

# FREIGHT POLICY TRANSPORTATION INSTITUTE



Background on the Relationship Between  
Transport and Trade  
Ken Casavant

# BACKGROUND ON THE RELATIONSHIP BETWEEN TRANSPORT AND TRADE

PRESENTATION TO THE WASHINGTON STATE  
TRANSPORTATION COMMISSION

KEN CASAVANT

*Freight Policy Transportation Institute*



# Freight Policy Transportation Institute

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## Research Team

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# We Will Talk About...

1. Transportation infrastructure and economic development
  - ▣ Factors of impact assessment
  - ▣ Bilateral trade and spillover effects
  - ▣ Spatial temporal models
2. Transportation demand as driver
  - ▣ Agricultural commodities trade
  - ▣ Freight services and modal share
  - ▣ Ports and inland waterways
3. Next research steps

# The Issue

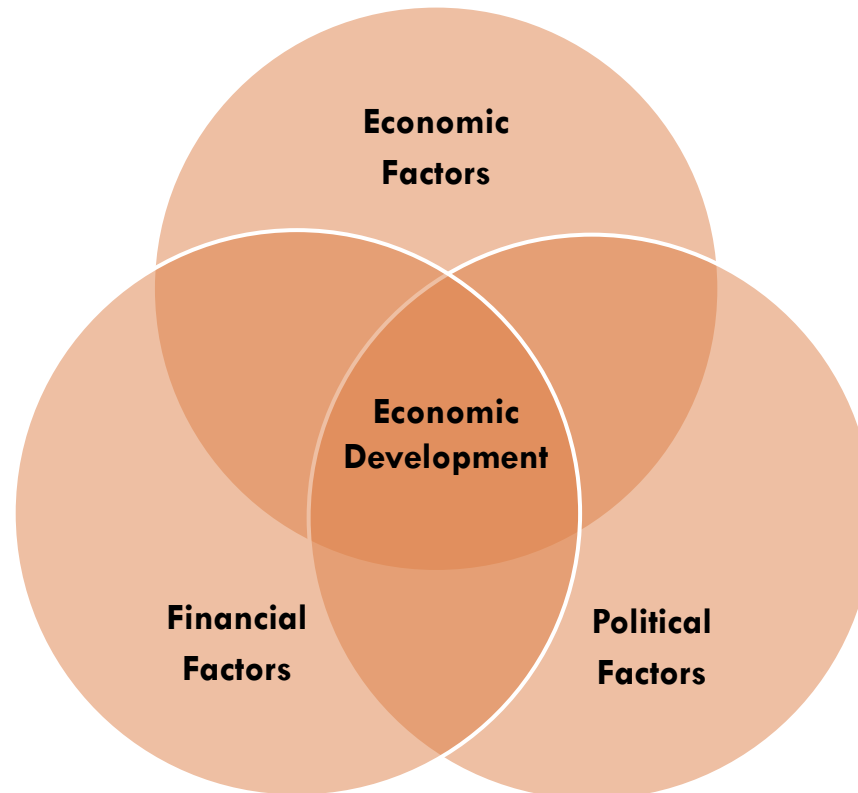
- Relationship between infrastructure and economic development is “clear” but maybe not so clear
  - *Aschauer* – 1989
  - Clark et al. – 2004
  - Easterly – 1993
- General agreement on transportation improvements, combined with political and institutional conditions is positive
  - Nadiri and Marnumes – 1994
  - Banister and Berechman – 2001
  - Istrate et al. – 2010

# The Issue (Continued)

- Expert competitiveness in trade appears related to U.S. and competitors' investments and is the subject of a state and national push
- **So: here we are in this white paper and subsequent model development**



# Transport as a Necessary but not Sufficient Condition



**Combined Effects of Economic, Financial and Political Factors**

# Infrastructure Investments and Output

## Estimates of Output Elasticity of Public Infrastructure Investments

Author(s)	Geographic Scale	Output Elasticity of Public Investment
Aschauer (1989)	National	0.39
Holtz-Eakin (1994)	National	0.39
Munnell (1990)	National	0.34
Costa et al. (1987)	States	0.20
Eisner (1991)	States	0.17
Mera (1973)	Regional	0.20
Duffy-Deno and Eberts (1991)	Urban Areas	0.08
Eberts and Fogerty (1987)	Urban Areas	0.03

