Economic impact of Foot and Mouth Disease Outbreak in the Midwestern US: the trade implication

Work in progress

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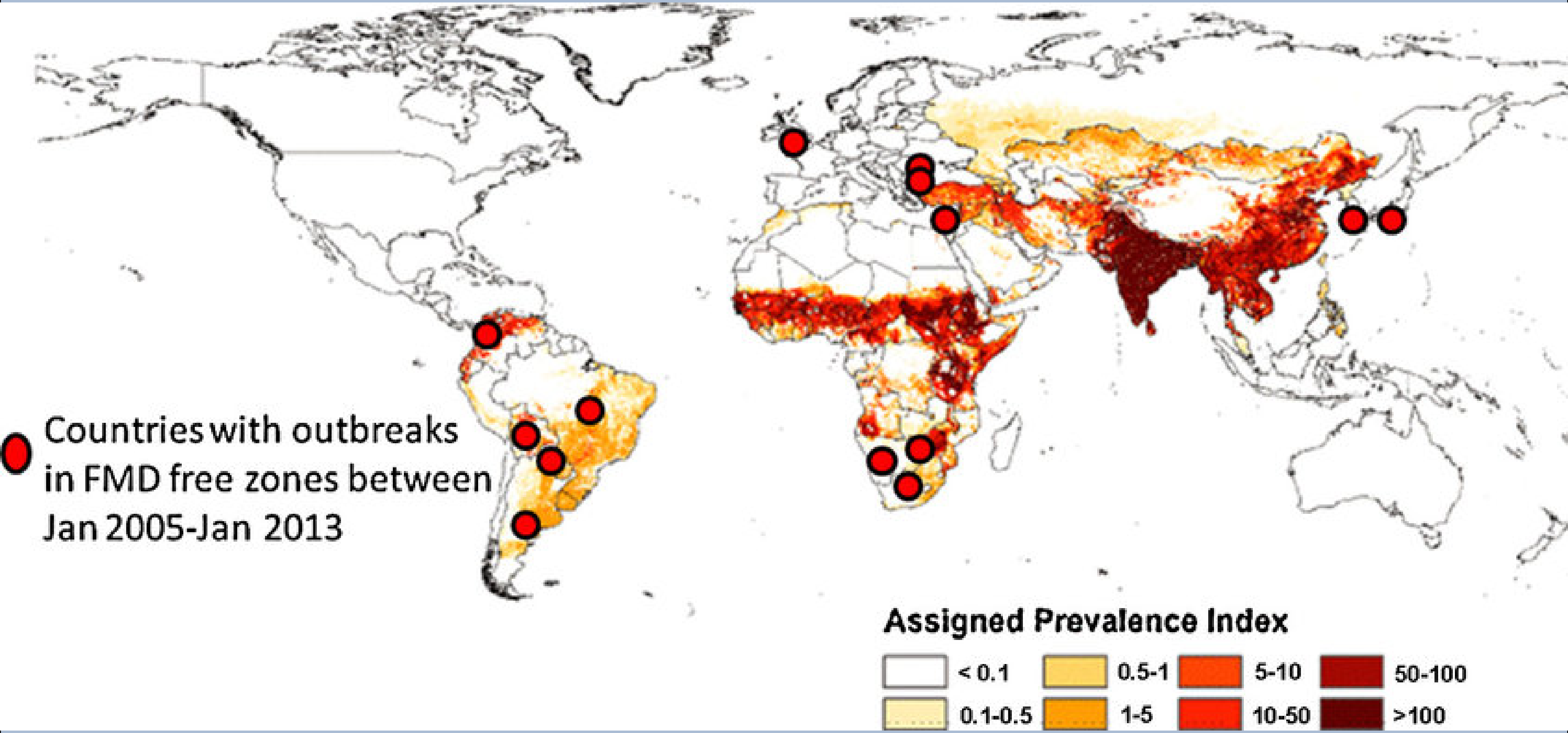
FMD Facts

