Working Towards Regional Collaboration on Economic Development: A Midwest US Perspective

Geoffrey J.D. Hewings

Director

Regional Economics Applications Laboratory
University of Illinois
Institute of Government and Public Affairs
217.333.4740 217.244.9339 (fax)
hewings@uiuc.edu
www.real.uiuc.edu

Support provided by the Institute for Work & Economy is gratefully acknoweldged

R | E | A | L

Modeling the Midwest Economy

- REAL has developed a portfolio of models:
- (1) Econometric Input-Output Impact and Forecasting Models (annual forecasts through 2040)
  - 6-region (WI, IL, IN, OH, MI and Rest of US)
  - 2-region (5 Midwest states and Rest of US)
  - 11-region MW model
  - Individual state models
  - Chicago Metro area
- (2) Computable General Equilibrium Model
  - Chicago Metro area
  - 2-region (Midwest and Rest of the US)
- (3) Indices and Business Cycle Analysis
  - Chicago and IL metro areas
  - 5 Midwest states and US

Changes in the Midwest Economy

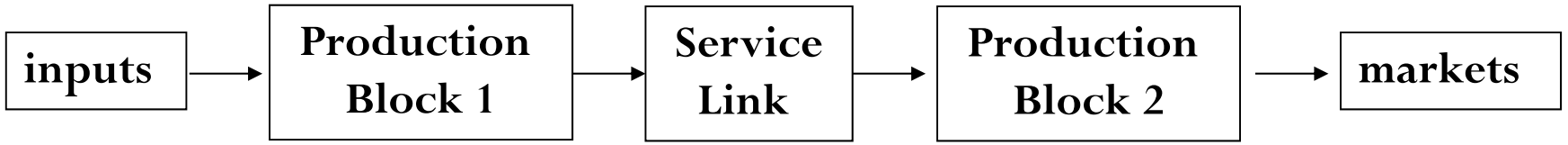
- Over the past three decades important structural changes in the US economy
  - Decreasing relative contribution of manufacturing to GNP
  - Changes in location of economic activity
  - Changes in the spatial organization of production
- Midwest has experienced greater absolute impacts from these changes
  - Impacts have not always been uniform across Midwest states
  - For example, IL became a non-manufacturing dominated state 2-3 years ahead of the US as a whole
  - States within the region becoming more ***complementary*** at the same time as more ***competitive***

Midwest Economic Structure

- Midwest characterized by
  - Significant interdependence
    - Both internal markets (i.e. within Midwest)
    - International markets – international trade dominated by exports to Canada and Mexico
  - Structural problems
  - Labor force issues
    - Net out-migration of highly endowed human capital
    - ?underinvestment in high-skill blue-collar human capital?
  - Governance issues – failure to appreciate and exploit economic interdependencies

How has the economy changed?

- Two important characteristics:
  1. Each state is **hollowing out** – typical establishment is now less dependent on sources of inputs within the state and on markets within the state ---- *ripple effects of change within the state are now smaller than 20 years ago*
  2. Structure of production is changing – fragmentation is now a characteristic of production
     - The value chain is now longer
     - Firms are organizing production to exploit economies of scale in individual plants in specialized component production and shipping to other plants to add further components



State 1 State 2

The Volume of the Midwest Trade

- Domestic trade still far more important than international trade for the Midwest states but significant share of Midwest interstate flows end up in international exports
- Dependency on the other Midwest states prominent
- Midwest export trade to other Midwest states in 2007 was $450 billion – would rank 7th in World

	($ million)			%	%	% Domesti
	Domestic	Foreign	Total	Foreign	Domestic	Midwest
IL	$399,913	$48,896	$448,809	10.89%	89.11%	32.40%
IN	$252,023	$25,956	$277,979	9.34%	90.66%	33.82%
MI	$226,875	$44,555	$271,430	16.41%	83.59%	32.29%
OH	$369,824	$42,562	$412,386	10.32%	89.68%	27.62%
WI	$172,125	$18,825	$190,950	9.86%	90.14%	33.19%