- ❑ But, causality is still ambiguous
- ❑ Scale and scope of investment affects findings



# Bilateral Trade and Spillover Effects

- Simultaneous changes in bilateral trade
  - ▣ Liberalization and technological investments is muddied by spillover effects
  - ▣ Studies show port efficiencies have largest impact on bilateral trade flows



# Bilateral Trade and Spillover Effects (Continued)

- Deteriorating infrastructure affects trade
  - -3 elasticity of trade cost and flow
  - 12% increase in transport costs reduced trade volume by 28%



# Spatial Temporal Models

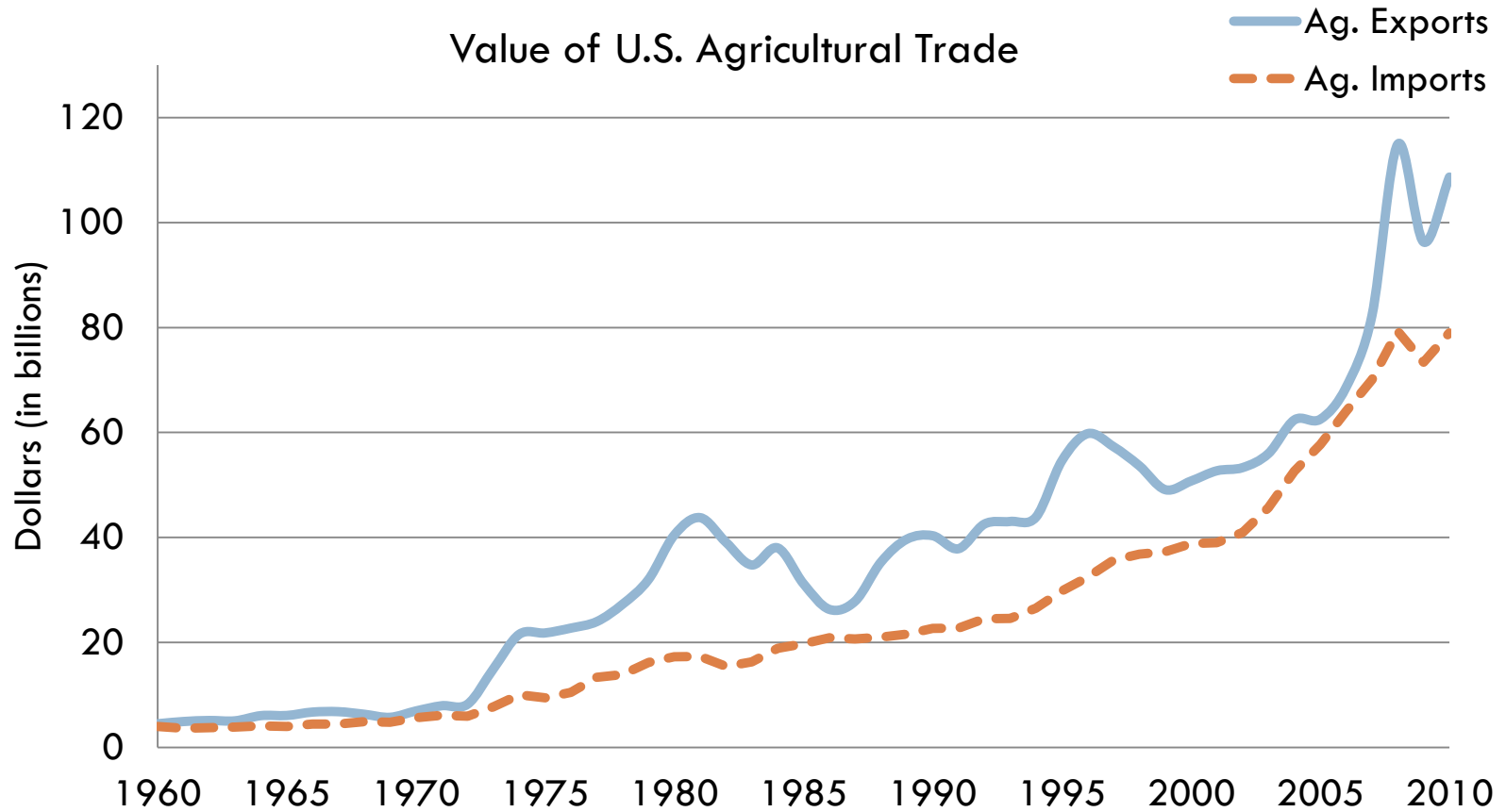
- A whole host of spatial equilibrium models at regional and international levels
- Grain trade and domestic transportation improvements have received most attention
  - Samuelson – 1952
  - Fuller et al. – 2001
  - Fellini et al. – 2001
  - Costa and Parr – 2007



