

# Growing Knowledge about Globalization (GKG)

Observing Trade, 1980-2001

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Princeton University, University of Washington, University of Technology Sydney & NetMap Analytics

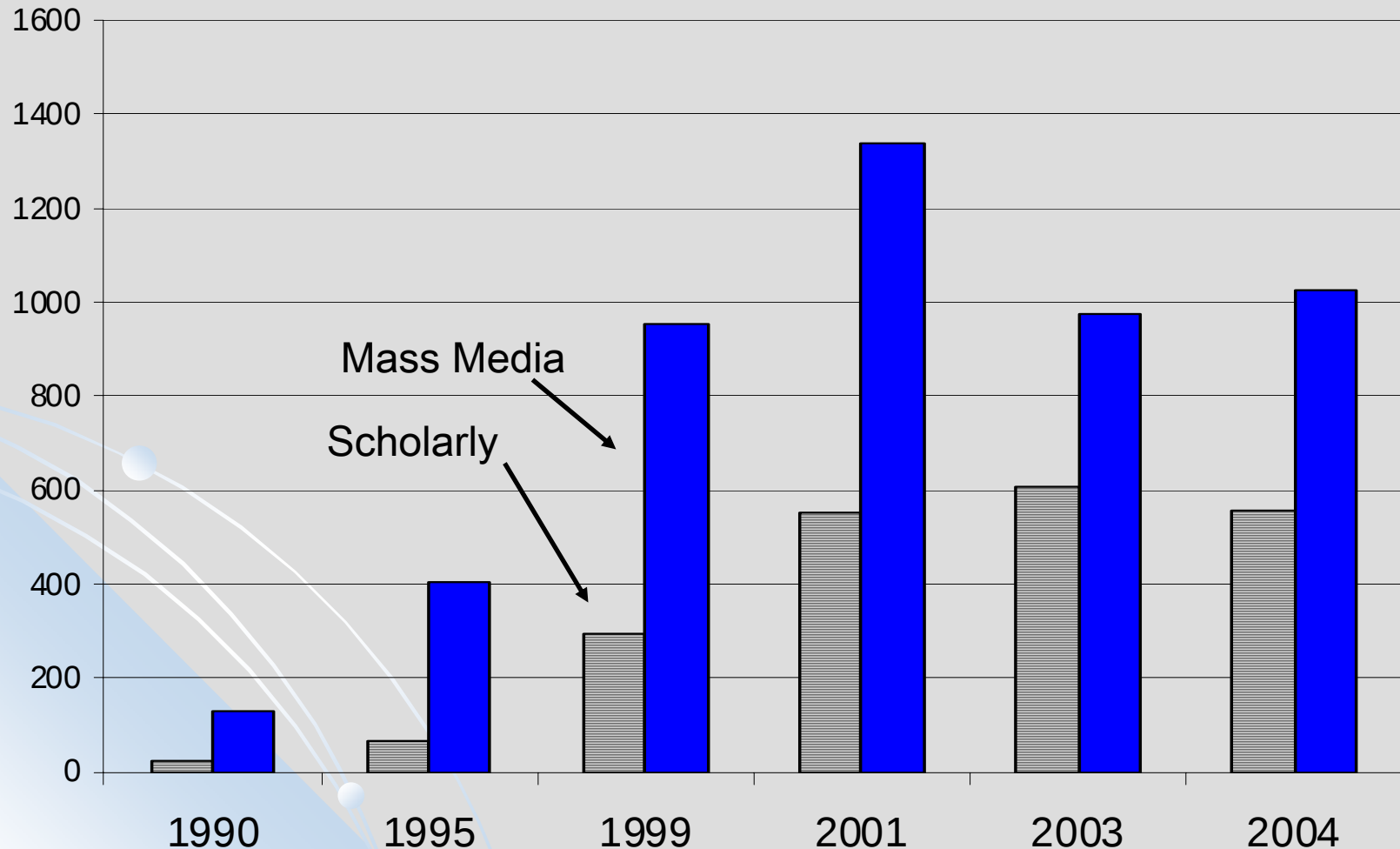
Kellogg Institute for International Studies

University of Notre Dame

October 6, 2005

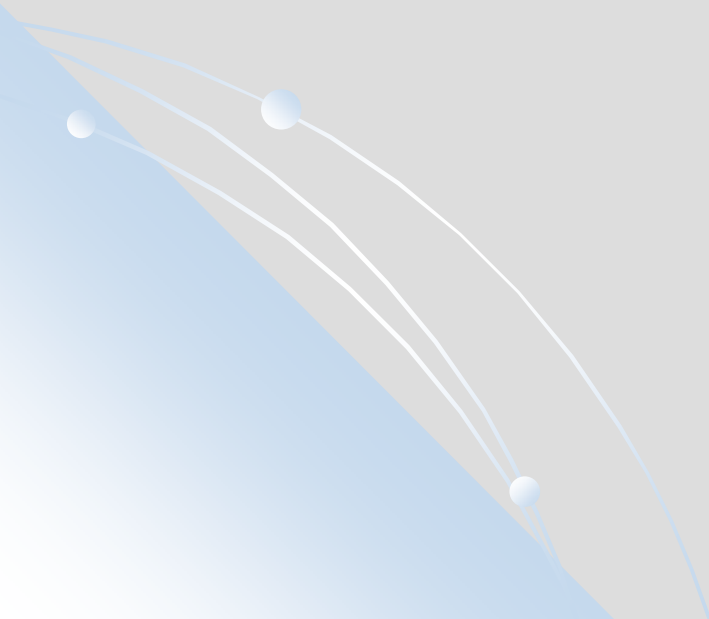
# Globalization is everywhere....

## Articles on Globalization



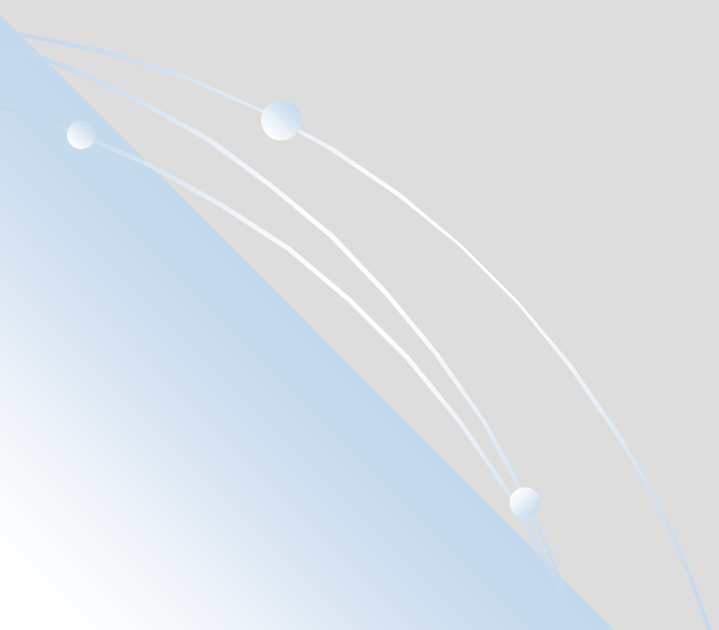
Globalization is a process leading to greater interdependence and mutual awareness (reflexivity) among economic, political, and social units in the world, and among actors in general.

*Mauro Guillén 2001*

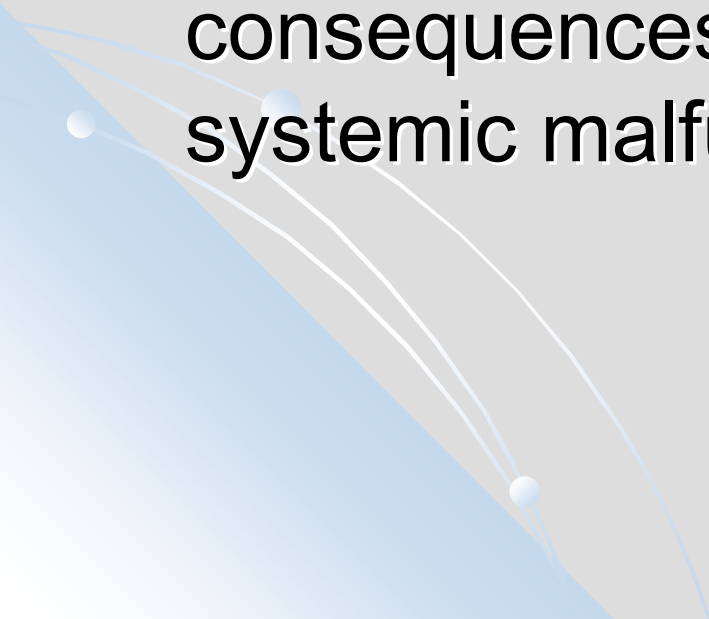


# Globalization is a Black Box

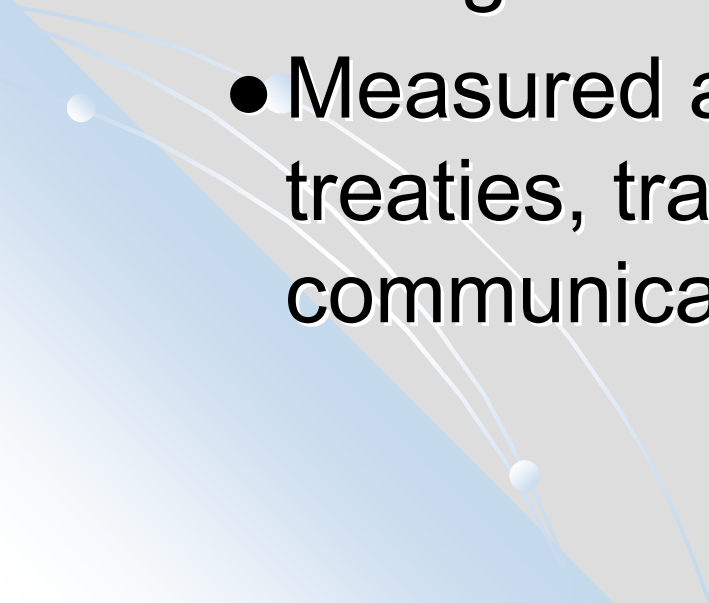
- Theory raced ahead of evidence
- Entrenched theoretical and public policy debates: *Is it good or bad?*
- Empirical evidence is uneven



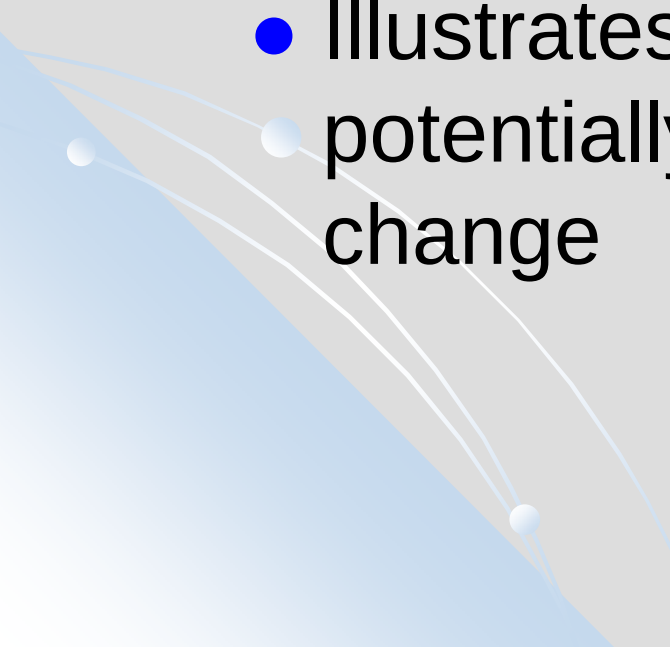
# Consequences of the....

- Failure to understand the structure of globalization
  - Failure to analyze interaction dynamics
  - Failure to foresee unintended consequences, crises, “normal accidents”, systemic malfunctions
- 

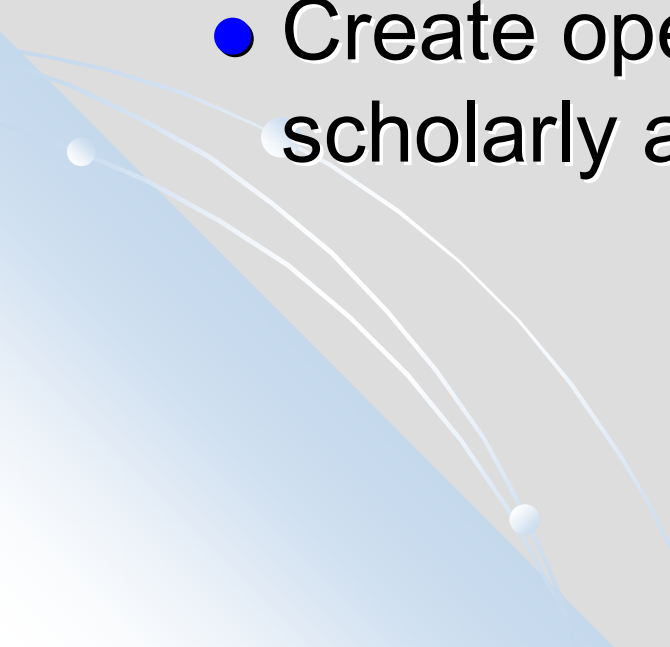
# Contents of the Black Box: Transactions

- Link disparate actors (nodes) around the globe
  - Actors can be people, cities, countries, or organizations
  - Measured as trade, capital transfers, treaties, travel, collaborations, and communication
- 

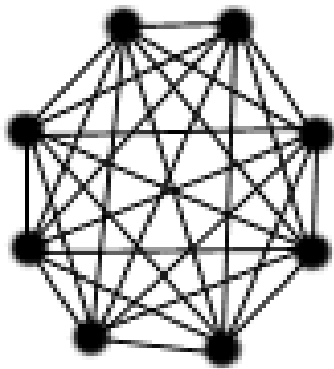
# Black Box of Globalization: Network Analysis

- Reveals the structure of social relations
  - Reveals winners and losers of globalization processes
  - Illustrates change over time and potentially reveals mechanisms of change
- 

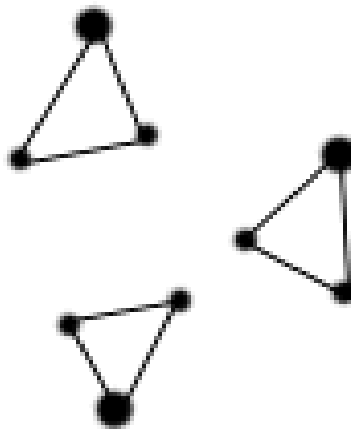
# Map the Pattern of Transactions: Reveal Globalization Network

- Build database on transactions
  - Develop tools for visualizing transactions statically and dynamically
  - Create open access data and tools for scholarly and public policy investigators
- 

