.946 | -8.947 |
| **Total (USA)** | -38.0600 | -38.0596 | -38.0601 | -38.0604 |

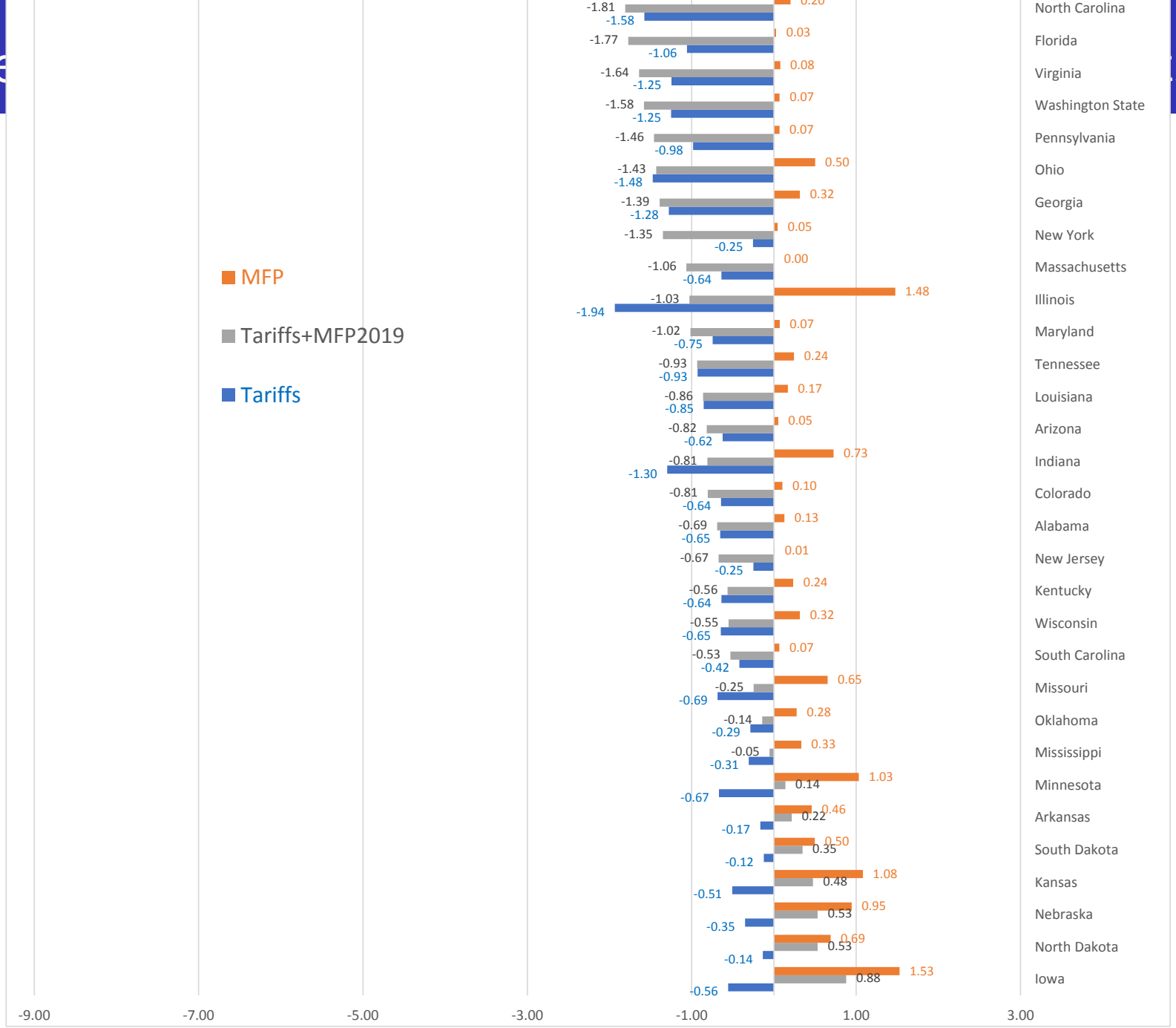
# Trade-war plus MFP (CARD APR paper for full results):