# Spatial Temporal Models (Continued)

- Combines production and transportation costs
- Focus on export volume, prices and producer revenue
- *Ex ante vs. ex poste*
- Studies look at spatial location of improvement –
  - ▣ U.S. vs. competitors
  - ▣ Processors vs. producers
  - ▣ Differing improvements by mode

# Demand and Needs Explosion



# Export Importance by Food Groups

## Export Share of Production for Selected Agricultural Commodities and Totals

Commodity	1988	1989	1990	1991	1992	1993	1994	1995	1996	Avg.
	Percent									
Primary crops	25.8	27	28.4	31.9	27.2	28.7	26.4	30.4	31.1	28.5
Meat & Livestock	7.4	8.6	8.6	8.1	7.6	9.2	9.2	9.6	11.3	8.8
Total agriculture	15.9	16.3	16.9	18.1	17.2	18.2	17.6	20.2	21.4	18.0

# Export Share by Commodity

## Export Share of Production for U.S. Major Agricultural Commodities

Commodity	1988	1989	1990	1991	1992	1993	1994	1995	1996	Avg.
	Percent									
Beef & Veal	2.1	3.4	3.5	3.7	4.3	4.1	4.9	5.1	5.4	4.1
Poultry	4.3	4.5	5.7	5.9	7.1	8.3	11.1	14.5	17.0	8.7
Pork	0.1	0.1	0.1	0.1	0.1	0.1	0.2	0.3	0.3	0.2
Oranges	5.0	5.0	6.2	3.8	7.0	7.2	5.7	6.4	5.2	5.7
Grapefruit	5.0	5.4	6.7	10.6	10.7	9.2	8.5	8.5	9.1	8.2
Apples	6.2	6.2	8.0	8.5	12.1	10.3	13.8	12.9	12	10.0
Grapes	9.7	8.8	5.6	8.9	8.9	8.1	8.5	9.0	9.3	8.5

