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## **Trade Effects on Agricultural Labor: Implications of CETA for U.S. Agricultural Exports**

**Caitlyn Carrico and Marinos Tsigas**

*Selected Paper prepared for presentation at the EAAE XV Congress, "Toward Sustainable Agri-Food Systems: Balancing between Markets and Society", August 29 – September 1, 2017 in Parma, Italy.*

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# Trade Effects on Agricultural Labor: Implications of CETA for U.S. Agricultural Exports

Caitlyn Carrico and Marinos Tsigas

*IATRC Symposium: CETA, Food Safety Standards, and  
Environmental Standards*  
XV EAAE Congress

1 September 2017

Disclaimer: This research presents hypothetical scenarios and represents the authors' personal analysis. The research presented and the authors' analysis should not be taken as the viewpoints of prior or present employers.

# Key Questions

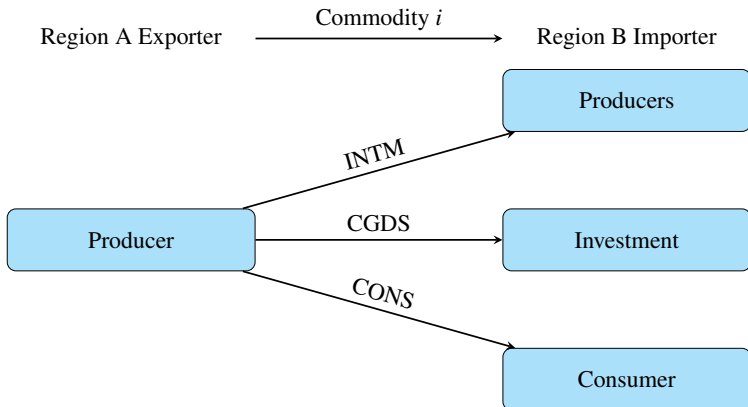
1. How does international trade affect workers ?
  - ◇ employment and wage effects
2. What framework to analyze these questions ?
  - ◇ multi-regional input-output (MRIO) framework
3. What insights can be gained from occupational distinction ?
  - ◇ distribution effects of trade across workers
4. How do trade shocks affect agricultural workers ?
  - ◇ CETA: effects of ag exports from US to Canada

## Contributions

- Popular media has highlighted a backlash against trade
- Economic literature has shown nuanced implications of trade for labor
  - ◇ wage/emp effects Chinese import competition (Autor, Dorn, and Hanson 2013)
  - ◇ stronger effects at low end of wage distribution (Autor, Dorn, Hanson, and Song 2014)
  - ◇ sectoral, regional effects (Caliendo, Dvorking, and Parro 2015)
- Depart from typical dialogue on implications of import competition for manufacturing
- Examine distributional effects of trade across occupations in supply chain analysis with a focus on trade shocks in agricultural markets and on agricultural workers

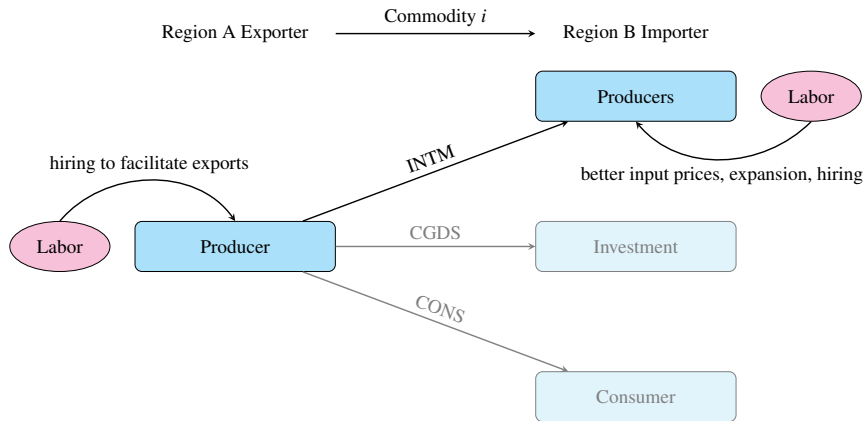
# Trade in MRIO Framework

direct cross-border linkages between suppliers and purchasing agents  
distinction between trade flows for each purchaser



# Labor in MRIO Framework

labor affected through supplying and purchasing producers



# Detailed U.S. Labor Statistics by Industry and Occupation

Carrico and Tsigas (*Economic Modelling* 2014)