The Volume of Midwest Trade

Decomposition of international trade reveals strong Canada and NAFTA dependency

		Decomposition of International Trade, 2007					
	Total	**Canada**	**% Canada**	**Mexico**	**% Mexico**	**NAFTA**	**% NAFTA**
	$ billion	$ billion		$ billion		$ billion	
IL	$48.896	$13.471	27.55%	$3.629	7.42%	$17.100	34.97%
IN	$25.956	$10.804	**41.62%**	$2.605	10.04%	$13.409	**51.66%**
MI	$42.562	$19.796	**46.51%**	$5.206	12.23%	$25.002	**58.74%**
OH	$44.555	$25.817	**57.94%**	$2.995	6.72%	$28.812	**64.67%**
WI	$18.825	$5.896	31.32%	$1.481	7.87%	$7.377	39.19%
Midwest	$180.794	$75.784	**41.92%**	$15.916	8.80%	$91.700	**50.72%**
US	$1,148.198	$248.888	21.68%	$135.918	11.84%	$384.806	33.51%

Dependency >40% highlighted in bold

	Midwest	Percentage of US Total	Percentage of US Exports to Canada	Percentage of US Exports to Mexico	Percentage of US Exports to NAFTA
Midwest		15.75%	30.45%	11.71%	23.83%

The Costs of Interdependence

Spillover Effects of Jobs Losses in Midwest

Percentage Distribution in other states

Change in state

Impacts in

	IL	IN	MI	OH	WI	Rest of Midwest Total	RUS
IL	-	5.98%	4.70%	5.13%	3.85%	19.66%	80.34%
IN	9.36%	-	6.19%	12.00%	2.33%	29.88%	70.12%
MI	5.78%	5.73%	-	13.10%	5.06%	29.66%	70.34%
OH	4.54%	6.47%	8.24%	-	1.98%	21.24%	78.76%
WI	7.91%	3.64%	8.35%	5.00%	-	24.91%	75.09%

Midwest Trade – A Neglected Dimension

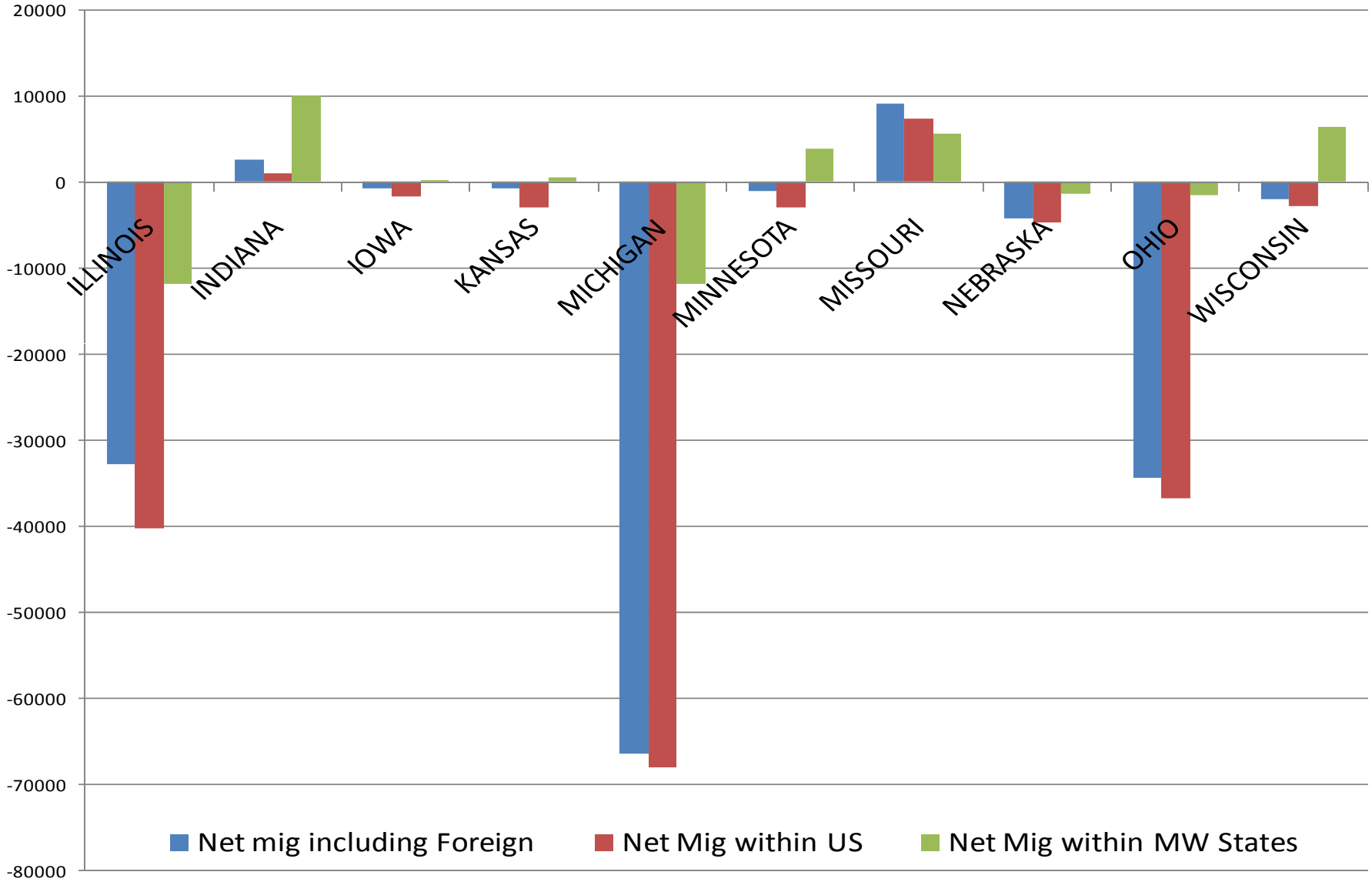
- In addition to significant trade in goods and services, there is another dimension of important trade that is rarely considered – trade in people and income
- Migration
  - Using annual IRS data, estimate state-to-state flows in people, households
  - Reveals significant role of migration
    - Responding to changes in economic opportunities (relocation for job changes) or change in status (e.g., retirement)
    - Generating economic stimuli
      - Positively – through immigration
      - Negatively – through outmigration
- Complementary set of flows of income