FMD Outbreaks

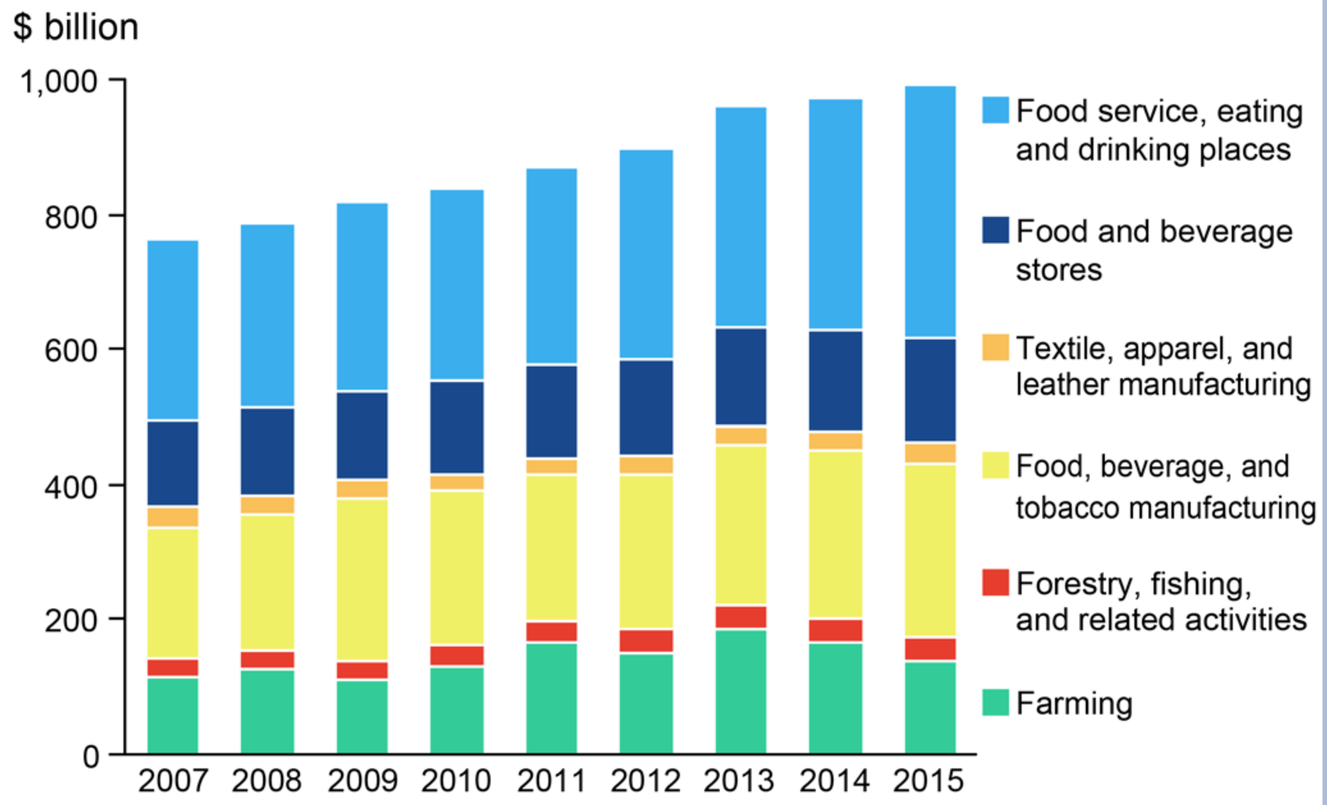


T.J.D. Knight-Jones and J. Rushton (2013)

US Livestock Production: Background

- US is a net exporter of food
- 1/3 of US beef goes to Mexico & Canada
- Many US states report livestock production
- US livestock production is economically significant

Value added to GDP by agriculture, food, and related industries, 2007-15



Note: GDP refers to gross domestic product.
Source: USDA, Economic Research Service using data from U.S. Department of Commerce, Bureau of Economic Analysis, *Value Added by Industry* series.

Measuring the impacts

What happens to domestic production when an FMD outbreak occurs?