# Export Share by Commodity (Continued)

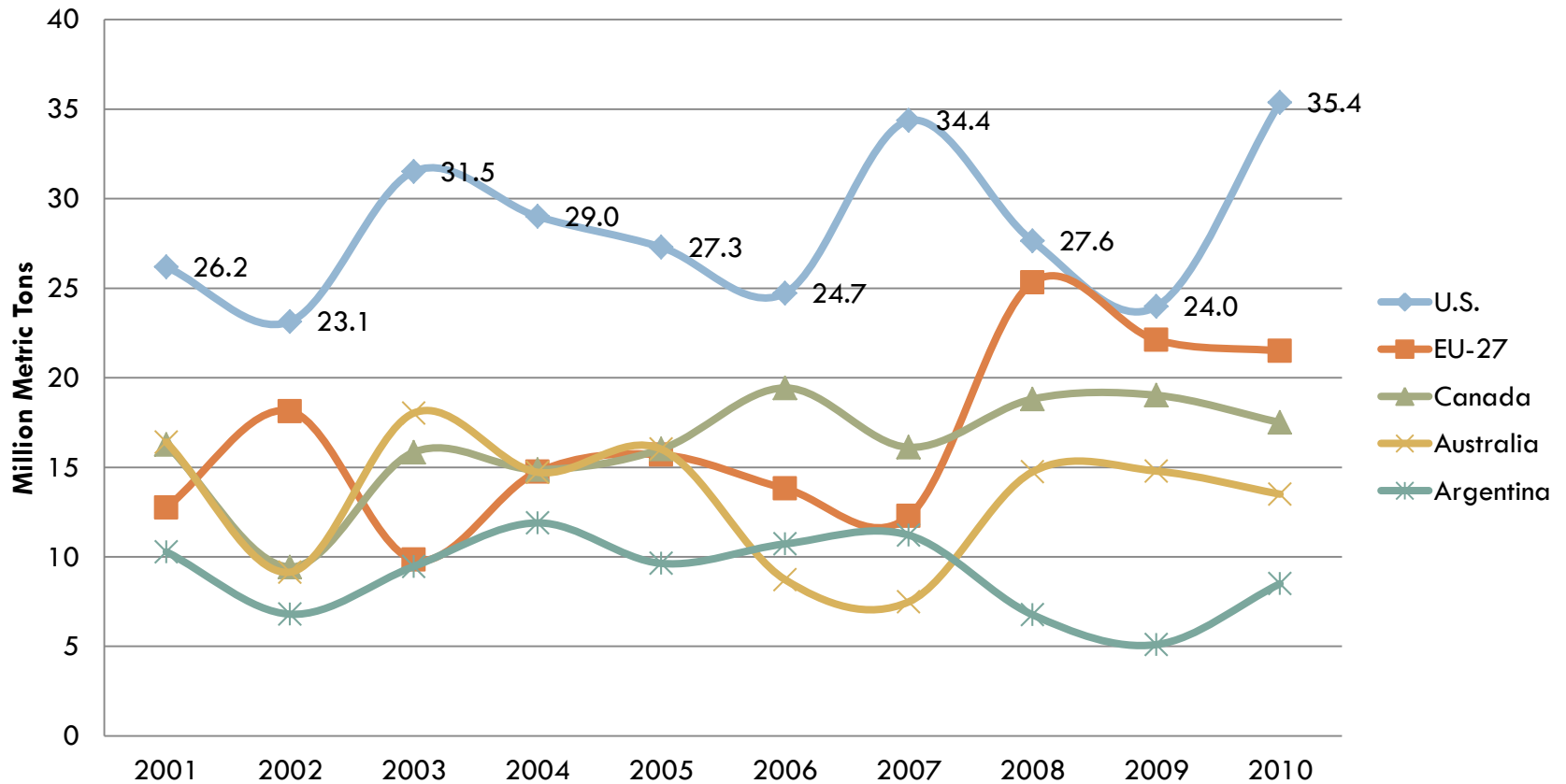
## Export Share of Production for U.S. Major Agricultural Commodities

Commodity	1988	1989	1990	1991	1992	1993	1994	1995	1996	Avg.
	Percent									
Almonds	51.6	57.3	66.2	71.7	71.6	80.8	67.7	81.8	97.1	71.8
Corn	22.3	27.5	29.0	22.6	20.3	19.4	17.1	24.6	24.4	23.0
Wheat	55.8	58.4	46.8	41.1	53.1	54.9	48.5	49.5	53.5	51.3
Rice	45.5	57.2	49.0	46.4	45.4	50.9	43.2	58.2	48.1	49.3
Sorghum	29.5	39.6	34.1	35.0	43.5	34.8	31.2	35.6	36.5	35.5
Soybeans	37.3	31.0	33.9	30.3	34.8	34.4	30.8	36.2	35.3	33.8
Sunfl. seeds	20.3	9.4	11.2	8.9	7.2	6.0	6.1	11.6	10.7	10.2