| State | Benchmark Private Consumption ($B) | Welfare Impacts: Tariff Scenario ($B) | Welfare Impacts: Tariff+MFP Scenario ($B) | MFP payments ($B) | Net MFP payments ($B) | Allocated Tariff Revenue ($B) |
|---|---|---|---|---|---|---|
| California | 1690.3 | -6.2548 | -8.2391 | 0.1060 | -1.9312 | 4.1602 |
| Colorado | 229.3 | -0.6426 | -0.8056 | 0.1030 | -0.1580 | 0.5329 |
| Florida | 801.0 | -1.0583 | -1.7731 | 0.0270 | -0.6949 | 1.4742 |
| Georgia | 359.5 | -1.2797 | -1.3914 | 0.3160 | -0.1074 | 0.8646 |
| Iowa | 110.3 | **-0.5576** | **0.8785** | 1.5280 | 1.3970 | 0.2676 |
| Illinois | 535.1 | -1.9359 | -1.0287 | 1.4760 | 0.8832 | 1.2106 |
| Indiana | 226.4 | -1.2994 | -0.8099 | 0.7260 | 0.4745 | 0.5136 |
| Kansas | 102.1 | **-0.5082** | **0.4752** | 1.0820 | 0.9578 | 0.2535 |
| Michigan | 375.4 | -1.7651 | -1.8863 | 0.2450 | -0.1194 | 0.7442 |
| Minnesota | 252.4 | **-0.6674** | **0.1403** | 1.0330 | 0.7849 | 0.5066 |
| Missouri | 218.9 | -0.6863 | -0.2464 | 0.6530 | 0.4284 | 0.4586 |
| Montana | 40.8 | **-0.0500** | **0.0462** | 0.1290 | 0.0934 | 0.0726 |
| North Dakota | 33.5 | **-0.1358** | **0.5320** | 0.6910 | 0.6501 | 0.0835 |
| Nebraska | 72.7 | **-0.3512** | **0.5318** | 0.9460 | 0.8595 | 0.1767 |
| New York | 931.9 | -0.2540 | -1.3511 | 0.0460 | -1.0693 | 2.2776 |
| Ohio | 435.9 | -1.4759 | -1.4338 | 0.5010 | 0.0392 | 0.9431 |
| Pennsylvania | 517.0 | -0.9825 | -1.4599 | 0.0670 | -0.4666 | 1.0897 |
| South Dakota | 35.7 | **-0.1238** | **0.3475** | 0.4970 | 0.4590 | 0.0777 |
| Texas | 1003.7 | -4.3121 | -4.1998 | 1.2970 | 0.1081 | 2.4278 |
| Virginia | 363.2 | -1.2464 | -1.6409 | 0.0770 | -0.3818 | 0.9369 |
| Vermont | 27.3 | **0.0026** | **-0.0195** | 0.0020 | -0.0216 | 0.0482 |
| Washington | 310.2 | -1.2512 | -1.5817 | 0.0690 | -0.3210 | 0.7964 |
| Wisconsin | 217.3 | -0.6472 | -0.5518 | 0.3160 | 0.0919 | 0.4576 |
| **USA** | **12756.4** | **-38.137** | **-38.129** | **14.338** | **0.000** | **29.280** |

# Trade-war plus MFP (CARD APR paper for full results):



# Trade ... s):


MFP
Tariffs+MFP2019
Tariffs
-9.00
-7.00
-5.00
-3.00
-1.00
1.00
3.00
North Carolina -1.81 -1.58 0.20
Florida -1.77 -1.06 0.03
Virginia -1.64 -1.25 0.08
Washington State -1.58 -1.25 0.07
Pennsylvania -1.46 -0.98 0.07
Ohio -1.43 -1.48 0.50
Georgia -1.39 -1.28 0.32
New York -1.35 -0.25 0.05
Massachusetts -1.06 -0.64 0.00
Illinois -1.03 -1.94 1.48
Maryland -1.02 -0.75 0.07
Tennessee -0.93 -0.93 0.24
Louisiana -0.86 -0.85 0.17
Arizona -0.82 -0.62 0.05
Indiana -0.81 -1.30 0.73
Colorado -0.81 -0.64 0.10
Alabama -0.69 -0.65 0.13
New Jersey -0.67 -0.25 0.01
Kentucky -0.56 -0.64 0.24
Wisconsin -0.55 -0.65 0.32
South Carolina -0.53 -0.42 0.07
Missouri -0.25 -0.69 0.65
Oklahoma -0.14 -0.29 0.28
Mississippi -0.05 -0.31 0.33
Minnesota 0.14 -0.67 1.03
Arkansas 0.22 -0.17 0.46
South Dakota 0.35 -0.12 0.50
Kansas 0.48 -0.51 1.08
Nebraska 0.53 -0.35 0.95
North Dakota 0.53 -0.14 0.69
Iowa 0.88 -0.56 1.53

# COVID-19: China Regional Model

- Tom's Regional GAMS Model (MRIO data 30x30)
  Mi, Meng, Guan, Shan, Song, Wei, Liu, and Hubacek (2017) DOI: 10.1038/s41467-017-01820-w
- CARD database on Chinese economic activity
  different indexes monthly/bi-weekly/weekly (Nov. 2019 to March. 2020)
  Xi He (ISU), Wendong Zhang (ISU), and Tao Xiong (Huazhong Ag University).
- Research question: Conditional on the structure, what are the shocks (size, persistence, and propagation) needed to match snap-shot observables?
  - provincial labor shocks
  - terms-of-trade
  - ???