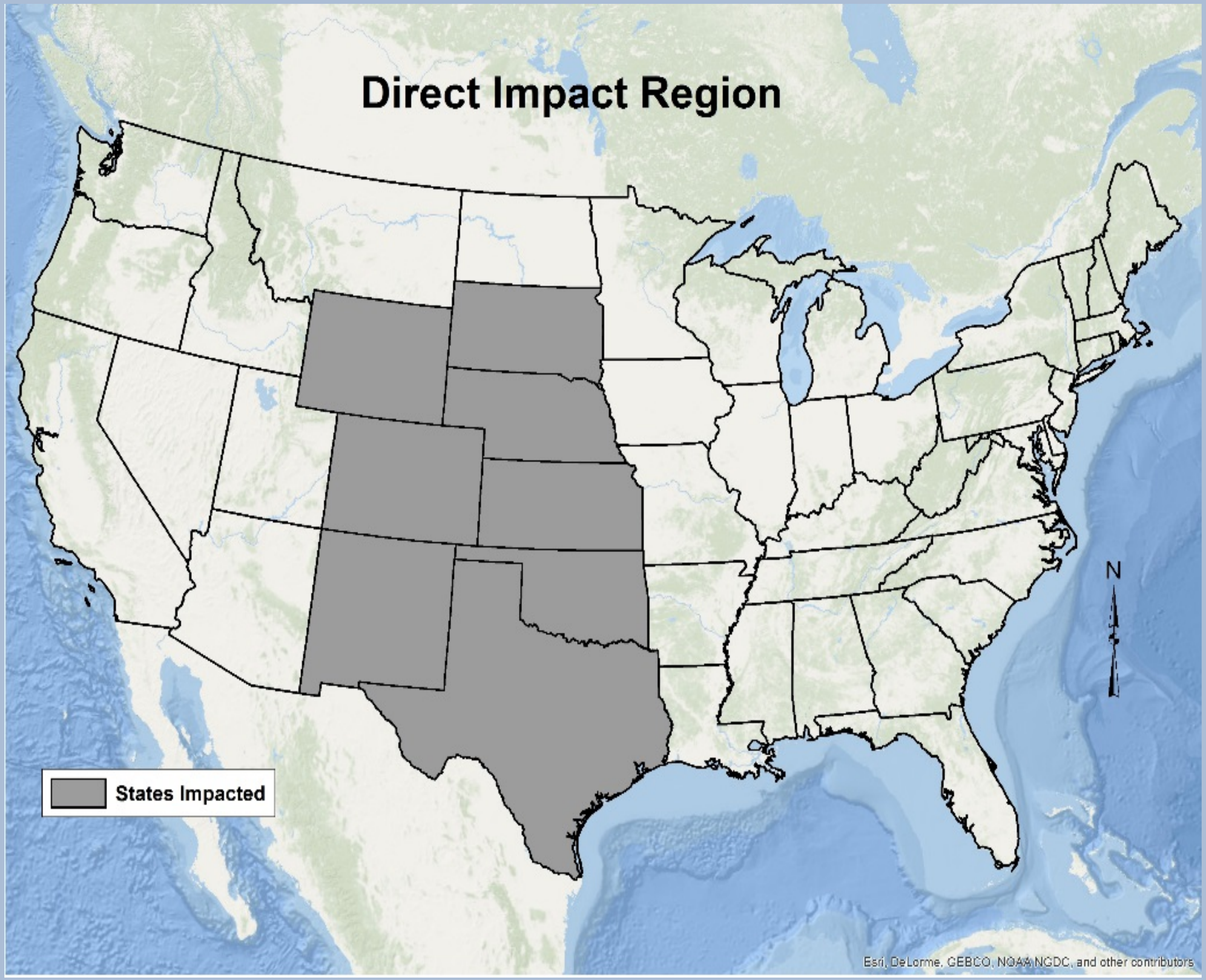
- Several studies have examined this including Schroeder et al. (2015), Lee et al. (2012), Hagerman et al. (2012), Elbakidze et al. (2009) and Pendell et al. (2007)

What are the implications for the macroeconomy?

- Impacts to employment, prices, taxes, revenue, etc., in a specific region or all of the US.