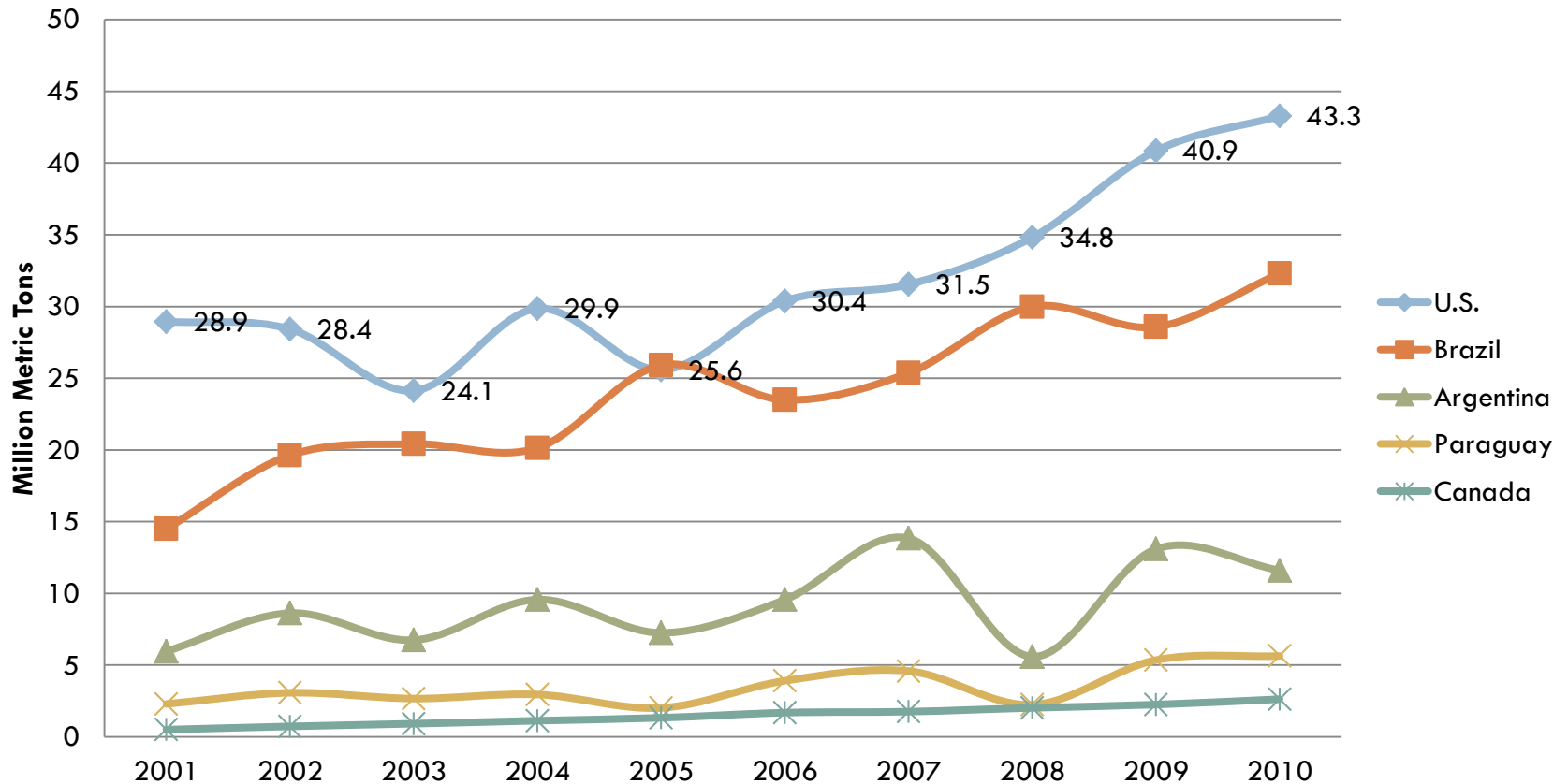
# Competitive Countries for Wheat

## Top 5 Wheat Exporting Countries