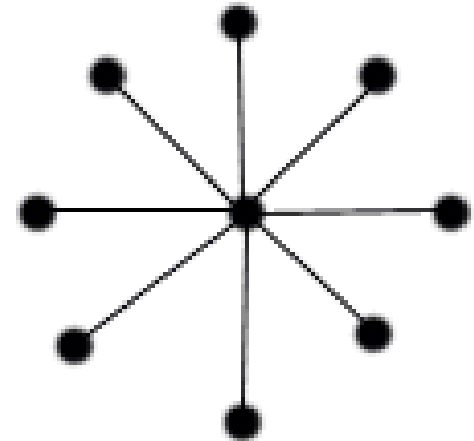
# Models of Globalization



Universal



Clustered

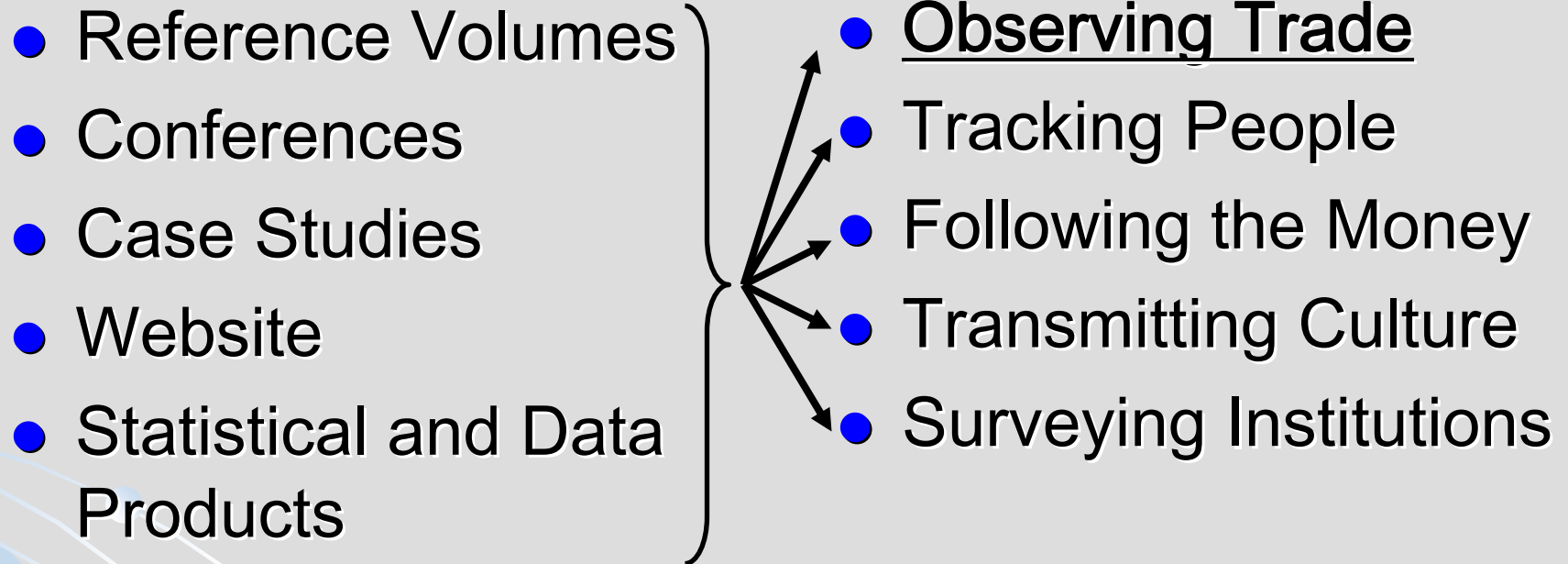


Hegemonic

# Growing Knowledge about Globalization

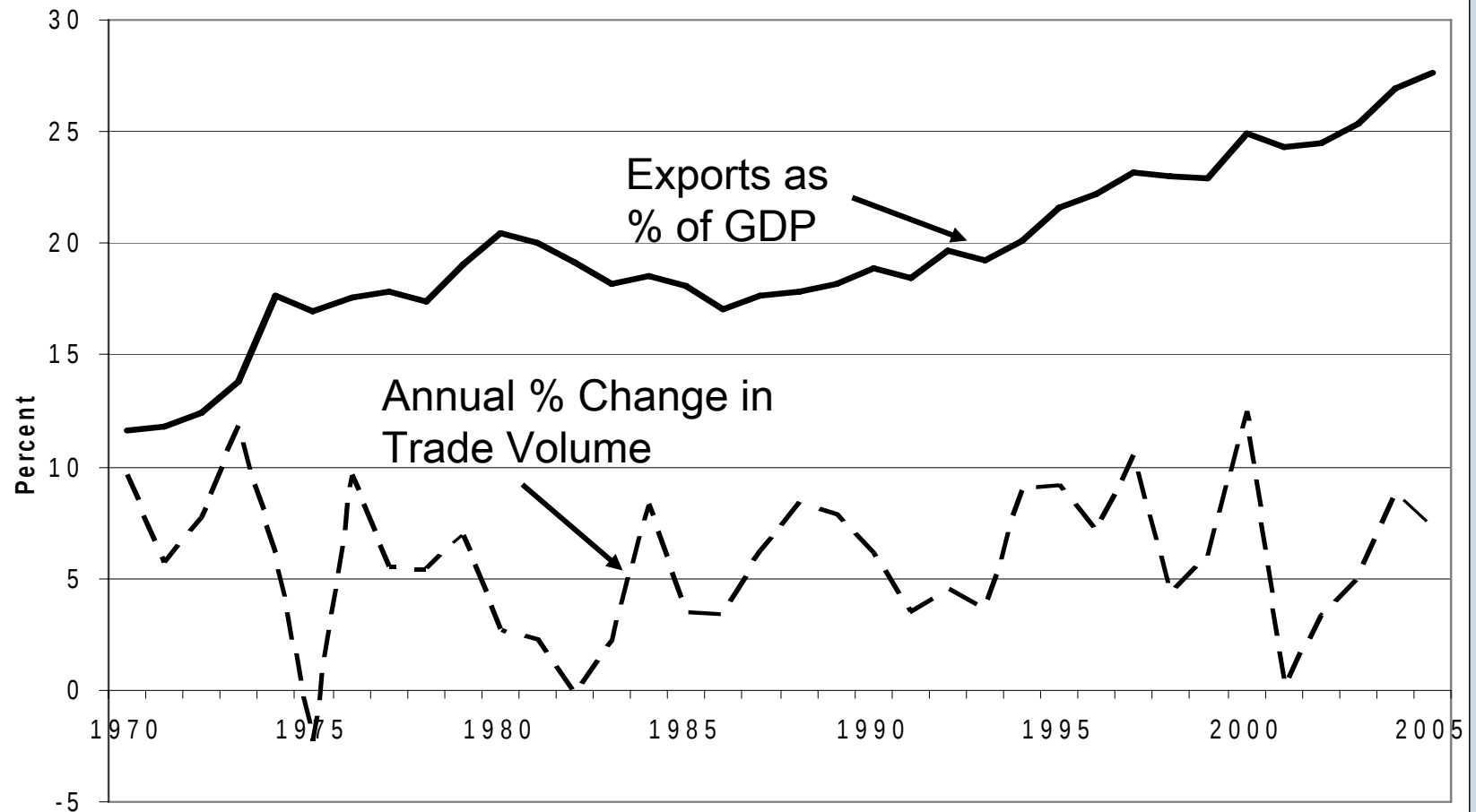
- Who?
  - A cross-national, multi-institutional collaboration
- What?
  - Database, web-based interface for public access, and development of visualization tools
- How?
  - Research, descriptive publications, teaching tools, and open access website
- When?
  - Five-year effort from 2005-2010

# GKG Projects and Products



# Observing Trade

Worldwide Exports



# Significant Moments of Observation

| Year | Characterization of Era                                                                                                              |
|------|--------------------------------------------------------------------------------------------------------------------------------------|
| 1980 | <p>“Crisis in the Global System”</p> <p>Post OPEC, UNCTAD, collapse of Import Substitution, onset of debt crisis</p>                 |
| 1990 | <p>“Victory of the Market”</p> <p>Establishment of EC, End of Cold War, GATT, Structural Adjustment Policies, Container Shipping</p> |
| 2001 | <p>“North versus South”</p> <p>WTO, Internet</p>                                                                                     |

# Data and Methods

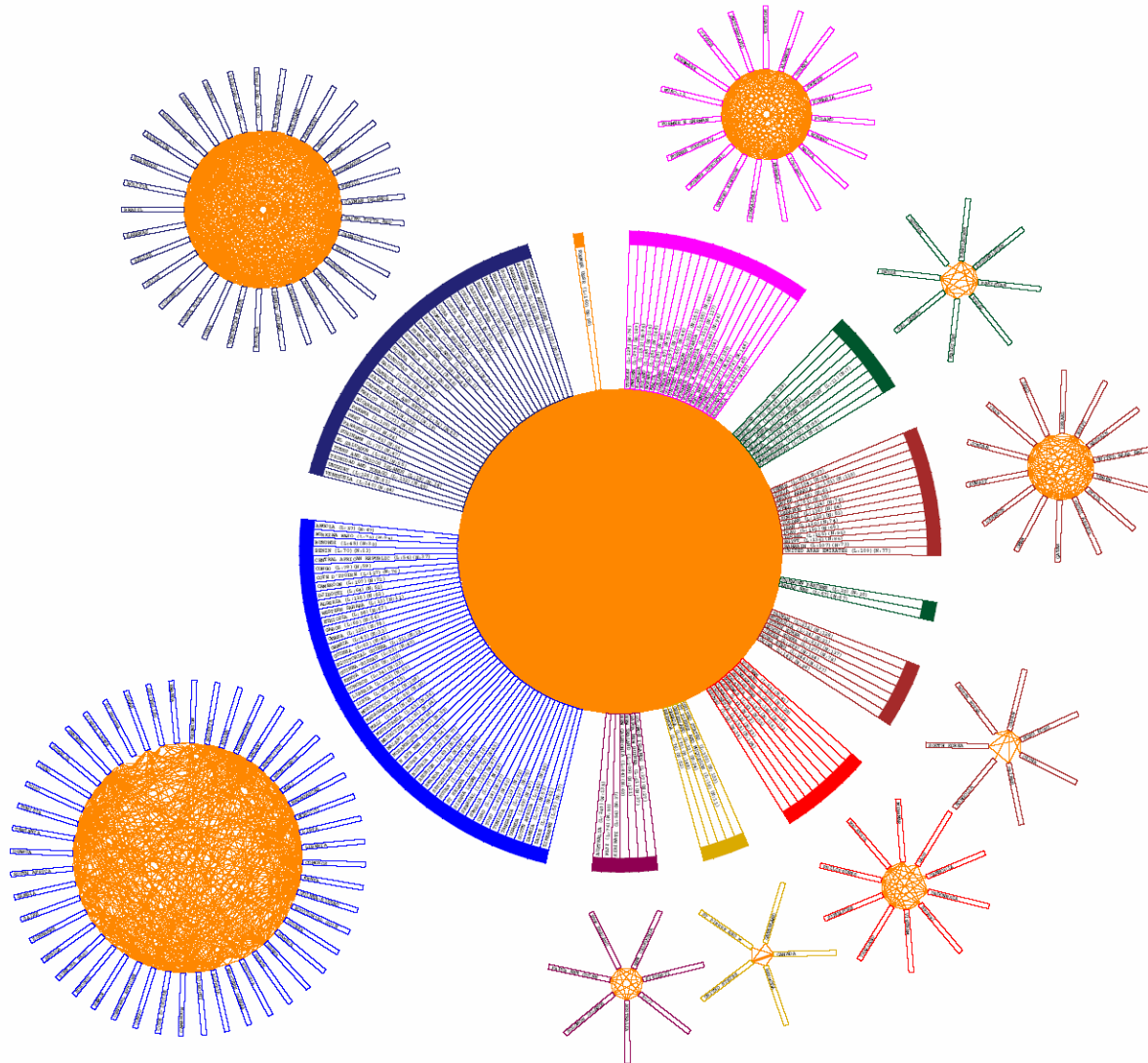
## ● Trade Data

- World Trade Analyzer
- 1980, 1990, 2001
- \$ Amount of exports/imports between every country
- Including an aggregate of all commodities and 93 of those related to food, shelter, clothing, energy, machinery and engines.

## ● Network Maps

- Apply *NetMap Visualizer* software
- Analyze country and regional trade patterns
- Observe emergent groups
- Display Cartesian maps
- Follow step links from central nodes