Trade in People (Average Annual, 1992-2006

NET-Mig wthn US	-52,978	3,820	-3,841	-4,410	-22,987	2,908	7,605	-3,003	-20,726	4,865
NET	Illinois	Indiana	Iowa	Kansas	Michigan	Minnesota	Missouri	Nebraska	Ohio	Wisconsin
Illinois	-52,978	6,875	382	125	129	1,475	2,052	26	-168	6,925
Indiana	-6,875	3,820	-110	-125	-608	264	70	-63	-1,528	224
Iowa	-382	110	-3,841	223	42	1,180	744	-219	84	420
Kansas	-125	125	-223	-4,410	34	120	1,118	-179	45	114
Michigan	-129	608	-42	-34	-22,987	444	234	-29	-641	787
Minnesota	-1,475	-264	-1,180	-120	-444	2,908	-37	-284	-212	624
Missouri	-2,052	-70	-744	-1,118	-234	16	7,605	-480	-108	-214
Nebraska	-26	49	494	179	29	284	480	-3,003	68	111
Ohio	168	1,528	-84	-45	641	212	108	-68	-20,726	181
Wisconsin	-6,925	-224	-420	-114	-787	-624	214	-136	-84	4,865
RUS	-35,159	-4,917	-1,914	-3,380	-21,754	-463	2,622	-1,572	-18,181	-4,306
Foreign Migrant	3,071	1,659	1,057	1,472	2,144	1,397	1,570	709	3,116	963
State Non-Mig	9,652,081	4,842,935	2,355,141	2,061,541	7,655,150	3,896,650	4,278,820	1,381,741	8,968,213	4,345,089

- From 1988 to 2006, Illinois, Michigan, and Ohio lost 52,978, 22,987, and 20,726 people on average each year.
- On the other hand, Missouri, Wisconsin, Indiana, and Minnesota recorded gains in net migration.
- 34% of Illinois net out migrants went to the other 9 MW states (17,819). Within these flows, 13% went to Indiana and 13% went to Wisconsin.
- Indiana gained 8,737 people from the other 9 MW states, while lost 4,917 people to the Rest of United States. Therefore, the net gain for Indiana was 3,820 people on average. The biggest contributors were Illinois and Ohio.