					Indirect impacts	
Author	**Study Region**	**Modeling Software**	**Direct Impacts (millions)**	**Control Costs (millions)**	**Revenue (millions)**	**Jobs (thousands)**
Miller *et al.*, 2018	Kansas, Nebraska, Colorado, South Dakota, Wyoming, northern Oklahoma, panhandle of Texas, northern New Mexico	REMI			$12,000-47,000	172 - 685
Schroeder *et al.*, 2015	Kansas, Nebraska, Colorado, South Dakota, Wyoming, northern Oklahoma, panhandle of Texas, northern New Mexico	NAADSM	$16,000-188,000	$20-14,000		
Lee *et al.*, 2012	South San Joaquin Valley, California	NIEMO	$8,000-12,000		$23,000-34,000	
Ekboir, 1999	California				$6,800-13,500	
Elbakidze *et al.*, 2009	Panhandle of Texas	AusSpread	$600-1,000			
Pendell *et al.*, 2007	Southwest Kansas	NAADSM			$50-1,300	
Bates *et al.*, 2003	3 counties in California		$61-551			
Schoenbaum & Disney, 2003	South central U.S., north central U.S., western U.S.	Delphi 4.0	$260-3,270			
Oladosu *et al.*, 2013	3 cases evaluated: South San Joaquin Valley, CA; 8% of livestock affected; 30% of livestock affected	IMPLAN	$37,000-228,000			

Impacted Region



FMD response

- Stamping out
  - Still the emphatic preference of veterinarians surveyed
    - 3 month restrictions for trade resumption
- Vaccinate to die
  - Vaccine use may limit spread, may be necessary for containment
    - 3 month restriction for trade resumption
- Vaccinate to live
  - Vaccinated livestock enters food chain
  - Consumer preferences
  - Capacity issues for disposal
  - Regionalization of trade during outbreaks
    - 6 month restriction for trade resumption

Modeling Assumptions

- Choices were made to assure lower bound estimates
- Quarterly vs Annually
- Splitting the livestock output impacts:
  - 80% first year and 20% second year
- Government spending exogenous: emergency funds or reallocation of funds
- Consumer surplus->

  Consumer price for food and nonalcoholic beverages purchased for of-premises consumption

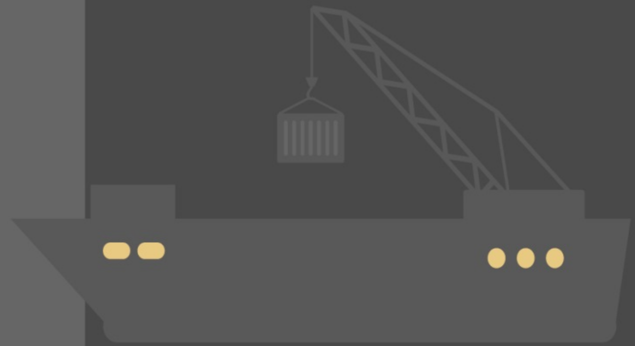
Trade effects

- Live animals completely banned.
- Livestock products trade ban varies
- US, Japan, European Union most strict

U.S. Agricultural Exports, FY 2016

United States Department of Agriculture
Foreign Agricultural Service

USDA



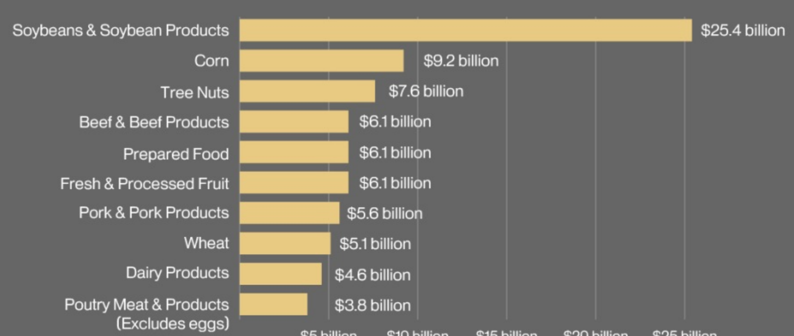
$129.7 Billion

Total value of U.S. agricultural exports in FY 2016, surpassing USDA's forecast.

$1 Trillion

Total value of U.S. agricultural exports between FY 2009 and FY 2016 - the strongest period for U.S. ag exports in history.