# Too Much Information? Randomness or Chaos?



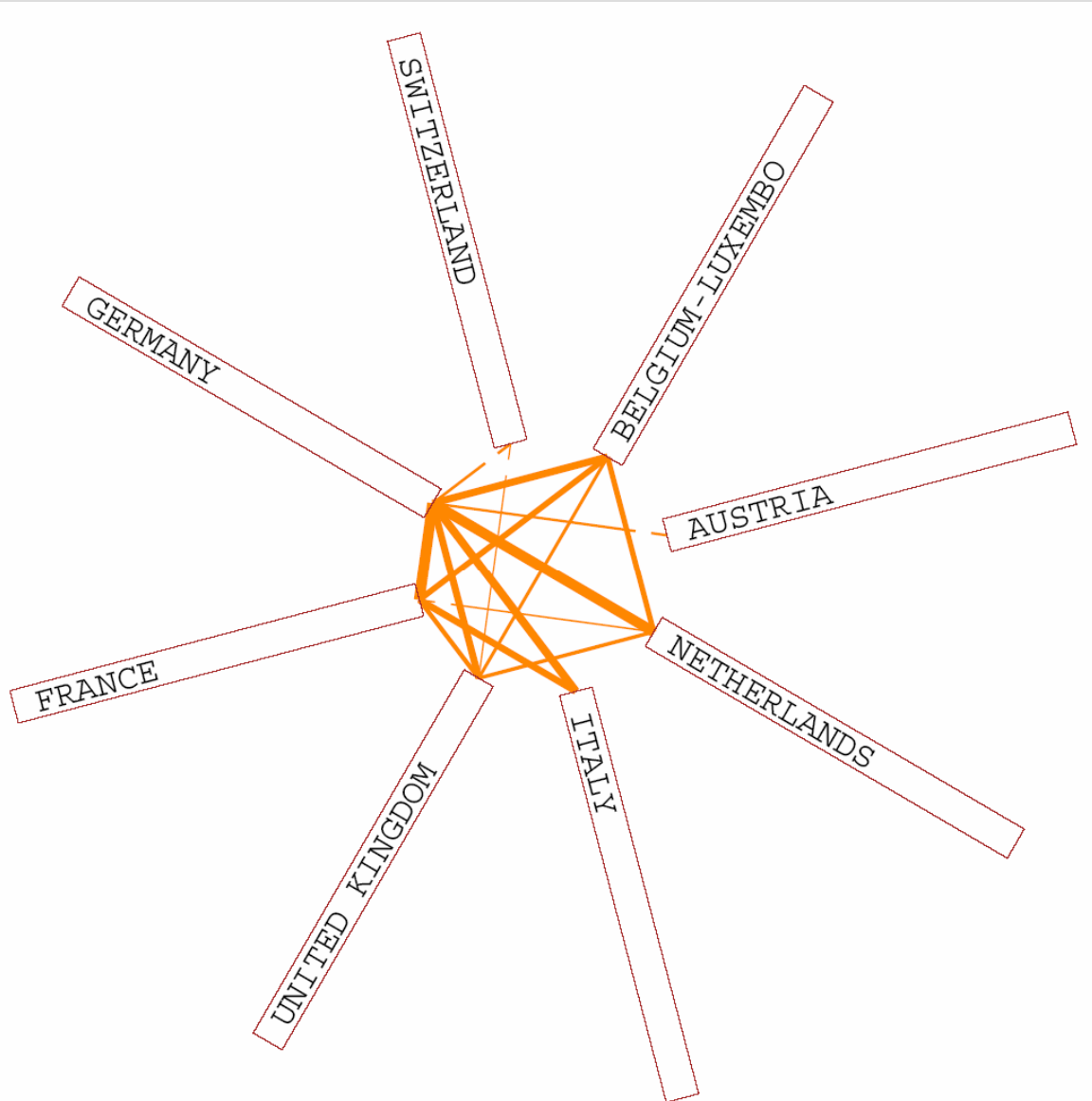
1980

World Trade

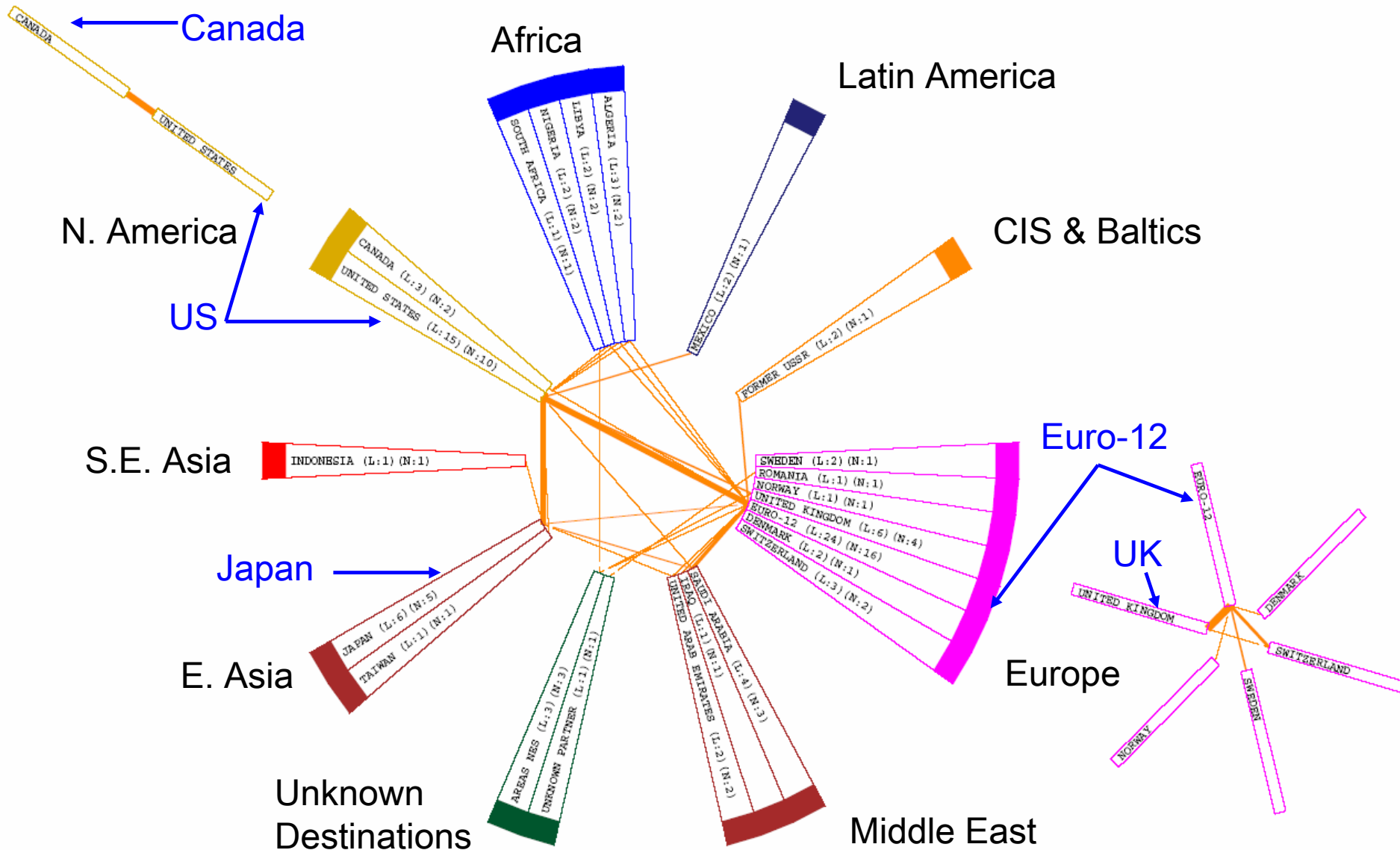
All commodities

No thresholds

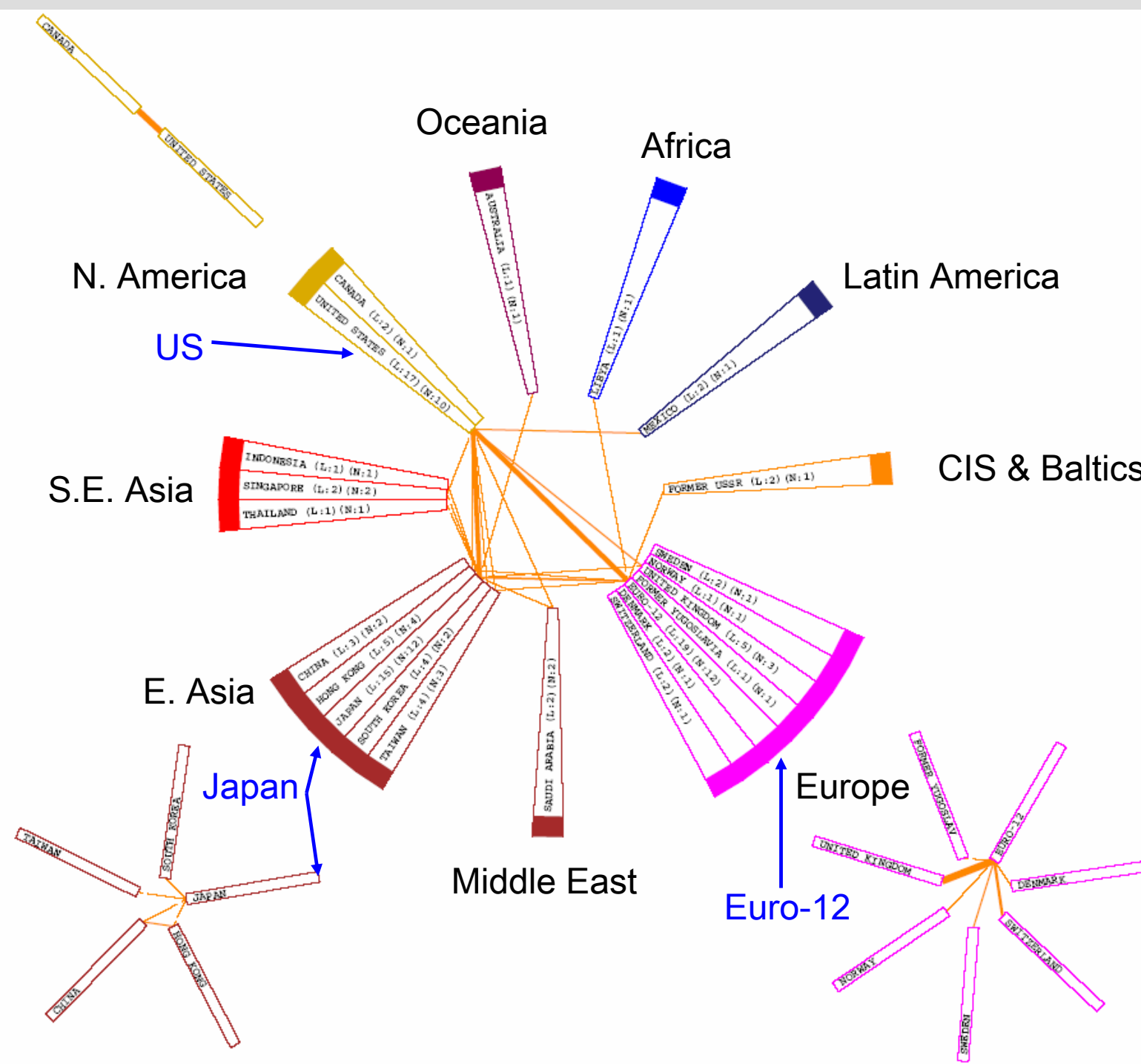
# Domestic or International?



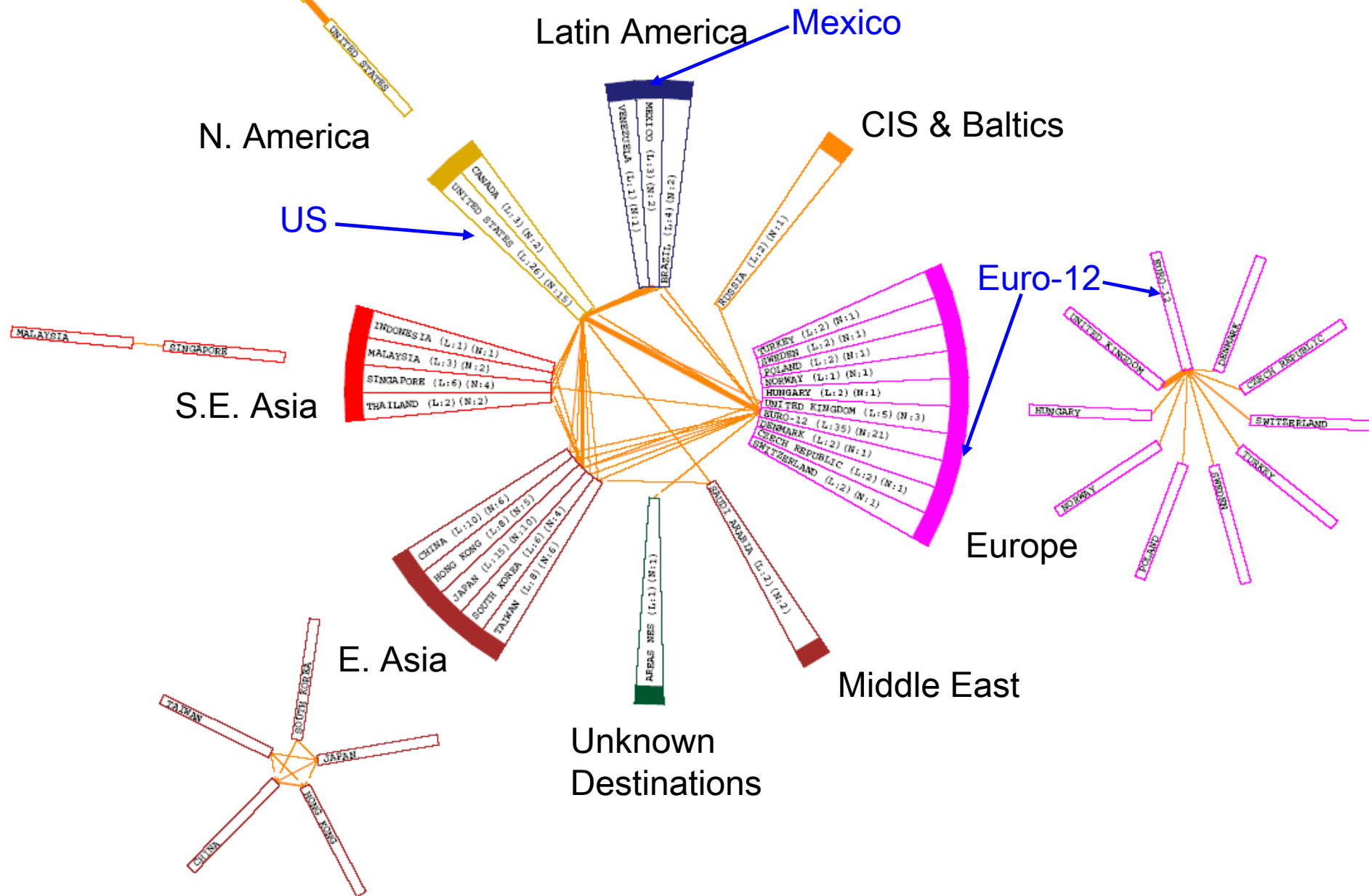
# 1980 Trade Structure with links $\geq 0.3\%$ of Total Trade Value: Euro-12



# 1990



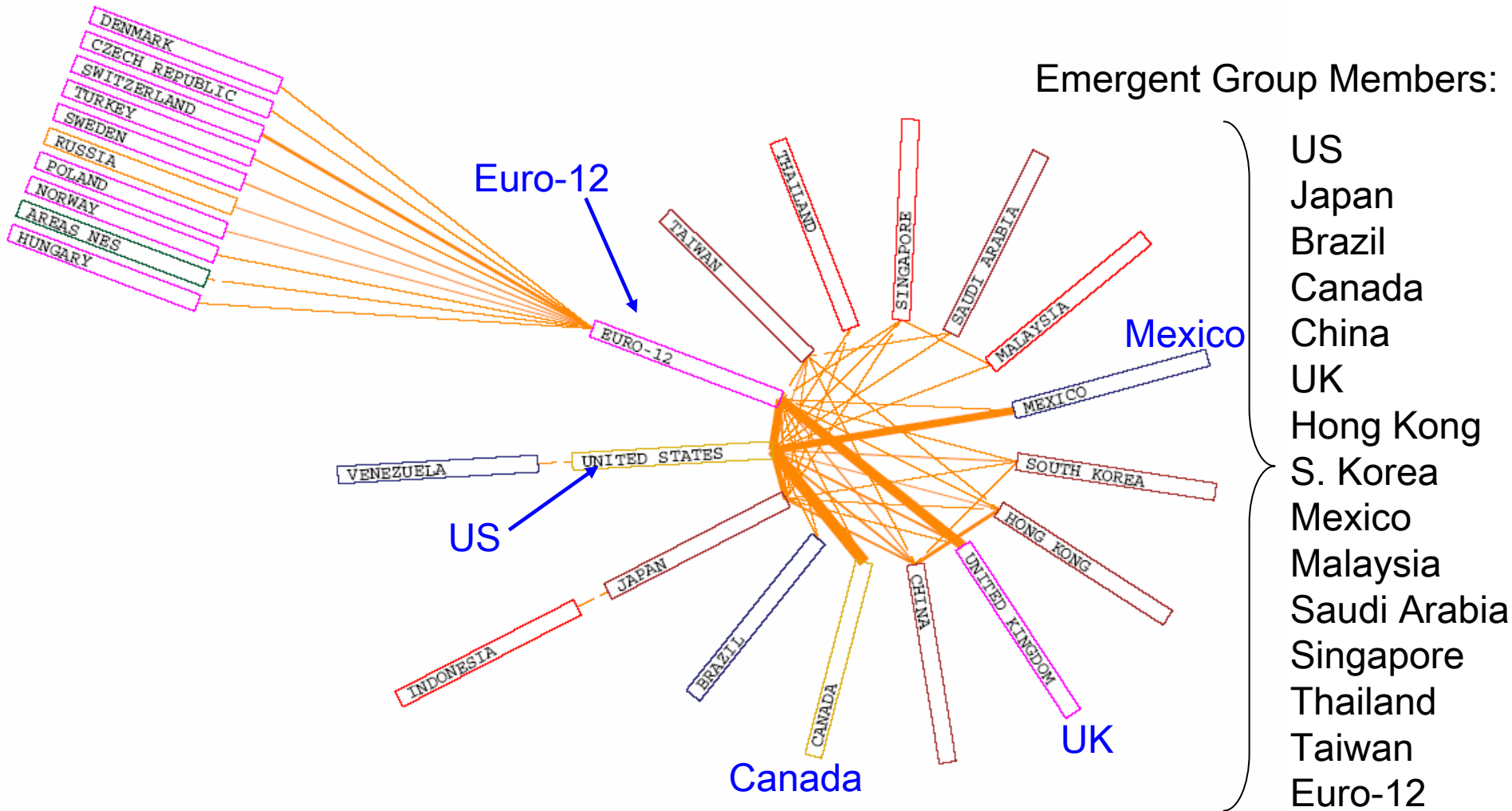
# 2001



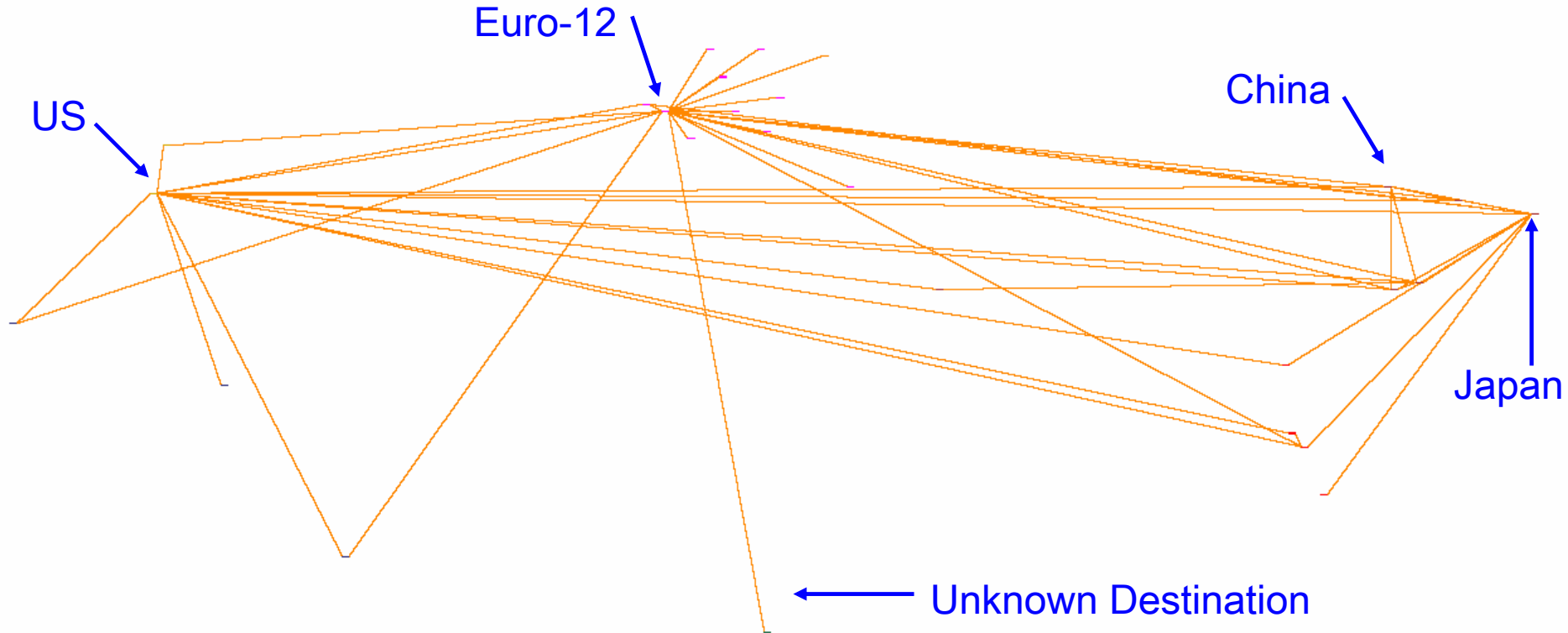
# Emergent Group Analysis

- NetMap creates several types of analyses, including:
  - Pre-defined groups based on some attribute such as regions or civilizations
  - Emergent groups
- Emergent groups represent countries which trade more with each other than with any other countries.
  - Composed of at least 3 countries
  - Which share at least 50% of the same trade ties