Migration Analysis



Recent Work: Midwest Model Development

- Expansion of the 6-region (WI, IL, IN,OH, MI and Rest of US) version to 11 regions with the additions of IA, KS, MN, MO, NE
- Rest of US now redefined to be the other 40 states
- Integration of occupational structure and migration into the current framework
- Seeking additional funding to enable addition of trade with:
  - Mexican regions (would have to be estimated)
  - Canadian provinces (province to US state trade data are available)

Draft Baseline Forecasts [1]: GRP

	Past 15 Years (1992~2007)	DRI Forecasts (2007~2040)	MW2REIM Forecasts (2007~2040)	MW11REIM Forecasts (2007~2040)
US	3.1 %	2.4 %		
MW	2.0 %		1.8 %	1.7 %
IA	2.3 %			1.8 %
IL	2.0 %			1.6 %
IN	2.1 %			1.6 %
KS	2.1 %			1.6 %
MI	1.7 %			1.6 %
MN	2.8 %			1.9 %
MO	1.9 %			1.6 %
NE	2.2 %			1.7 %
OH	1.4 %			1.6 %
WI	2.3 %			1.9 %
ROUS	2.8 %		2.3 %	2.3 %

Note : 1. DRI forecasts are used as main exogenous (independent) variables both in MW2REIM and MW6REIM.
2. MW2REIM forecasts for MW variables are also used as main exogenous (independent) variables
3. MW11REIM forecasts for MW variables are derived by summing up the forecasts for 10 states (i.e. IL, IN, MI, OH, WI, IA, NE,KS, MO, MN,).

Draft Baseline Forecasts [4]: Total Jobs

	Past 15 Years (1992~2007)	DRI Forecasts (2007~2040)	MW2REIM Forecasts (2007~2040)	MW11REIM Forecasts (2007~2040)
US	1.8 %	N / A		
MW	1.2 %		0.7 %	0.6 %
IA	1.2 %			0.7 %
IL	1.2 %			0.6 %
IN	1.2 %			0.5 %
KS	1.4 %			0.5 %
MI	0.9 %			0.7 %
MN	1.7 %			0.8 %
MO	1.4 %			0.6 %
NE	1.4 %			0.8 %
OH	1.0 %			0.6 %
WI	1.4 %			0.6 %
ROUS	1.9 %		1.1 %	1.1 %

Note : 1. DRI forecasts are used as main exogenous (independent) variables both in MW2REIM and MW6REIM.
2. MW2REIM forecasts for MW variables are also used as main exogenous (independent) variables
3. MW11REIM forecasts for MW variables are derived by summing up the forecasts for 10 states (i.e. IL, IN, MI, OH, WI, IA, NE,KS, MO, MN,).