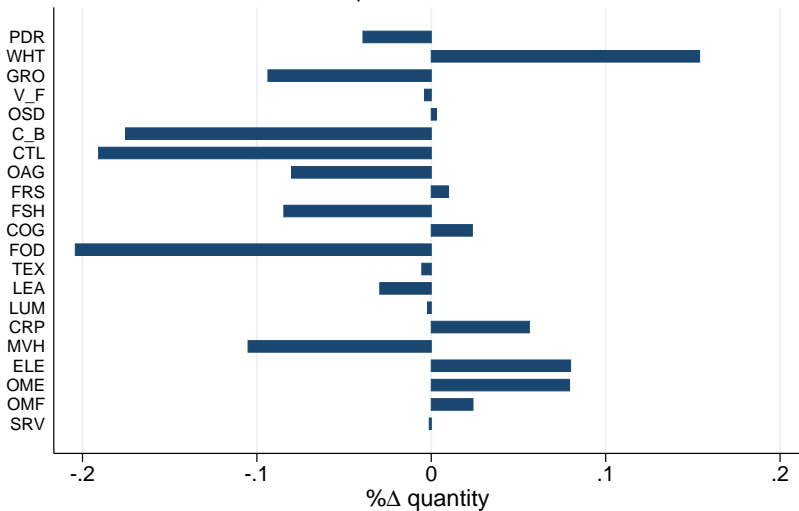
- US BLS Occupational Employment Statistics (OES) Survey
  - ◇ manufacturing and service sectors (NAICS)
  - ◇ non-farm establishments
  - ◇ number of employees, annual wages
- USDA 2007 Census of Agriculture
  - ◇ number of farm operators and hired workers
  - ◇ hired labor wages from farm production expenditure
  - ◇ operator wages from OES
- Compute wagebill from OES and USDA data
- Apply occupational shares by industry to U.S. wagebill in GTAP Data Base v9 (global trade, IO and national account statistics)



# Illustrative Scenario: Comprehensive Economic and Trade Agreement

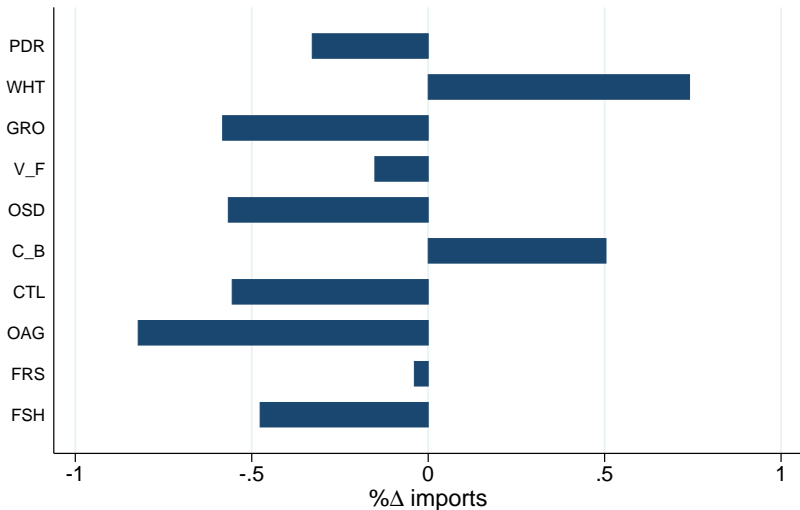
- CETA
  - Canada-EU trade agreement
  - Canada signed Oct. 2016, EU ratified Feb. 2017, awaiting national approvals
- Tariff removal on merchandise trade between Canada and the EU
  - GTAP Supply Chain Model: direct supplier-purchaser linkages following MRIO structure
  - Simplified scenario to illustrate MRIO linkages: excludes reductions in non-tariff barriers
- Closure - modelling assumption
  - Fixed labor supply (no unemployment)
  - Labor reallocation between sectors
  - Economy-wide wage effects