# 2001 Emergent Group Analysis

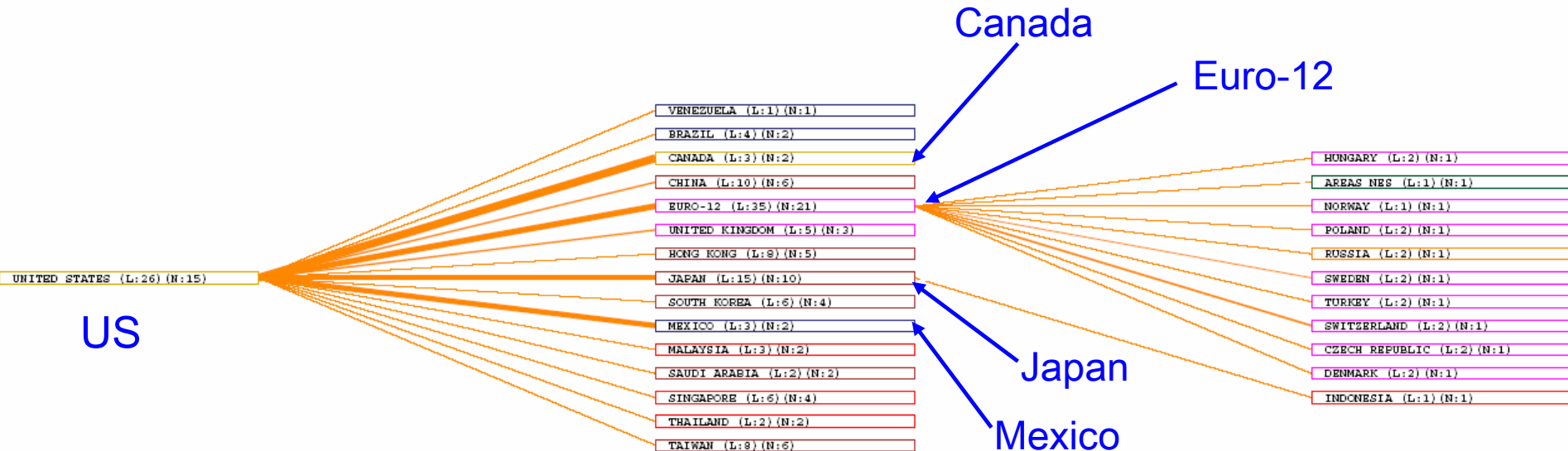
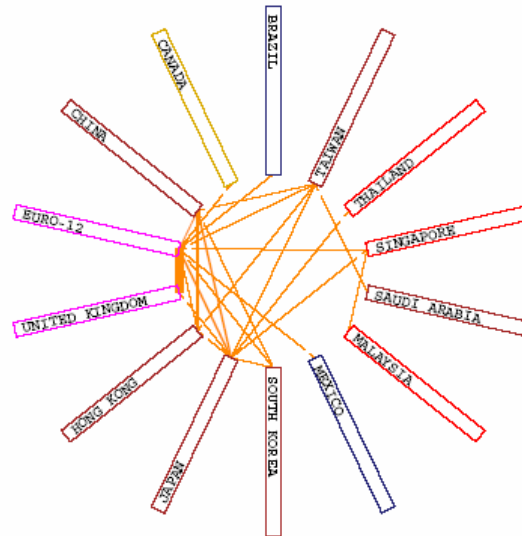


# 2001 Cartesian Map Analysis



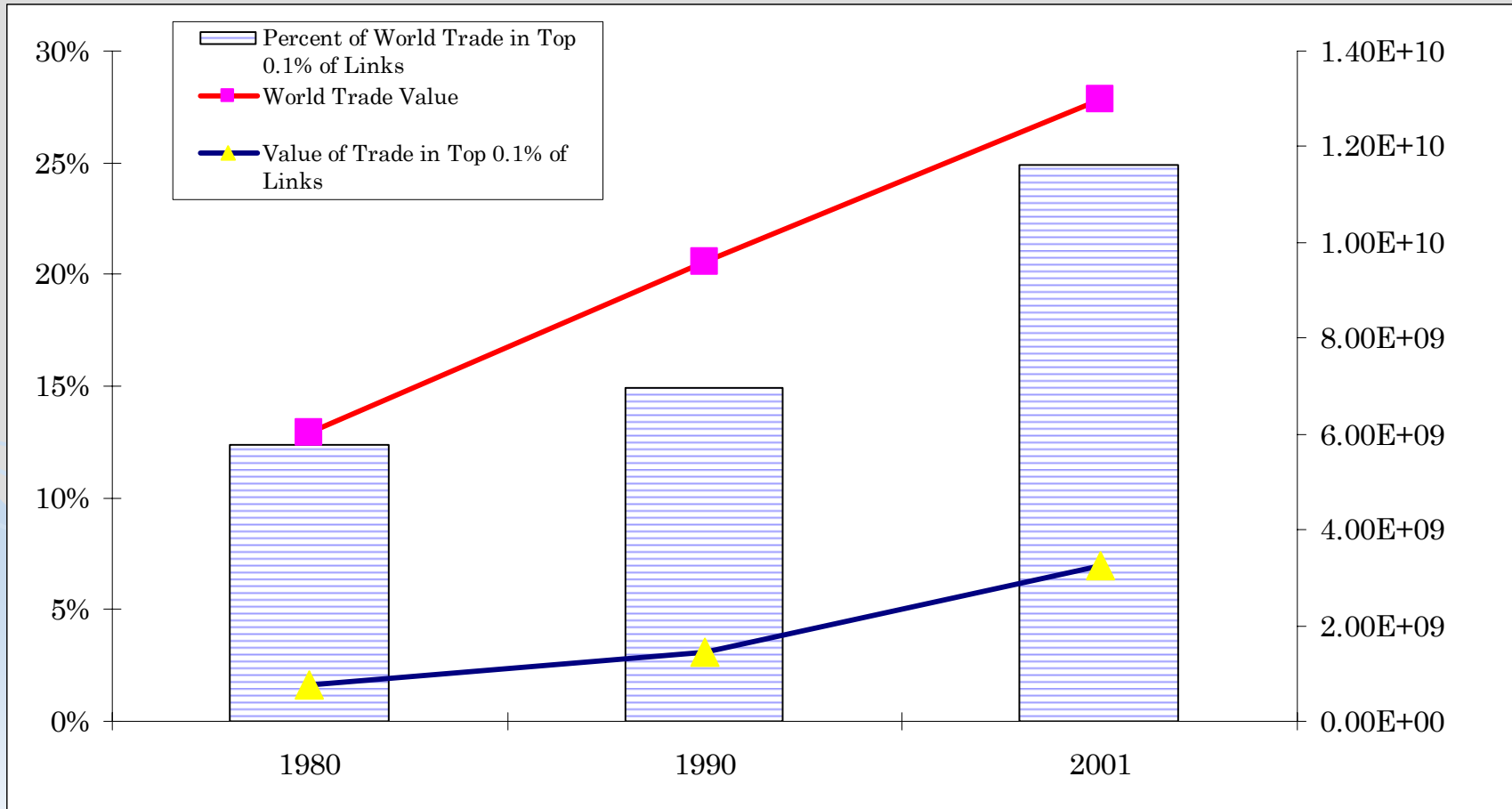
# Step Link Analysis

2001



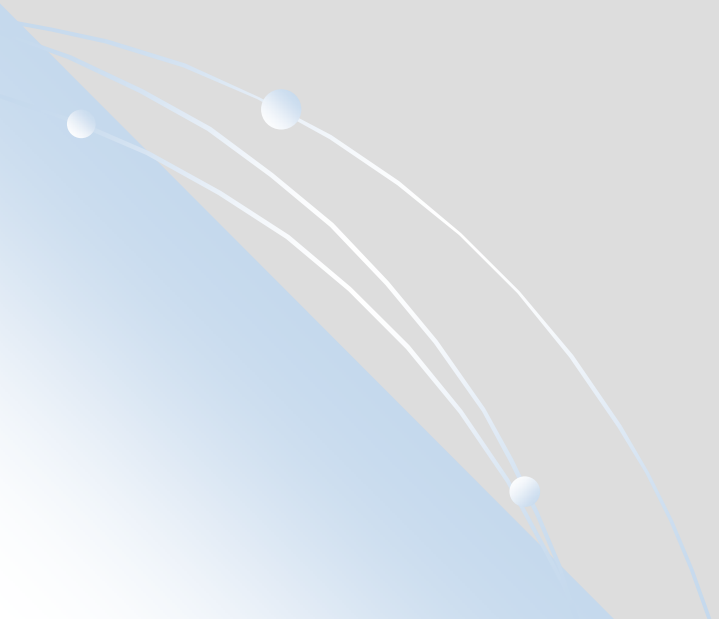
# Concentration of World Trade

## Links $\geq 0.3\%$ of Total Value



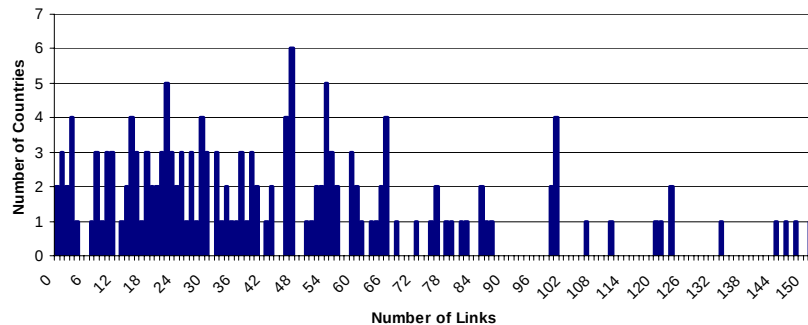
# Issue: Global Equality

- Rich get Richer?
- 80/20 Rule?
- Power Distribution

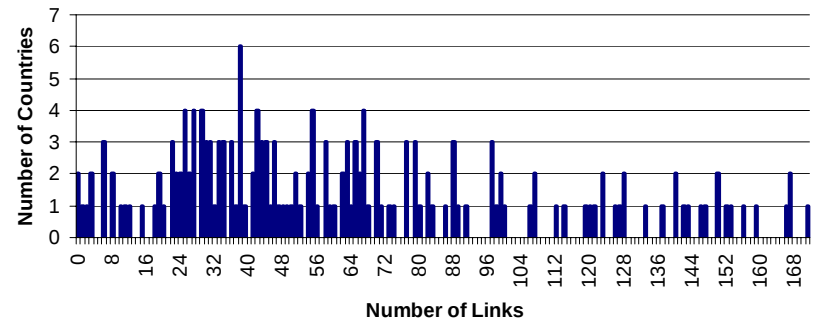


# Distribution of Links: Total Trade at \$Million Threshold

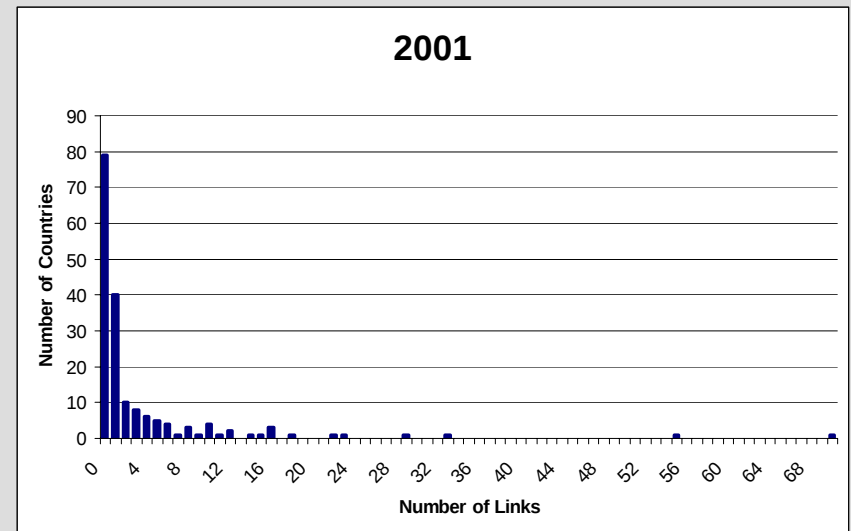
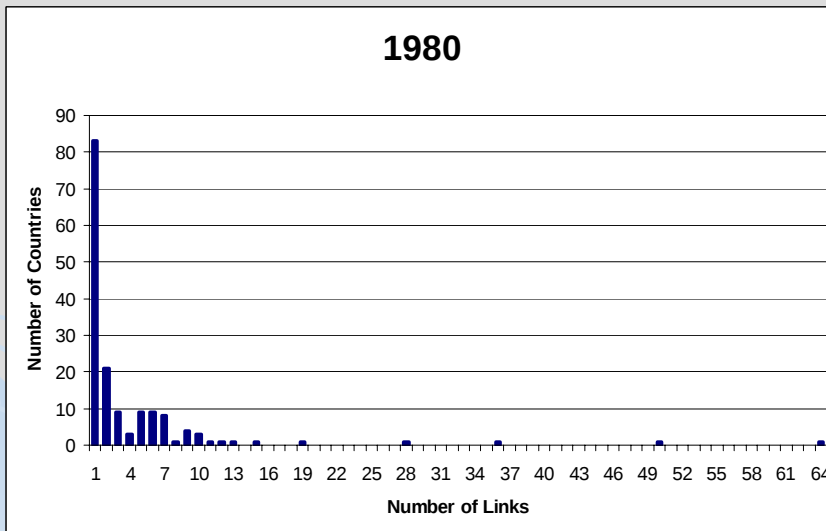
1980