Draft Baseline Forecasts [5]: Personal Income

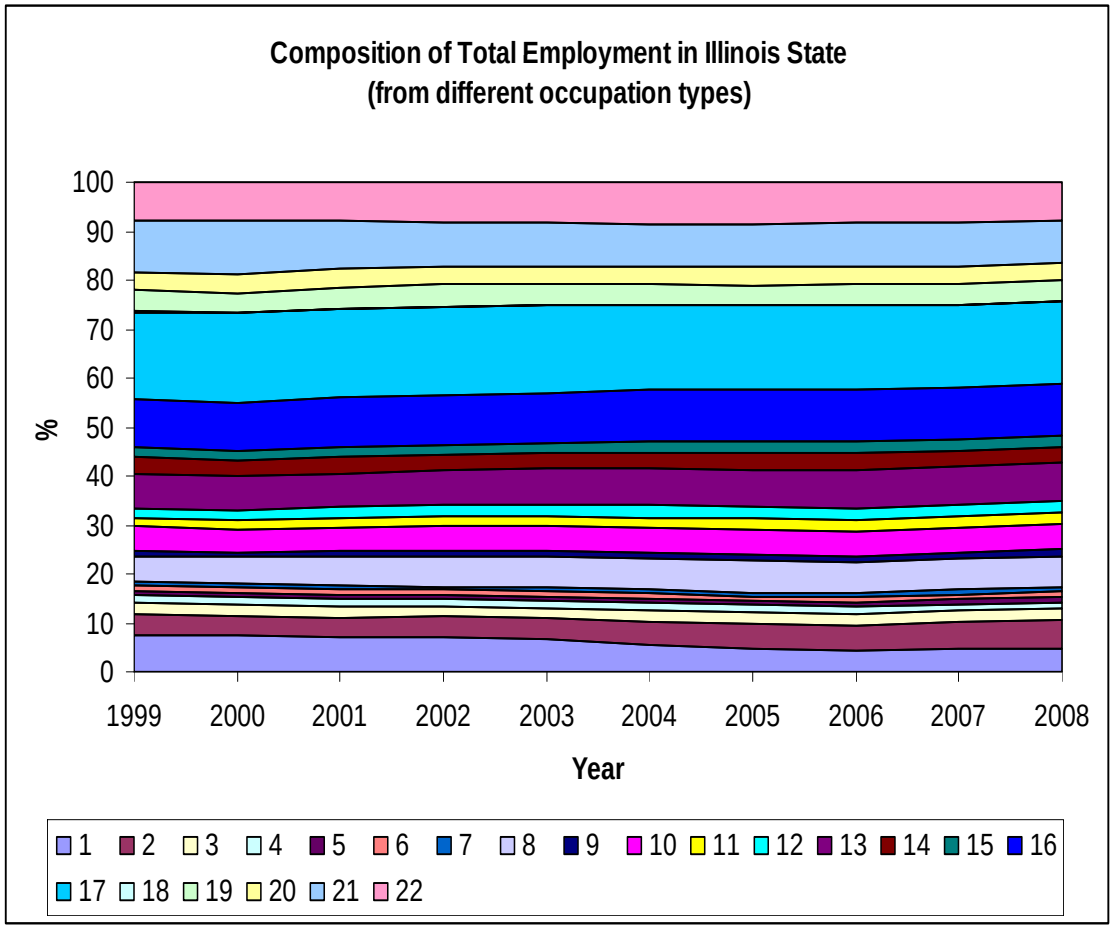
	Past 15 Years (1992~2007)	DRI Forecasts (2007~2040)	MW2REIM Forecasts (2007~2040)	MW11REIM Forecasts (2007~2040)
US	3.1 % (DRI) 2.6 % (BEA)	2.8 %		
MW	1.9 %		1.8 %	1.7 %
IA	2.1 %			1.8 %
IL	2.0 %			1.7 %
IN	1.9 %			1.6 %
KS	2.3 %			1.7 %
MI	1.3 %			1.8 %
MN	2.9 %			1.9 %
MO	2.2 %			1.7 %
NE	2.5 %			1.7 %
OH	1.3 %			1.7 %
WI	2.2 %			1.7 %
ROUS	2.8 %		2.6 %	2.6 %

Note : 1. DRI forecasts are used as main exogenous (independent) variables both in MW2REIM and MW6REIM.
2. MW2REIM forecasts for MW variables are also used as main exogenous (independent) variables
3. MW11REIM forecasts for MW variables are derived by summing up the forecasts for 10 states (i.e. IL, IN, MI, OH, WI, IA, NE,KS, MO, MN,).

Challenges Being Explored

- Occupational capital of the states and the match with current and future needs of industry
- Differences in investment in human capital and their impacts across states and ethnic groups
- Role of aging, retirement out-migration and in-migration on the economic competitive of the Midwest state economies
- Interconnection between interstate and interregional trade
- Spatial nature and strength of interstate value chains – clustered or dispersed across the region?