Top Products



Top Destinations

1 Canada
$20.3 billion
15.7% of total ag exports

2 China
$19.2 billion
14.8% of total ag exports

3 Mexico
$17.7 billion
13.6% of total ag exports

4 European Union
$11.6 billion
9.0% of total ag exports

5 Japan
$10.6 billion
8.2% of total ag exports

Twitter: **@USDAForeignAg** Website: **www.fas.usda.gov**

2018 Meat Exports

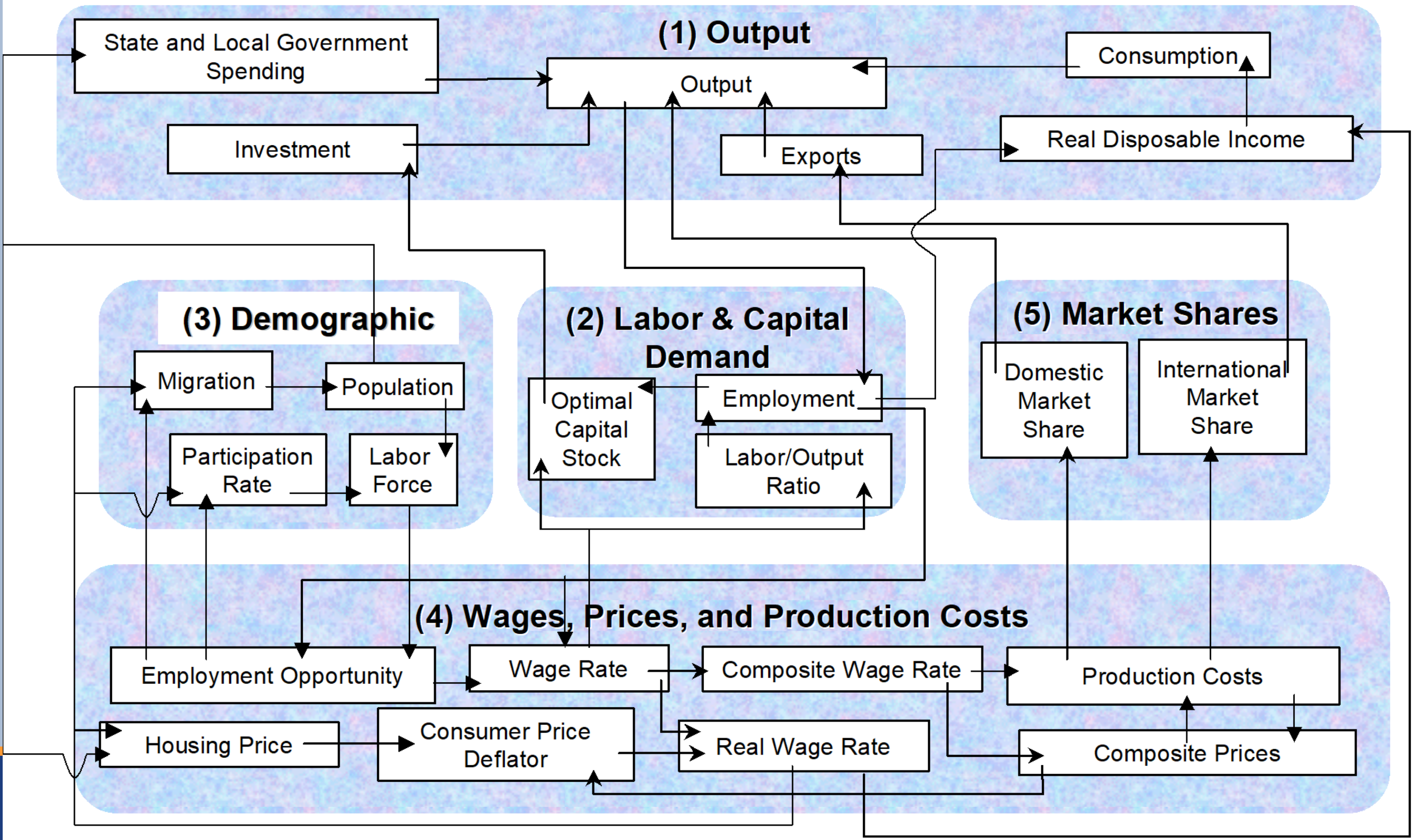
- Beef $7.3 billion, 14.7%
- Pork $4.6 billion, 16.2%
- Lamb $19.5 million

2004 national beef exports following BSE discovery in Washington fell by 81.9%, significantly more for most valuable cuts.

Policy Levers (so far)

- Production due to culling of animals
- Access to international markets
- Consumers’ reaction

REMI Model Linkages (Excluding Economic Geography Linkages)



Goal = policy recommendations

REMI strengths

- Improved forecast because of inter-industry relationships
- Substitution effects
- Time dimension not in IO

Modeling concerns

- Aggregated treatment of livestock sector
- Exogenous treatment of agricultural sector
- Annual model using quarterly impacts