2001

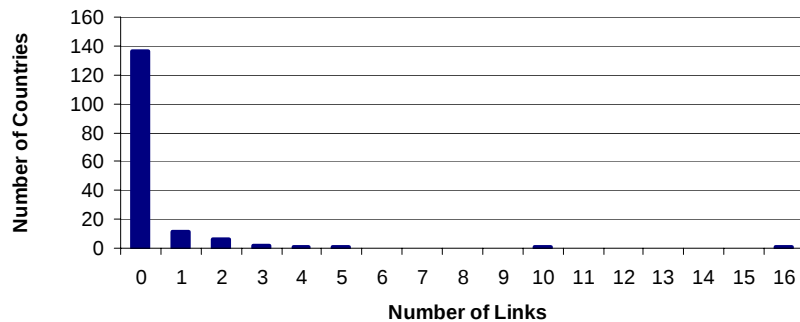


# Distribution of Links: Total Trade at 0.03% Threshold

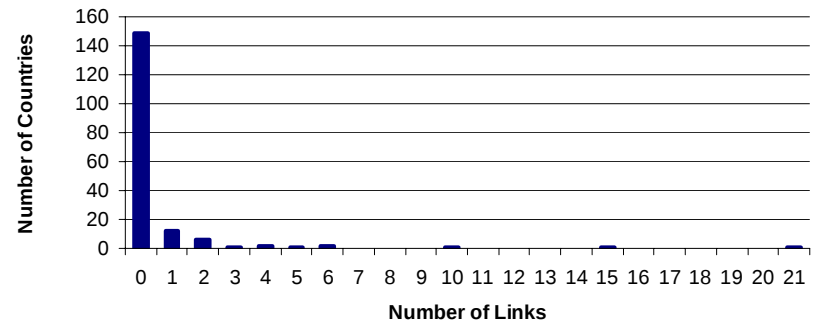


# Distribution of Links: Total Trade at 0.3% Threshold

**1980**

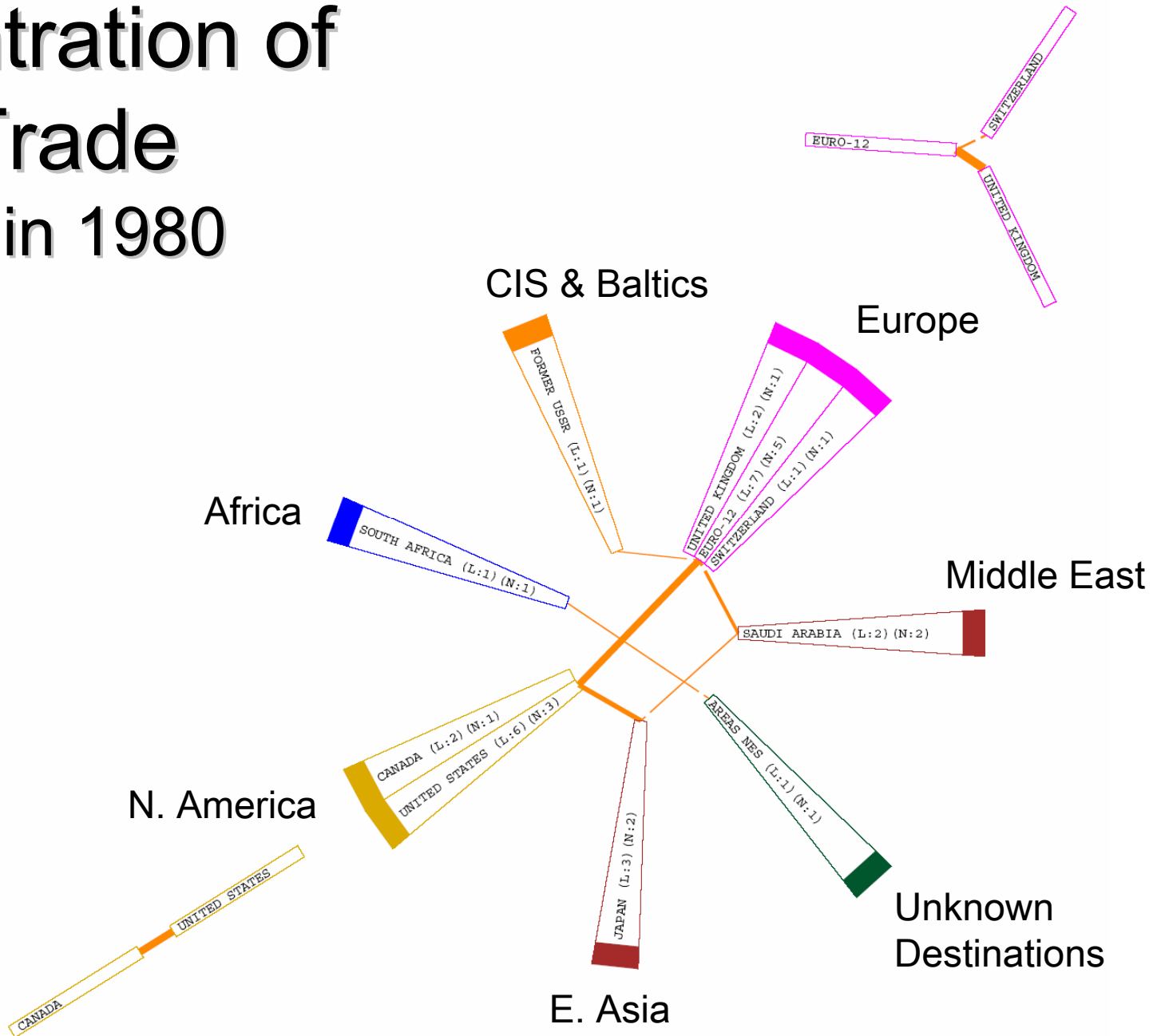


**2001**



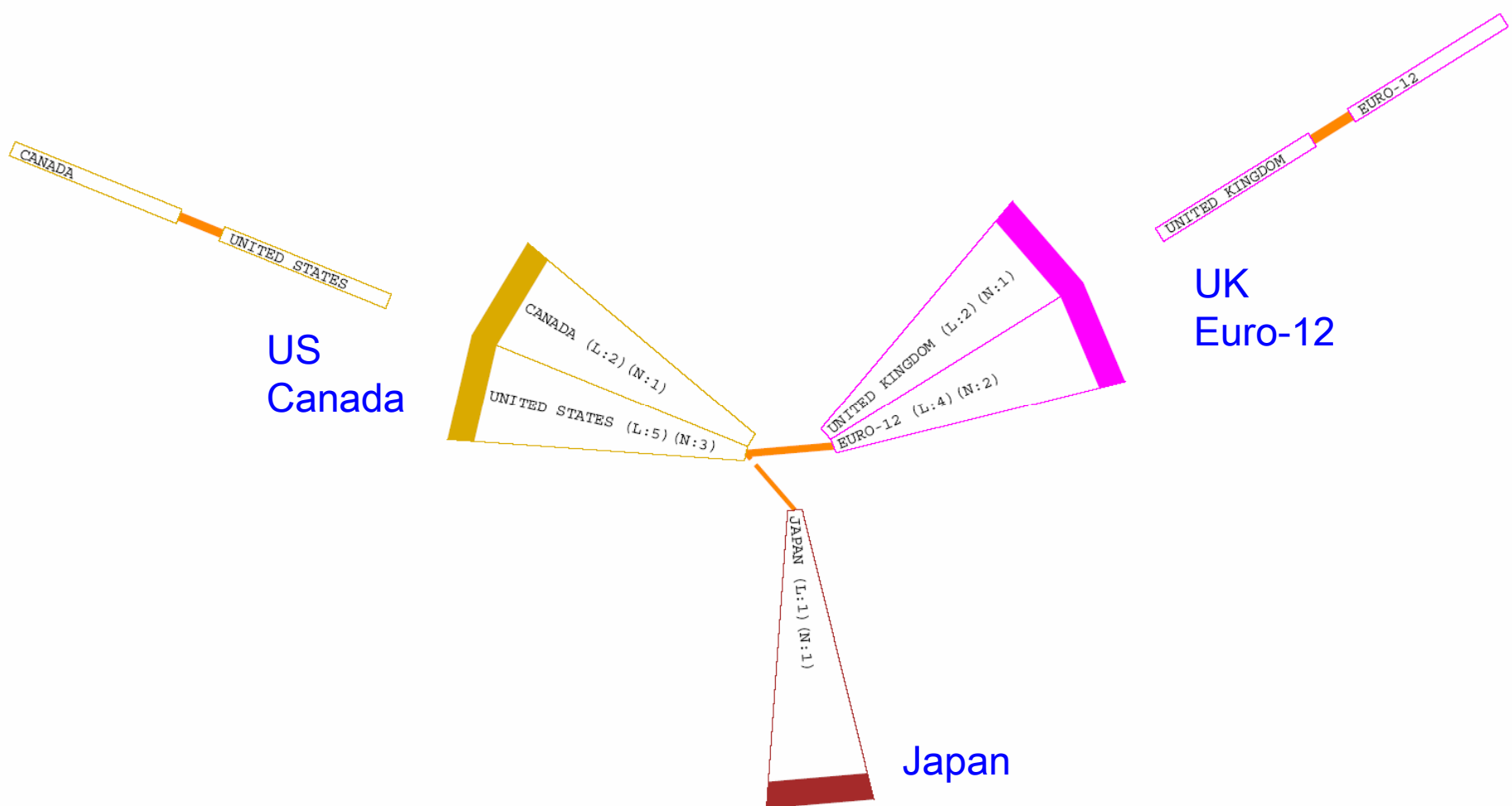
|                                                 | <i>Threshold</i> | <i>1980</i> | <i>2001</i> |
|-------------------------------------------------|------------------|-------------|-------------|
| <i>Number of Isolates</i>                       | \$Million        | 2           | 2           |
|                                                 | 0.03%            | 83          | 79          |
|                                                 | 0.3%             | 136         | 149         |
| <i>Average Number of Links without Isolates</i> | \$Million        | 45.4        | 63.9        |
|                                                 | 0.03%            | 6.3         | 6.2         |
|                                                 | 0.3%             | 2.8         | 3.6         |
| <i>Degrees of Separation without Isolates</i>   | \$Million        | 1.3         | 1.2         |
|                                                 | 0.03%            | 2.3         | 2.5         |
|                                                 | 0.3%             | 3.1         | 2.6         |