by Volume



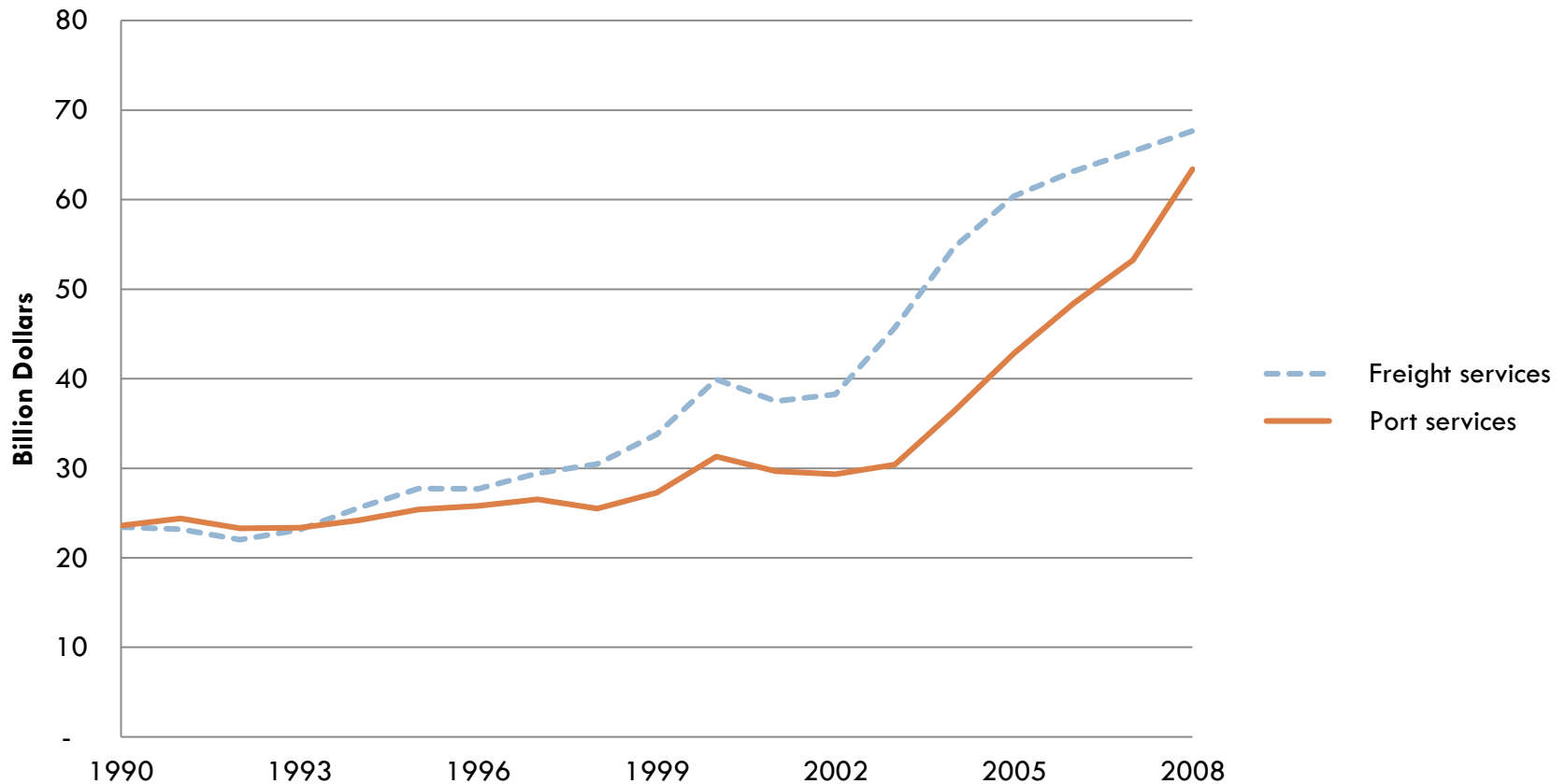
# Competitive Countries for Soybeans

## Top 5 Soybean