## U.S. Production by Sector expansion in Wheat



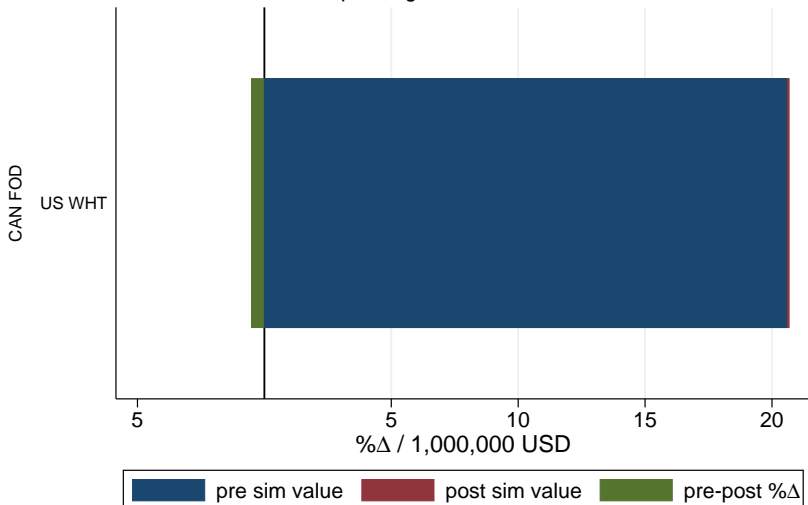
## Imports to Canada from U.S. by Agricultural Commodity

increased demand for U.S. Wheat



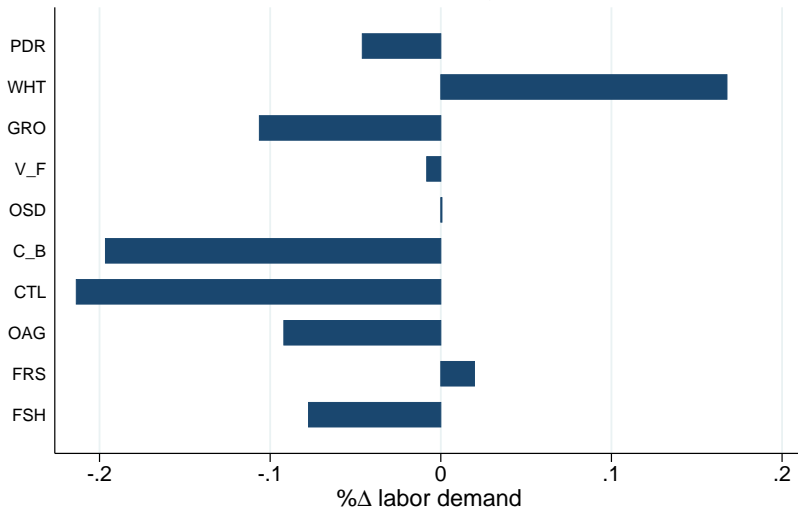
## Canadian Industry Demand for U.S. Wheat