# Concentration of World Trade Top 25% in 1980



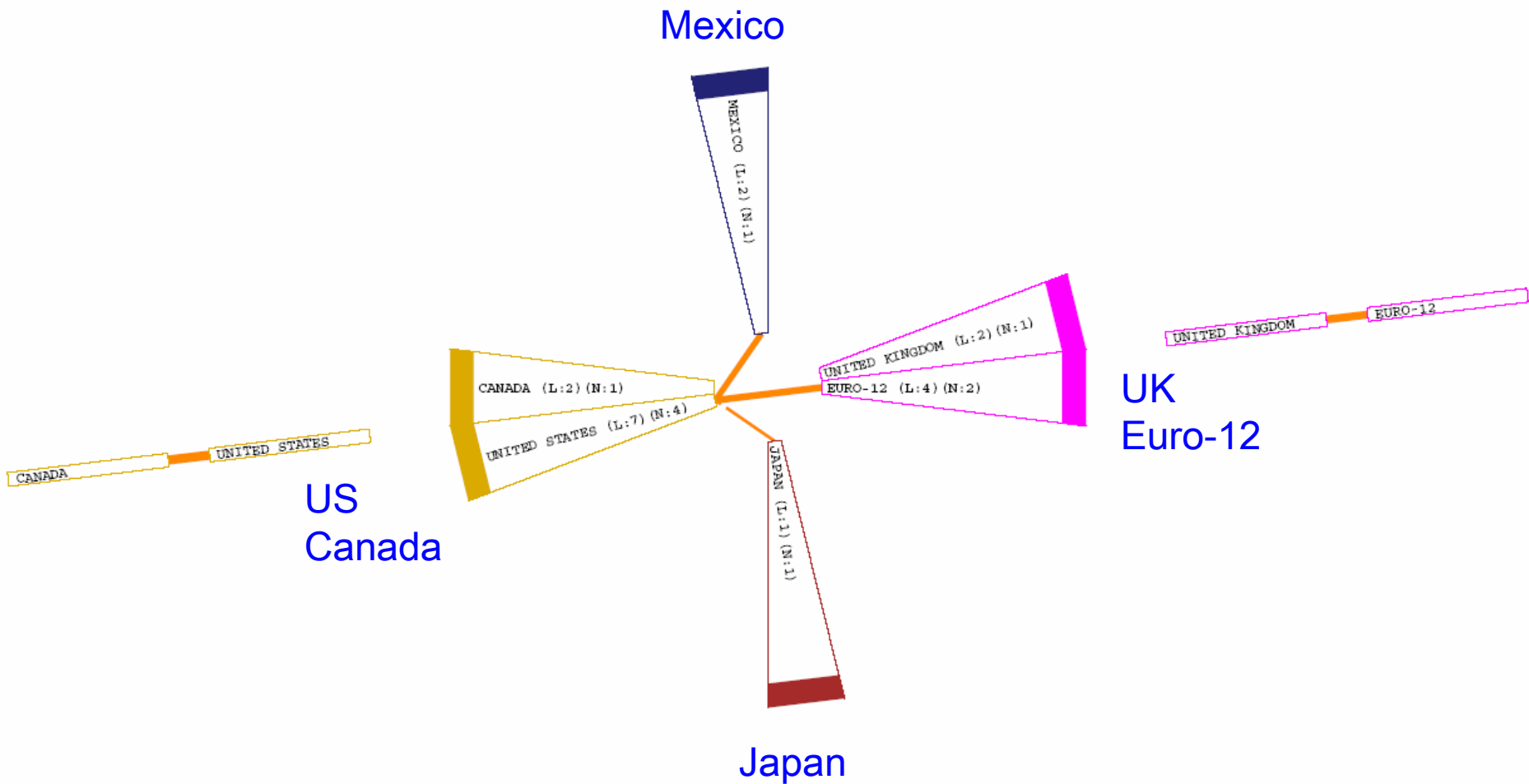
# Concentration of World Trade

## Top 25% in 1990



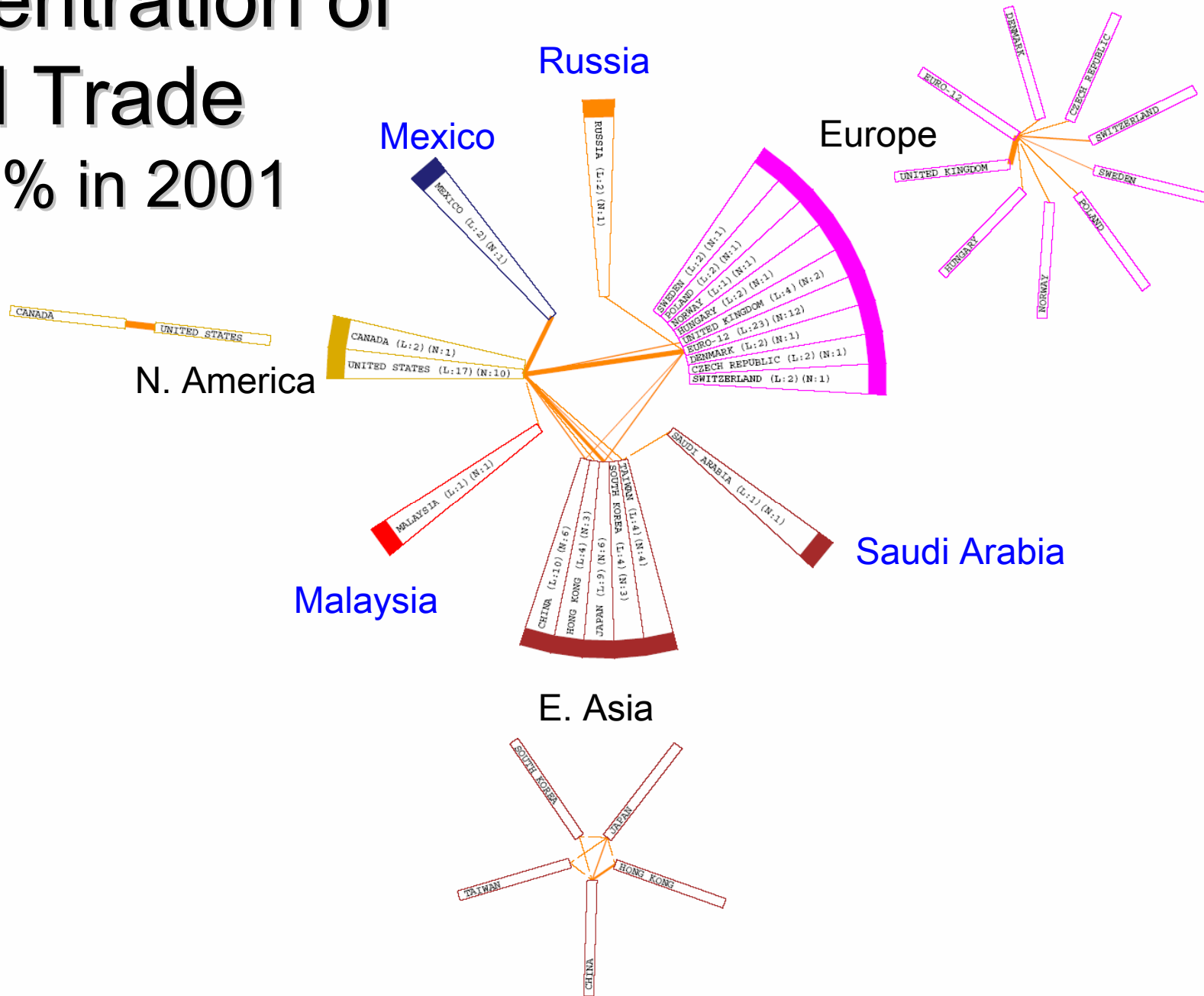
# Concentration of World Trade

## Top 25% in 2001



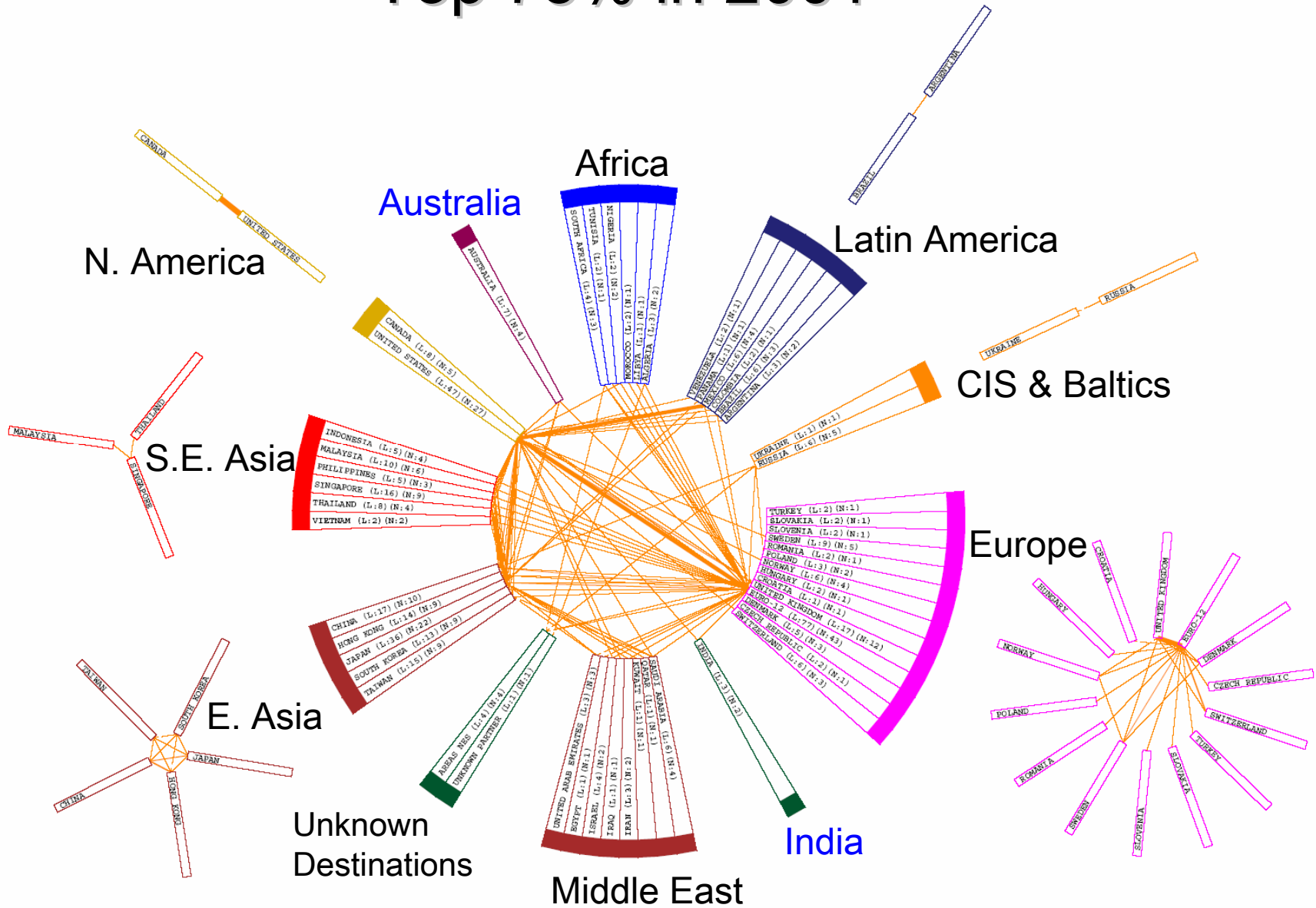
# Concentration of World Trade

## Top 50% in 2001



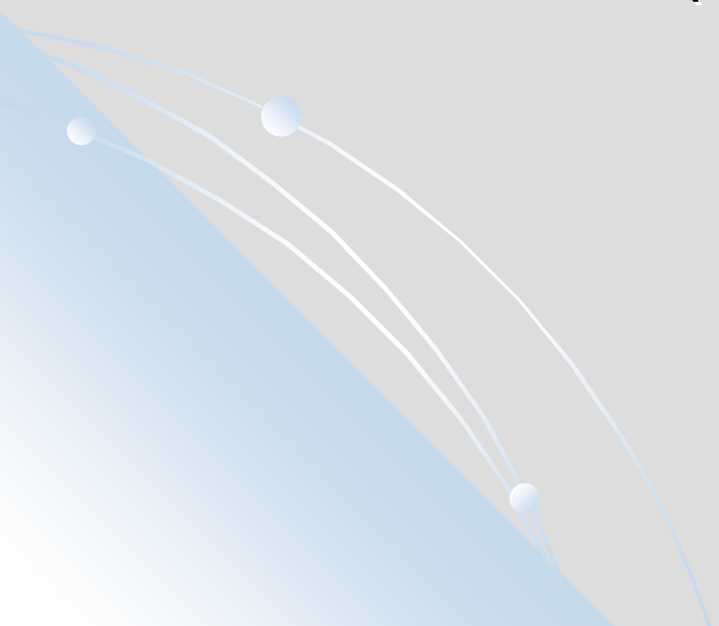
# Concentration of World Trade

## Top 75% in 2001



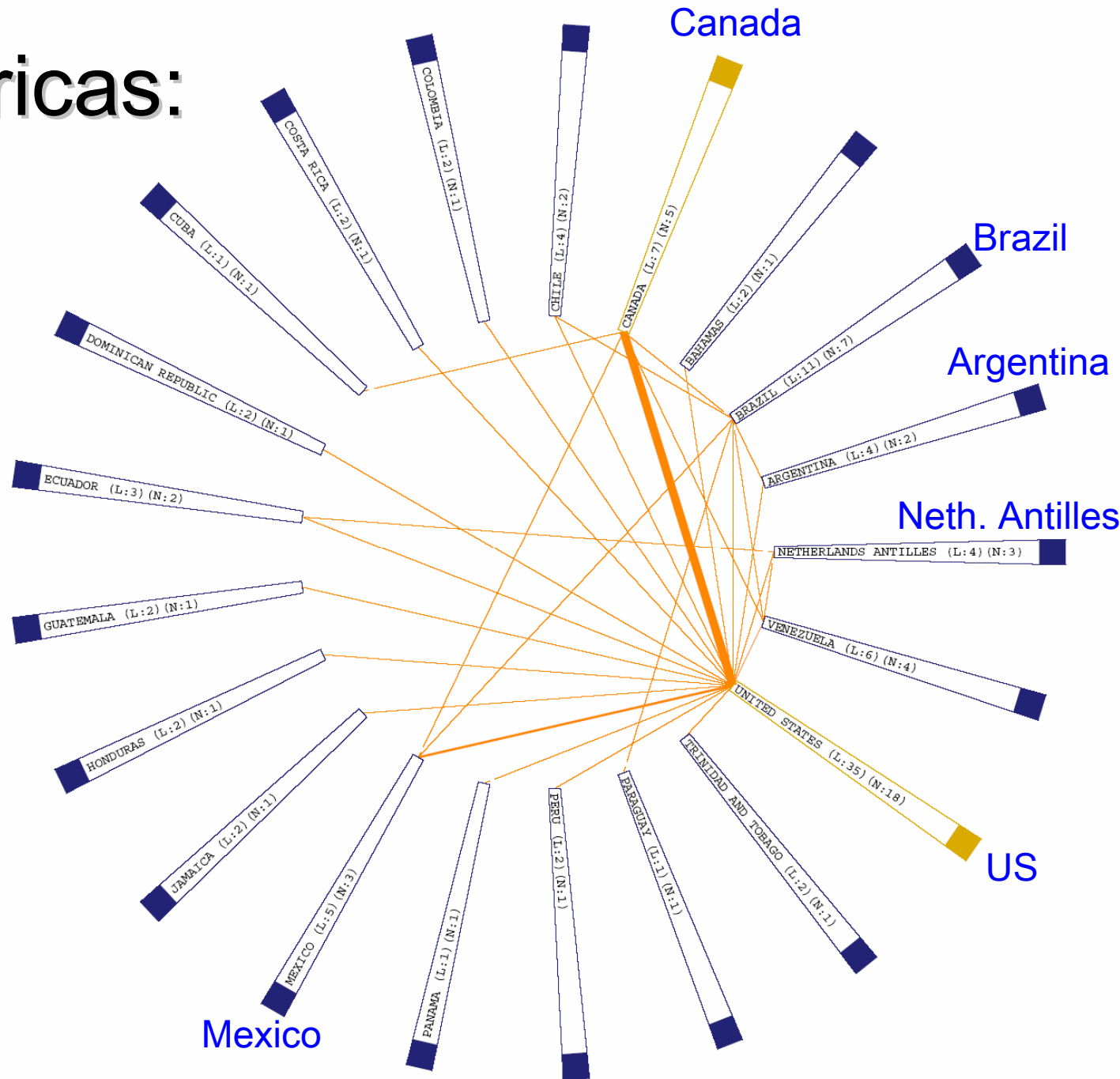
# Issue #2: Regional Effects

- Americas
- NAFTA
- Africa
- South Africa (Fractal?)

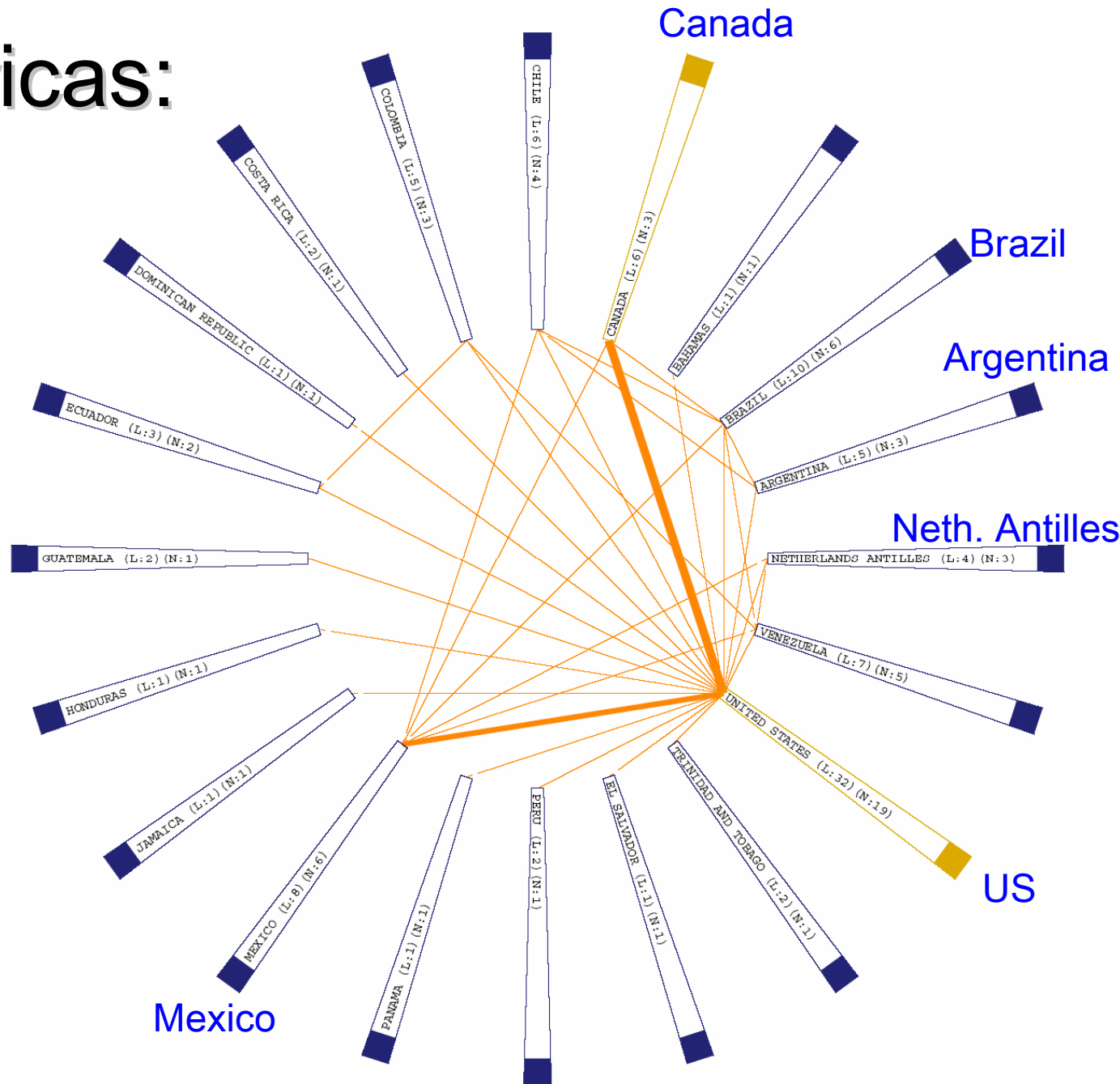


# The Americas: 1980

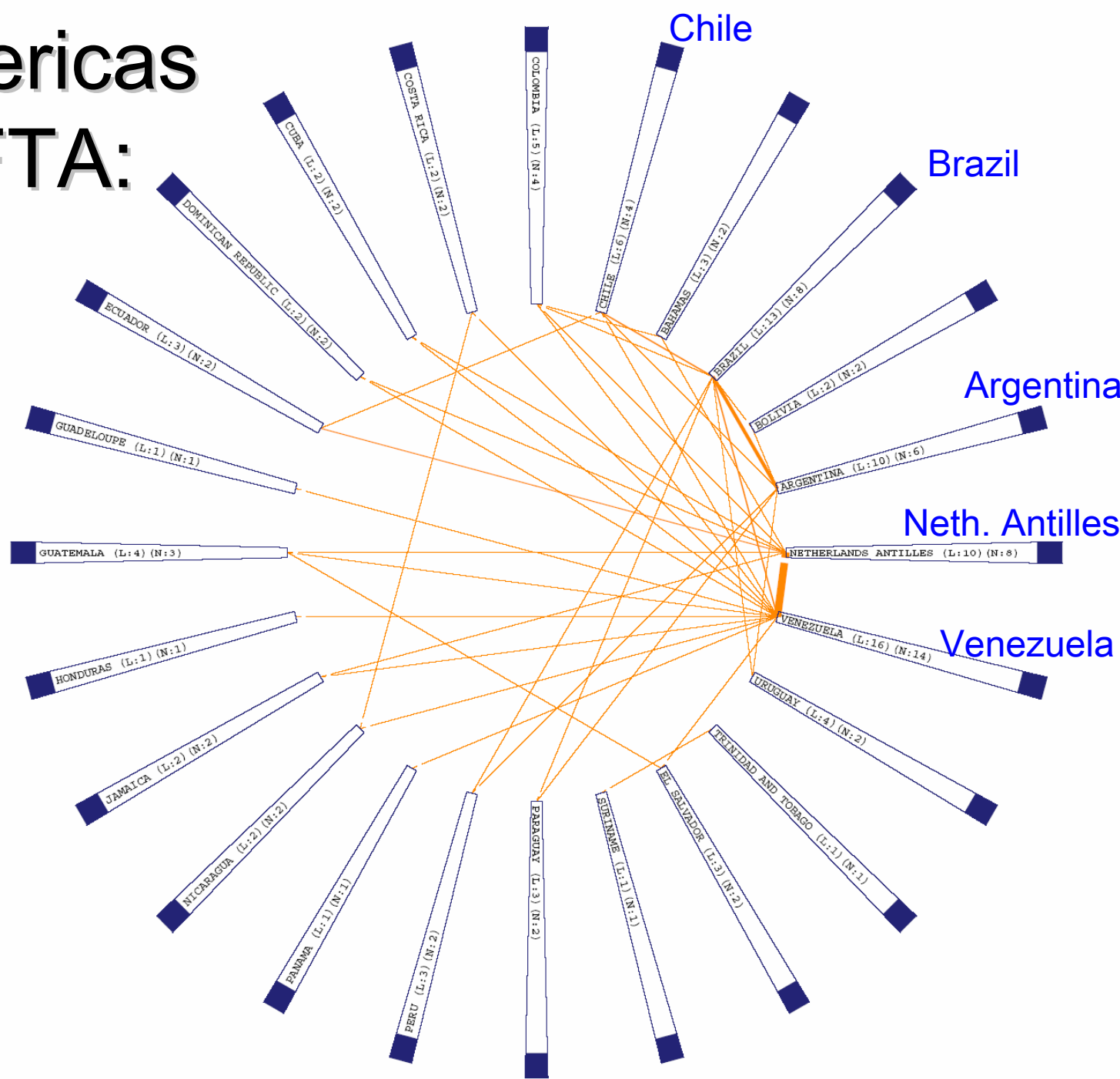
## Fifty Largest Unidirectional Trade Links