Dynamic Occupational Composition for the Overall Employment in Illinois State across 10 Years



Occupation	Description
1	Management Occupations
2	Business and Financial Operations Occupations
3	Computer and Mathematical Science Occupations
4	Architecture and Engineering Occupations
5	Life, Physical, and Social Science Occupations
6	Community and Social Services Occupations
7	Legal Occupations
8	Education, Training, and Library Occupations
9	Arts, Design, Entertainment, Sports, and Media Occupations
10	Healthcare Practitioner and Technical Occupations
11	Healthcare Support Occupations
12	Protective Service Occupations
13	Food Preparation and Serving Related Occupations
14	Building and Grounds Cleaning and Maintenance Occupations
15	Personal Care and Service Occupations
16	Sales and Related Occupations
17	Office and Administrative Support Occupations
18	Farming, Fishing, and Forestry Occupations
19	Construction and Extraction Occupations
20	Installation, Maintenance, and Repair Occupations
21	Production Occupations
22	Transportation and Material Moving Occupations

Stability of Staff Patterns and Occupation Allocation Coefficients in Illinois State

Staff Pattern – *The employment distribution across occupations in each industrial sector.*		**Industrial Sector (IREIM Categories)**
	Stable	*Construction*
		Robber and Misc. Plastic Products
		Furniture and Related Product Manufacturing
		Educational Services
		Food Services
	Unstable	*Retail Trade*
		Motion Picture and Sound Recording Industries
		Finance and Insurance
Occupation Allocation Coefficients – *The employment distribution across industrial sectors in each occupation.*		**Occupational Groups (OES Categories)**
	Stable	*Office and Administrative Support Occupations*
		Construction and Extraction Occupations
		Food Preparation and Serving Related Occupations
		Production Occupations
	Unstable	*Farming, Fishing, and Forestry Occupations*
		Arts, Design, Entertainment, Sports, and Media Occupations
		Protective Service Occupations
		Life, Physical, and Social Services Occupations

Example Application

- Ford Plant Closure

  Assumed that the Ford plants in the Chicago area are closed in Year 2007. The existing level of plants' activities are

  - Output: $2.1 billion
  - Direct Employment: 3,580
  - Direct Income: $374 million
  - Purchases from the suppliers: $1.5 billion

Example Application

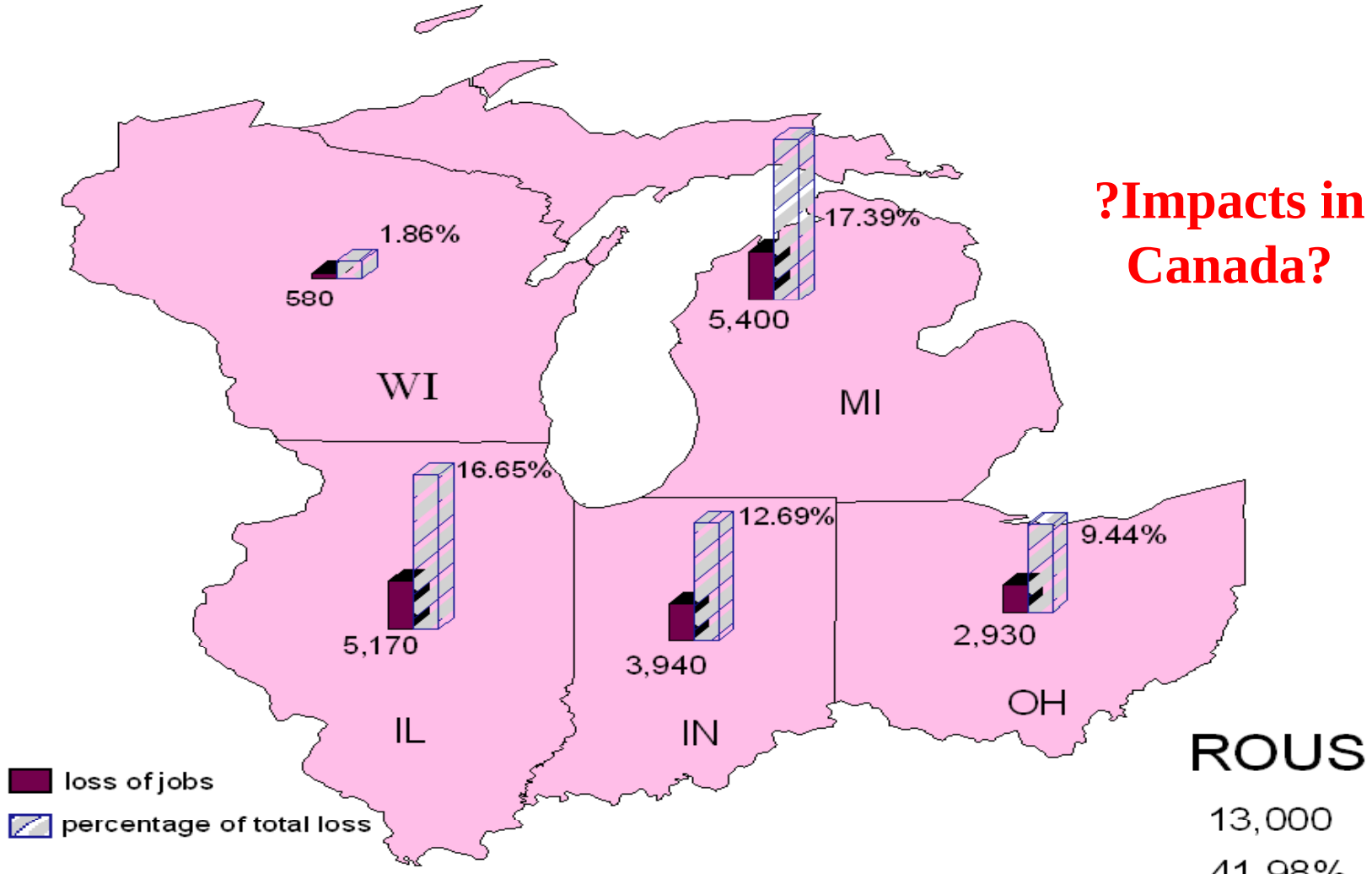
- Output (in Chained $2000)
  - Direct: $2.1 b
  - Indirect: $5.2 b
  - Total: $7.3 b
  - **Spatial Distribution of the Indirect effects**