Exporting Countries by Volume



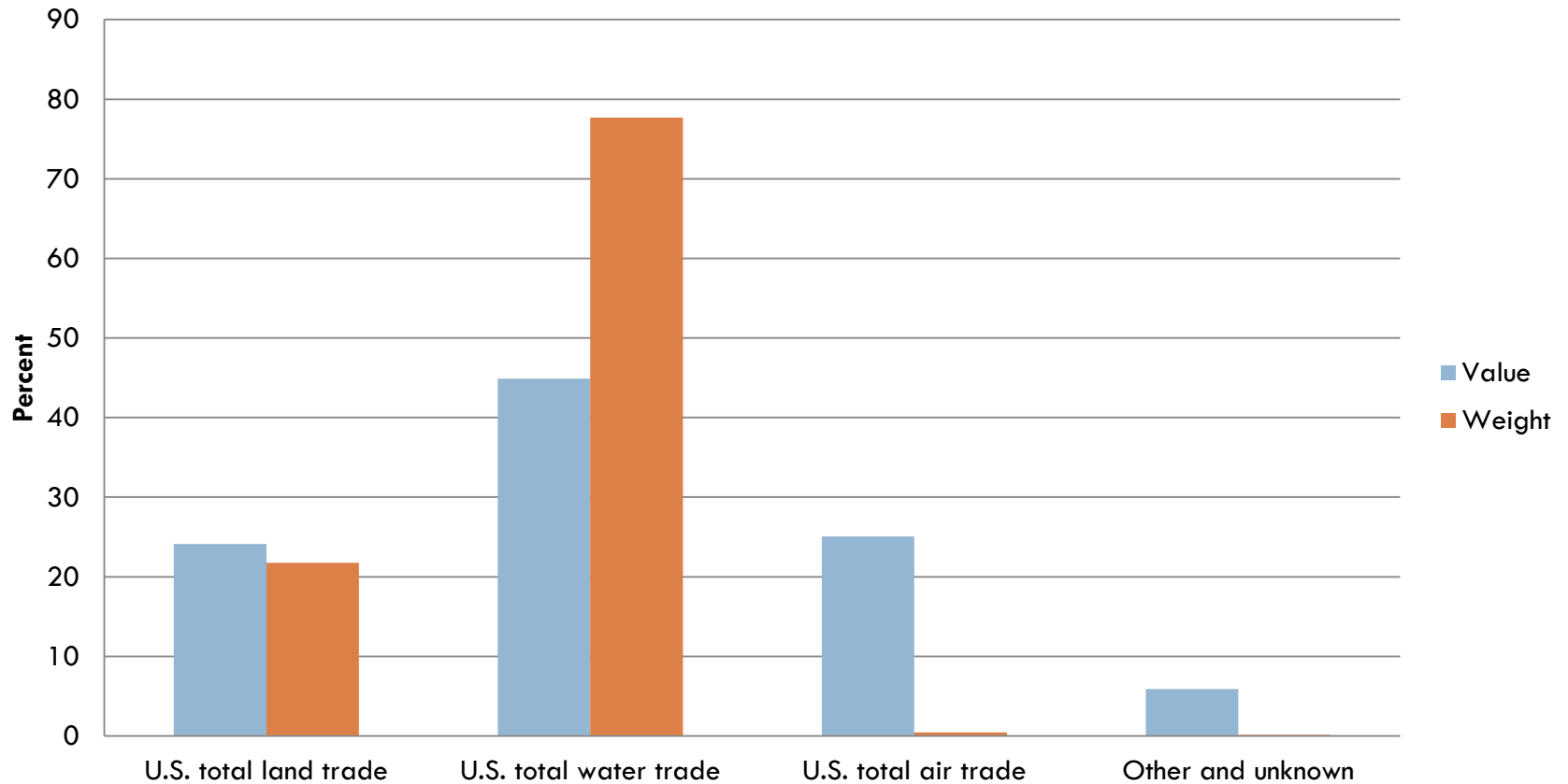
# Demand for Freight and Port Investments