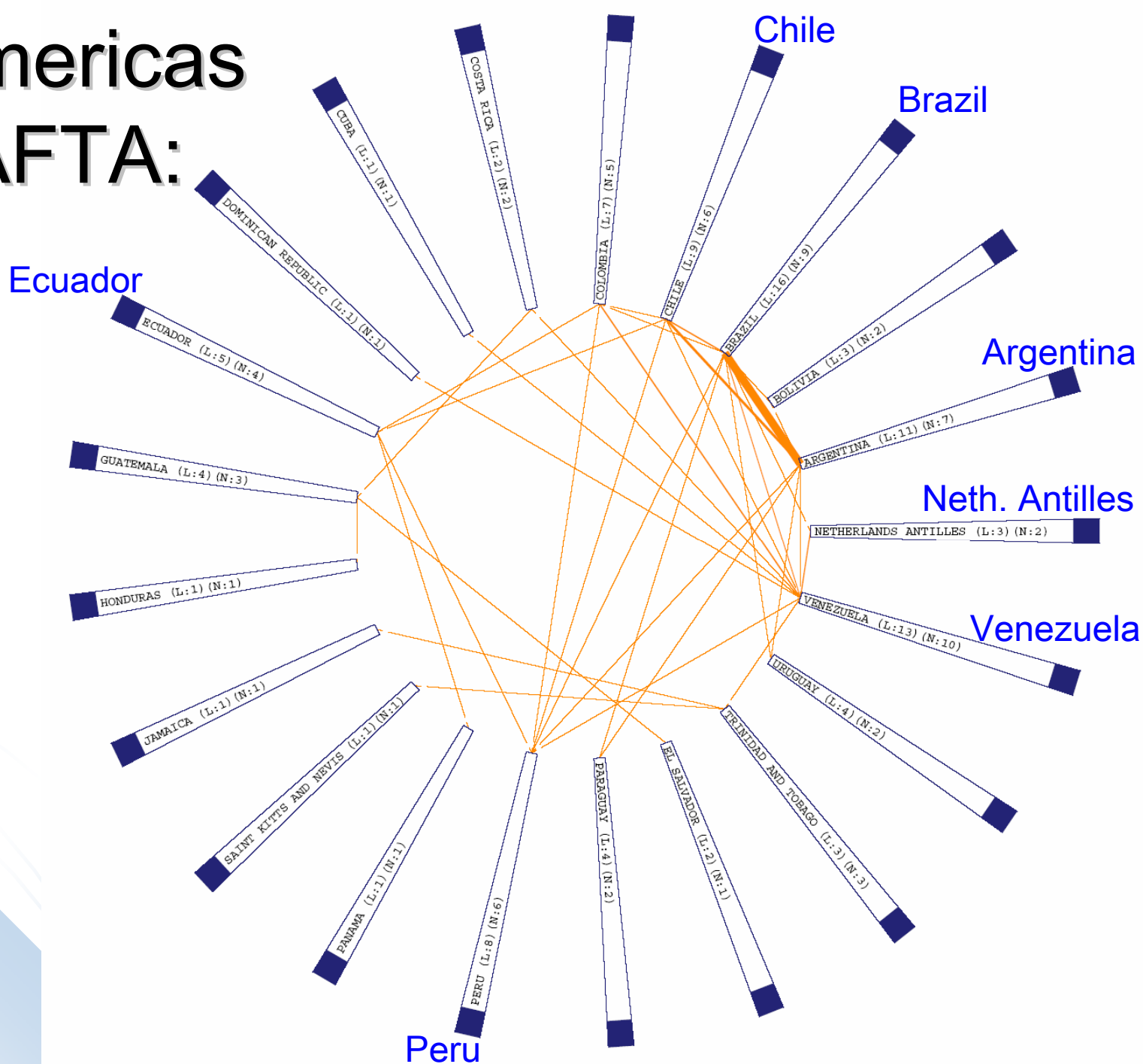
# The Americas: 2001



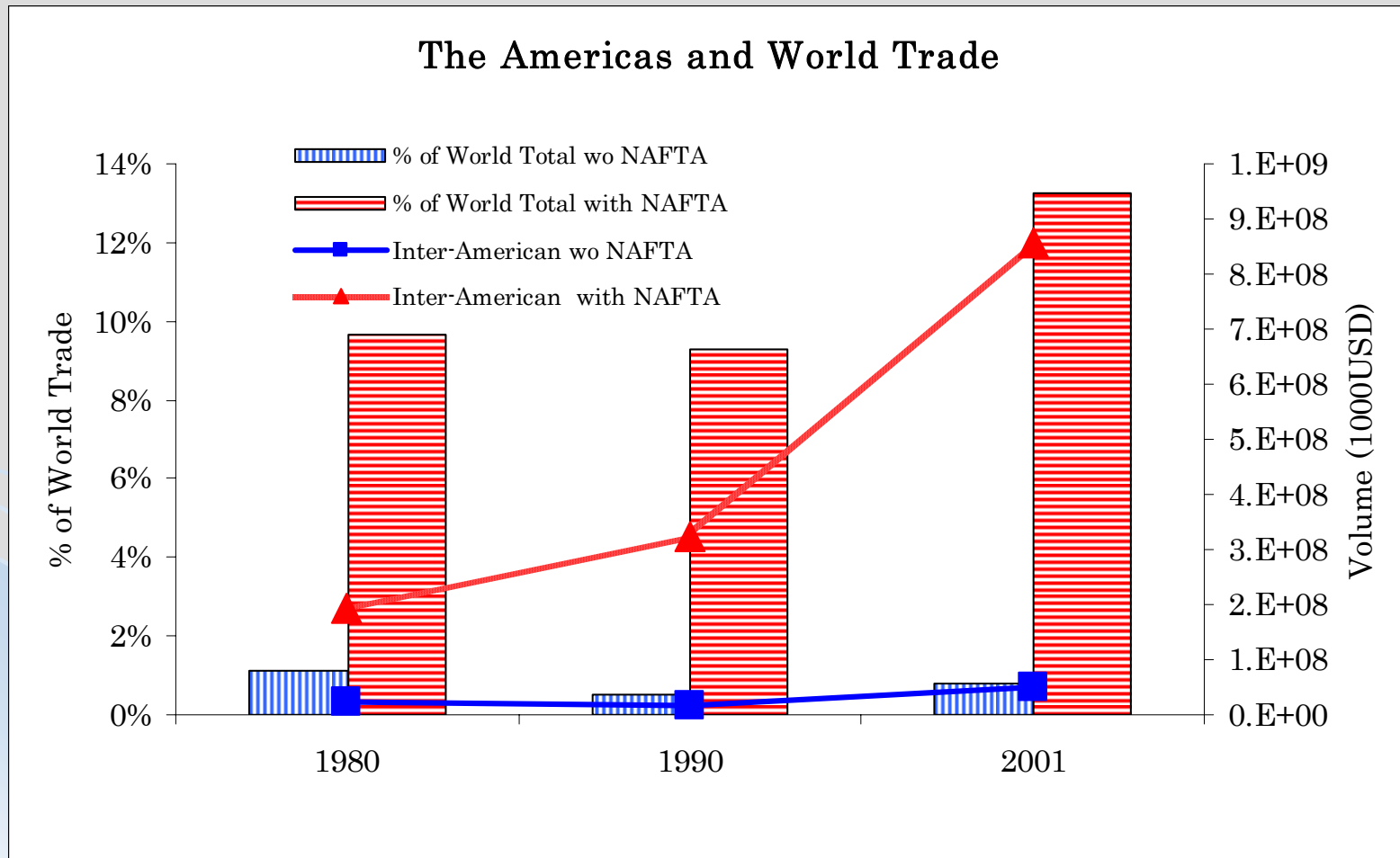
# The Americas w/o NAFTA: 1980



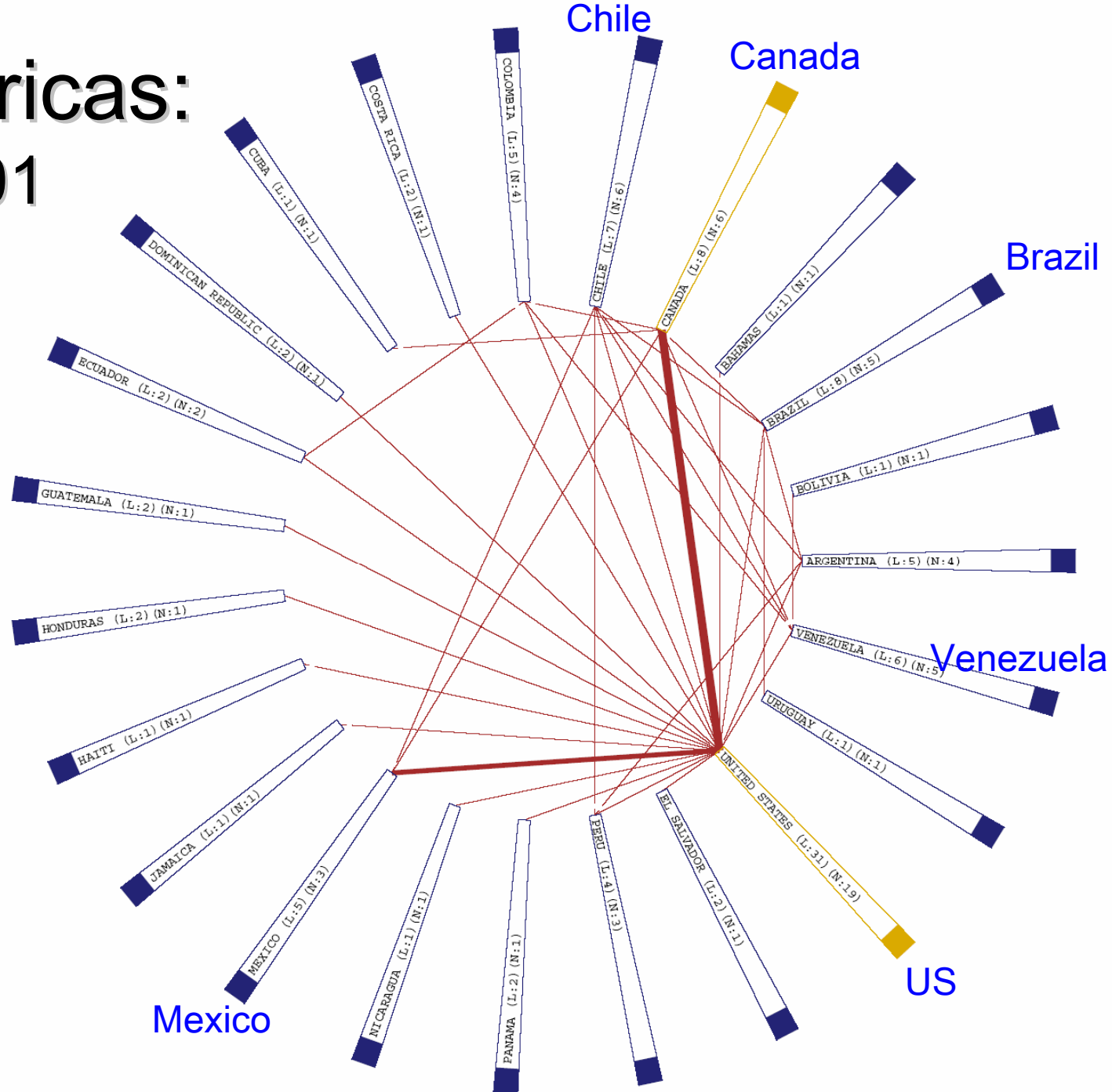
# The Americas w/o NAFTA: 2001



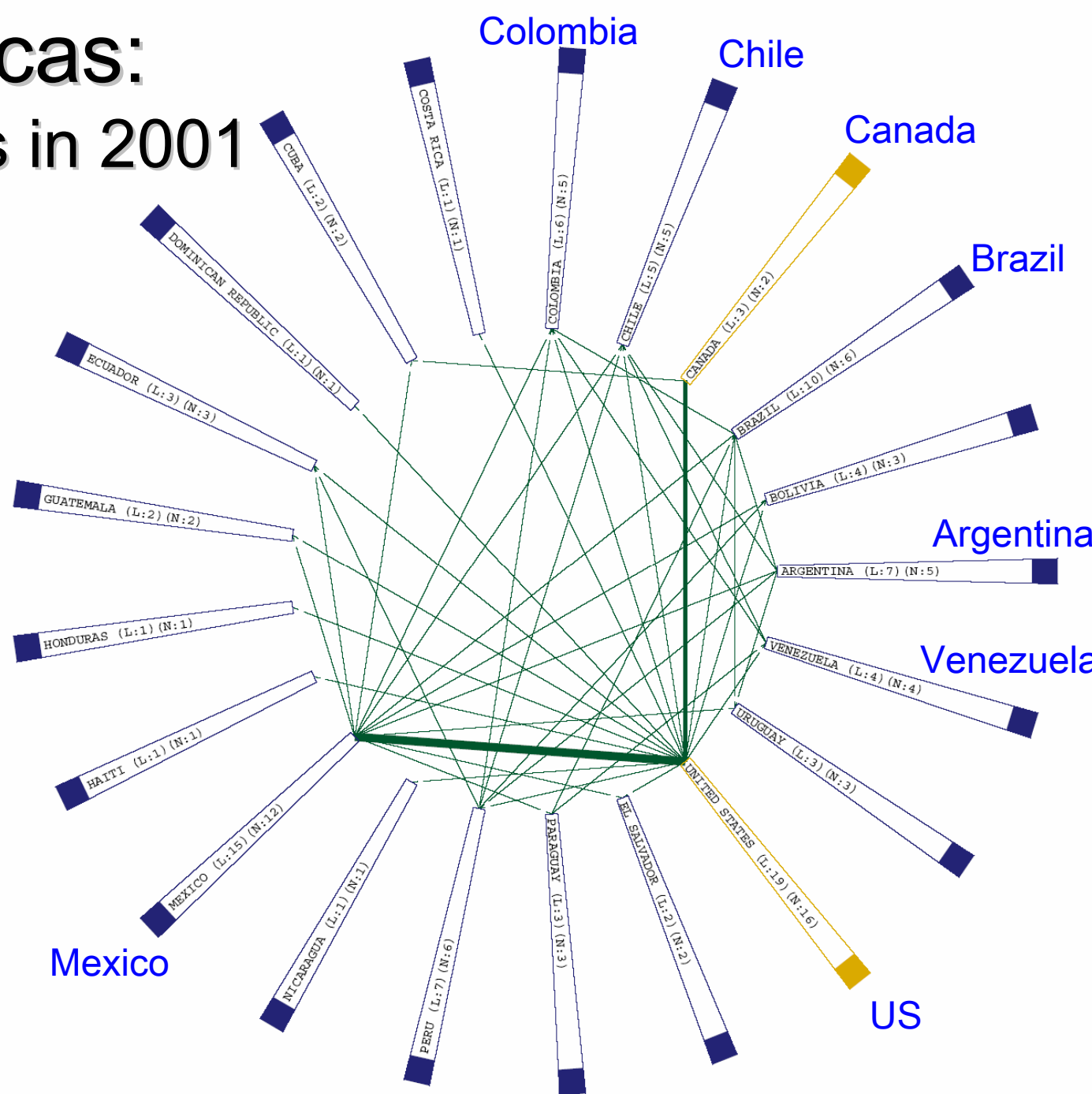
# Americas in World Trade



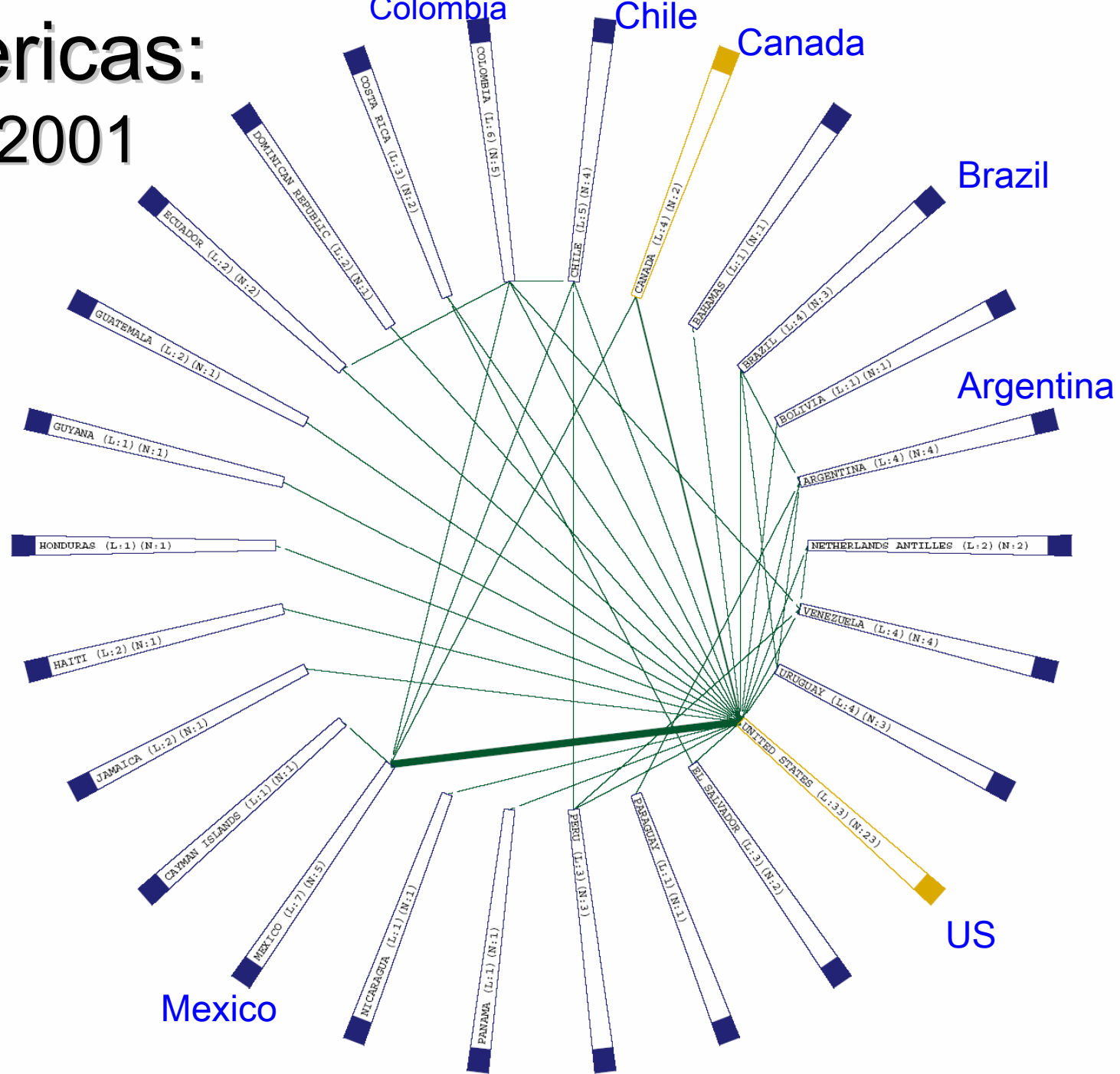
# The Americas: Food in 2001



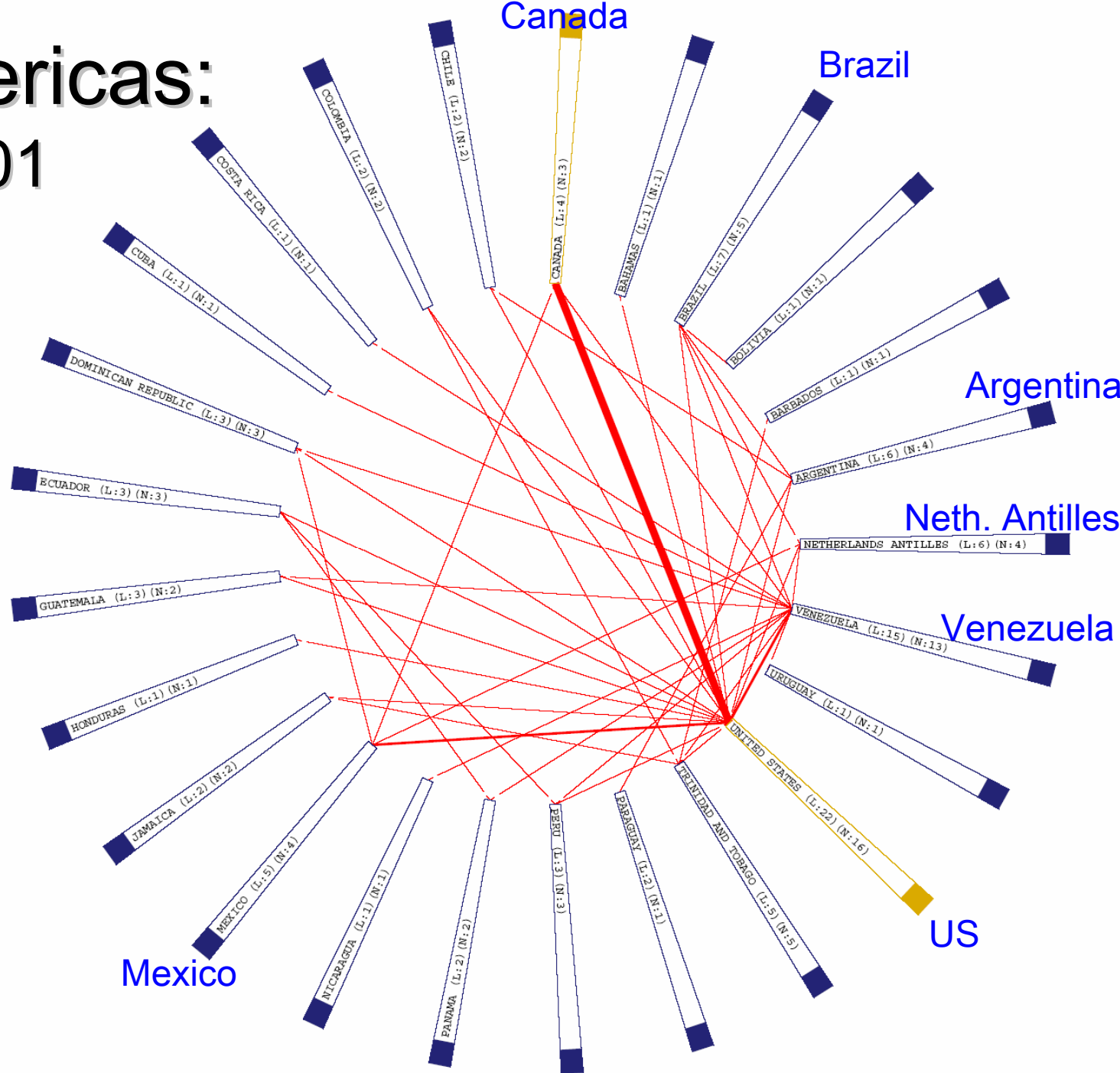
# The Americas: Textile Fibers in 2001



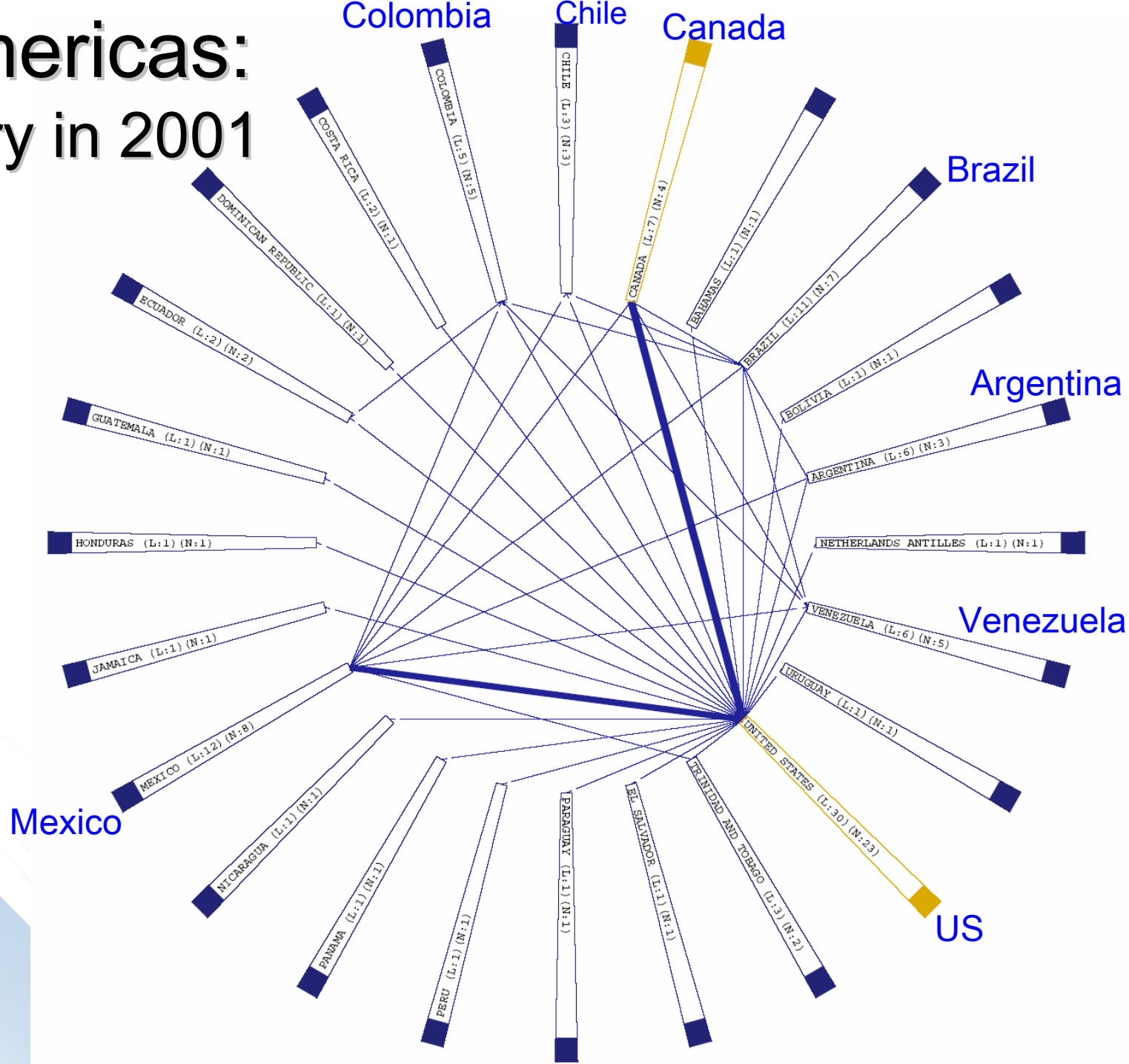