demand from expanding Canadian Processed Food sector



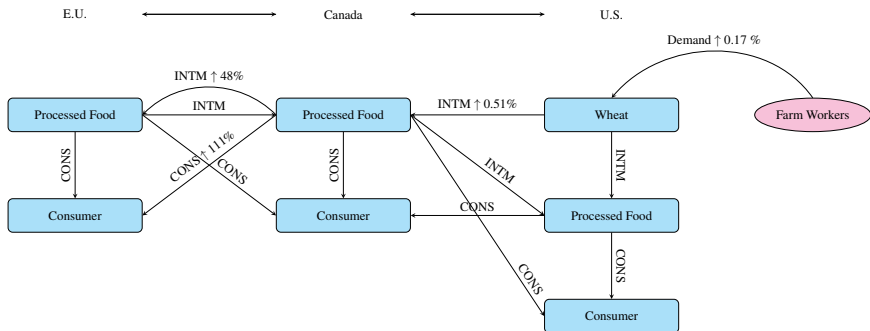
## U.S. Demand for Farm Workers

increased demand in Wheat sector, decreases elsewhere



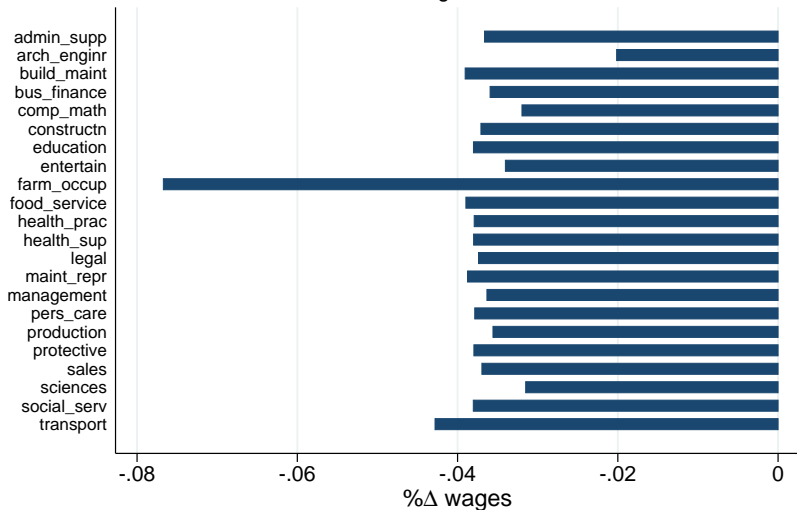
# Supply Chain Effects

increasing demand for farm workers as wheat exports rise



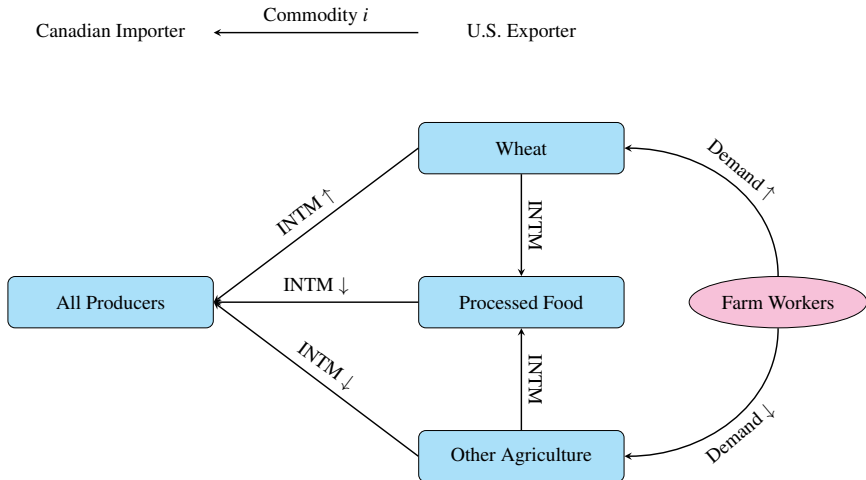
## U.S. Wages by Occupation

farm workers wages decline the most



# Wage Effects

main employers (other ag sectors) contract  
fixed labor supply - flooded market - wages decline





# Labor Review

- Labor in the supply chain: changes in labor demand
  - U.S. Wheat production expands with increasing exports to Canada
  - U.S. Wheat sector increases demand for Farm Workers
- U.S.-wide labor market effects: national wages
  - general wage decreases as economy-wide demand decreases with widespread sectoral contraction
  - wages for Farm Workers decrease the most as predominantly hired by contracting sectors

## Conclusion

- Globalization (trade) backlash in popular media
- Economic literature finds nuanced effects of trade across workers/regions and over time, with focus on manufacturing
- This paper explores effects of CETA on U.S. agricultural labor
  - MRIO framework
  - 22 U.S. labor occupations - Farm Workers broken out
- Supply chain effects: increased hiring of Farm Workers by expanding U.S. Wheat sector
- Economy-wide effects: overall, U.S. Farm Workers wages decline relatively more



OCCU	Occupational Description
Management	Management occupations
Bus_finance	Business and financial operations occupations
Comp_math	Computer and mathematical occupations
Arch_enginr	Architecture and engineering occupations
Sciences	Life, physical, and social science occupations
social_serv	Community and social services occupations
Legal	Legal occupations
Education	Education, training, and library occupations
Entertain	Arts, design, entertainment, sports, and media occupations
Health_prac	Healthcare practitioners and technical occupations
Health_sup	Healthcare support occupations
Protective	Protective service occupations
Food_service	Food preparation and serving related occupations
Build_maint	Building and grounds cleaning and maintenance occupations
Pers_care	Personal care and service occupations
Sales	Sales and related occupations
Admin_supp	Office and administrative support occupations
Farm_occup	Farming, fishing, and forestry occupations
Constructn	Construction and extraction occupations
Maint_repr	Installation, maintenance, and repair occupations
Production	Production occupations
Transport	Transportation and material moving occupations

## Education and Earnings by Occupation