## U.S. International Freight and Port Services Trade



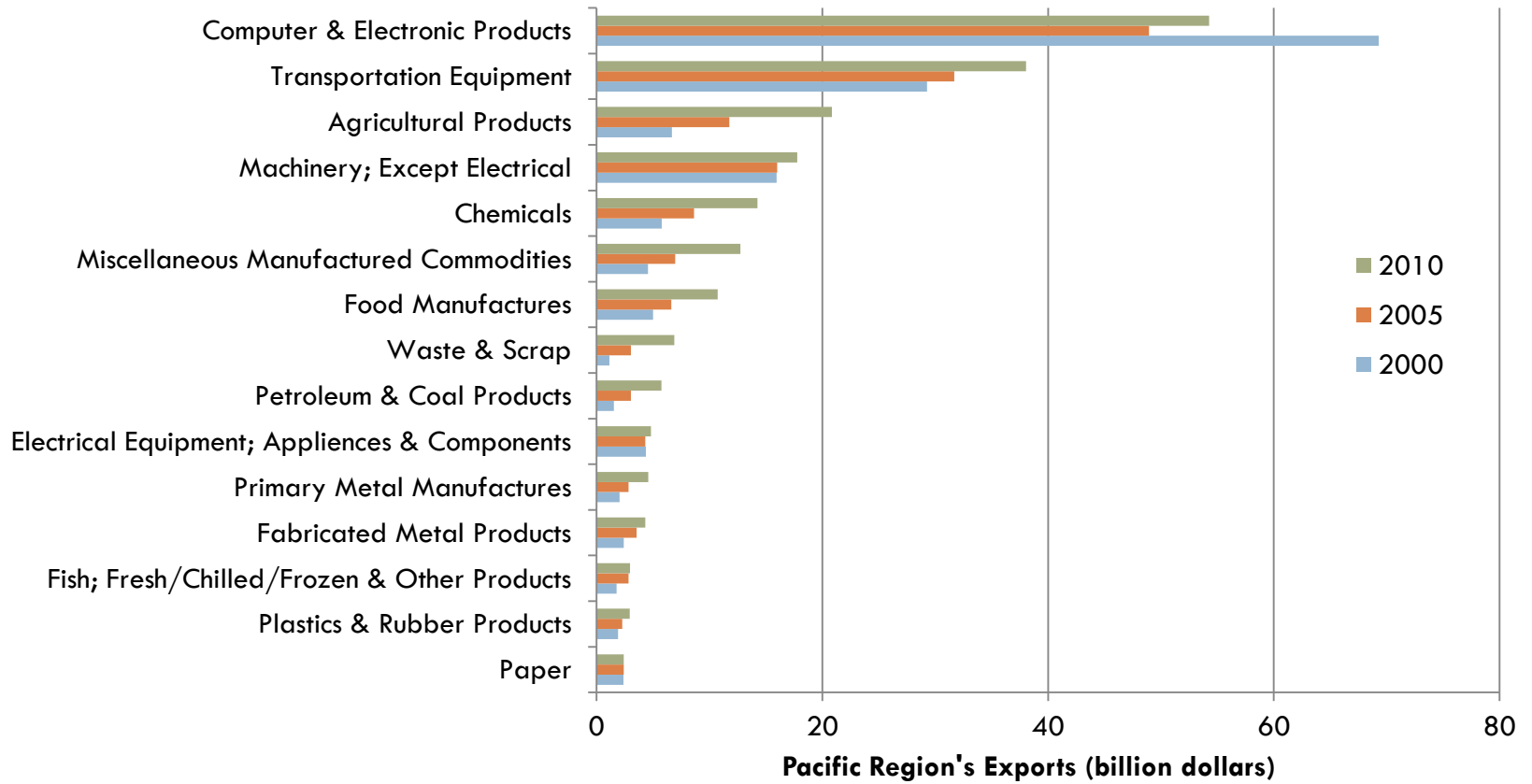
# Who Buys Our Exports?

**Modal Share of U.S. Merchandise Trade**



# What Are We Selling and What is Changing?

**U.S. Pacific Region's Export Product Profile for Top 15 Categories**



# Findings

- Ill defined relationship between trade and transportation
- Studies support investment
- Demand is and is hoped to be increasing
- Spatial equilibrium computable model will be developed



# Questions?

Check out the  
Freight Policy  
Transportation  
Institute's  
website!

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