IL:	17.3 %	**IN**:	12.9%
MI:	19.7%	**OH**:	9.1%
WI:	1.7%	**RUS**:	39.3%

Midwest concentration: 60.7%

  - Multiplier = 3.51

Indirect Employment Impacts Across States



?Impacts in Canada?

Tracing the Value Chain

Primary Metal and metal product manufacturing

- Table shows the percentage of indirect effects from a change in production in the state at the top of the column

	IL	IN	OH	WI	MI	RUS
IL	32.0%	7.3%	4.8%	3.9%	6.5%	4.5%
IN	5.9%	30.9%	5.3%	6.7%	3.5%	3.5%
OH	3.4%	4.5%	28.9%	6.2%	6.5%	2.9%
WI	4.2%	9.2%	9.6%	26.4%	3.7%	5.3%
MI	2.9%	1.8%	4.1%	1.5%	27.2%	2.1%
Total MW	16.5%	22.8%	23.8%	18.4%	20.2%	18.3%
RUS	51.5%	46.3%	47.3%	55.2%	52.7%	81.7%
Total	100.0%	100.0%	100.0%	100.0%	100.0%	100.0%
Multiplier	2.192	2.288	2.184	2.215	2.165	2.074

Tracing the Value Chain

Transportation, Logistics and Warehousing

- Table shows the percentage of indirect effects from a change in production in the state at the top of the column

	IL	IN	OH	WI	MI	RUS
IL	59.8%	5.8%	3.7%	2.4%	4.7%	1.8%
IN	2.2%	56.2%	2.4%	2.6%	1.4%	0.6%
OH	1.8%	2.4%	53.0%	3.6%	3.4%	0.9%
WI	1.8%	4.7%	5.5%	55.0%	1.6%	1.3%
MI	1.1%	0.7%	1.8%	0.6%	54.5%	0.5%
Total MW	6.9%	13.5%	13.5%	9.2%	11.0%	5.2%
RUS	33.4%	30.3%	33.5%	35.8%	34.4%	94.8%
Total	100.0%	100.0%	100.0%	100.0%	100.0%	100.0%
Multiplier	1.865	1.859	1.817	1.815	1.848	1.753

The Costs and Benefits of Interdependence

- While the existence of strongly-linked value chains can create positive benefits to the Midwest economy, during downturns, the reverse will be the case.
- During current recession, five Midwest states have lost 1.78 million jobs – 20% of the US total of lost jobs
- The results presented here provide compelling evidence of the need to view the region as an economic unit in considering strategic investment