# The Americas: Apparel in 2001



# The Americas: Fuel in 2001



# The Americas: Machinery in 2001



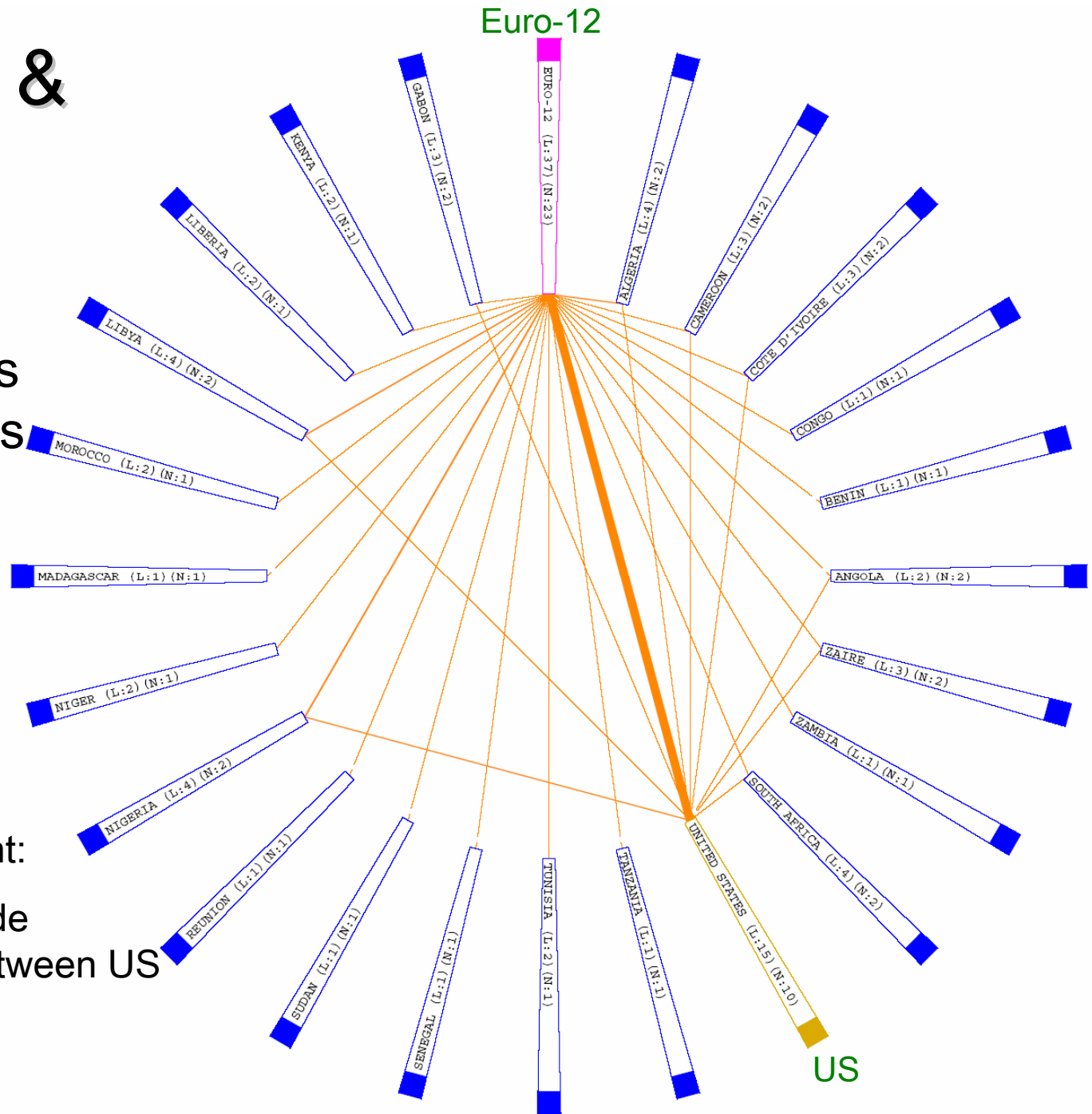
# Africa, US & Euro-12

1980

All Commodities  
50 Largest Links

These links represent:

88.90% of Africa trade  
discounting trade between US  
& Euro-12



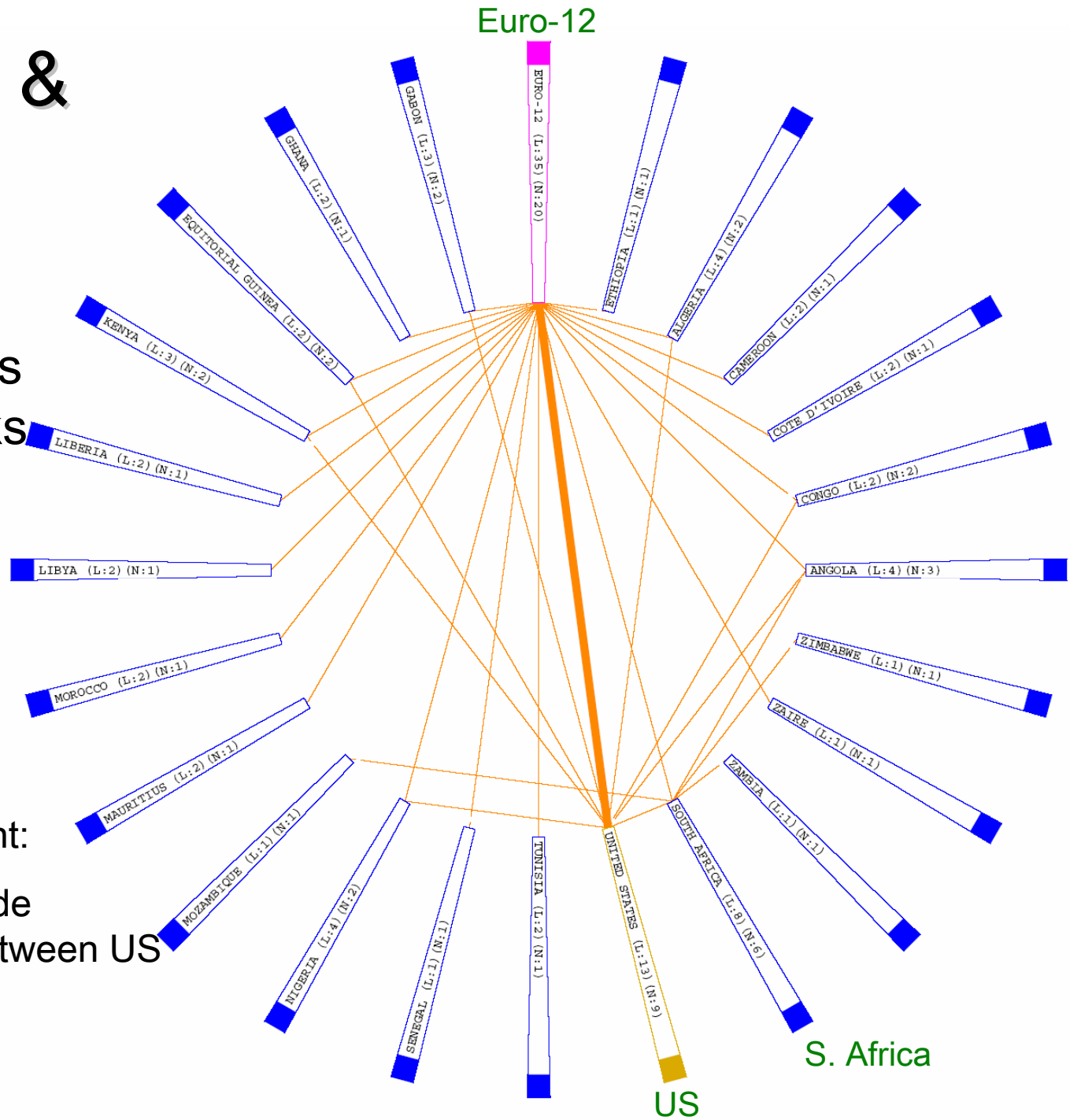
# Africa, US & Euro-12

2001

All Commodities  
50 Largest Links

These links represent:

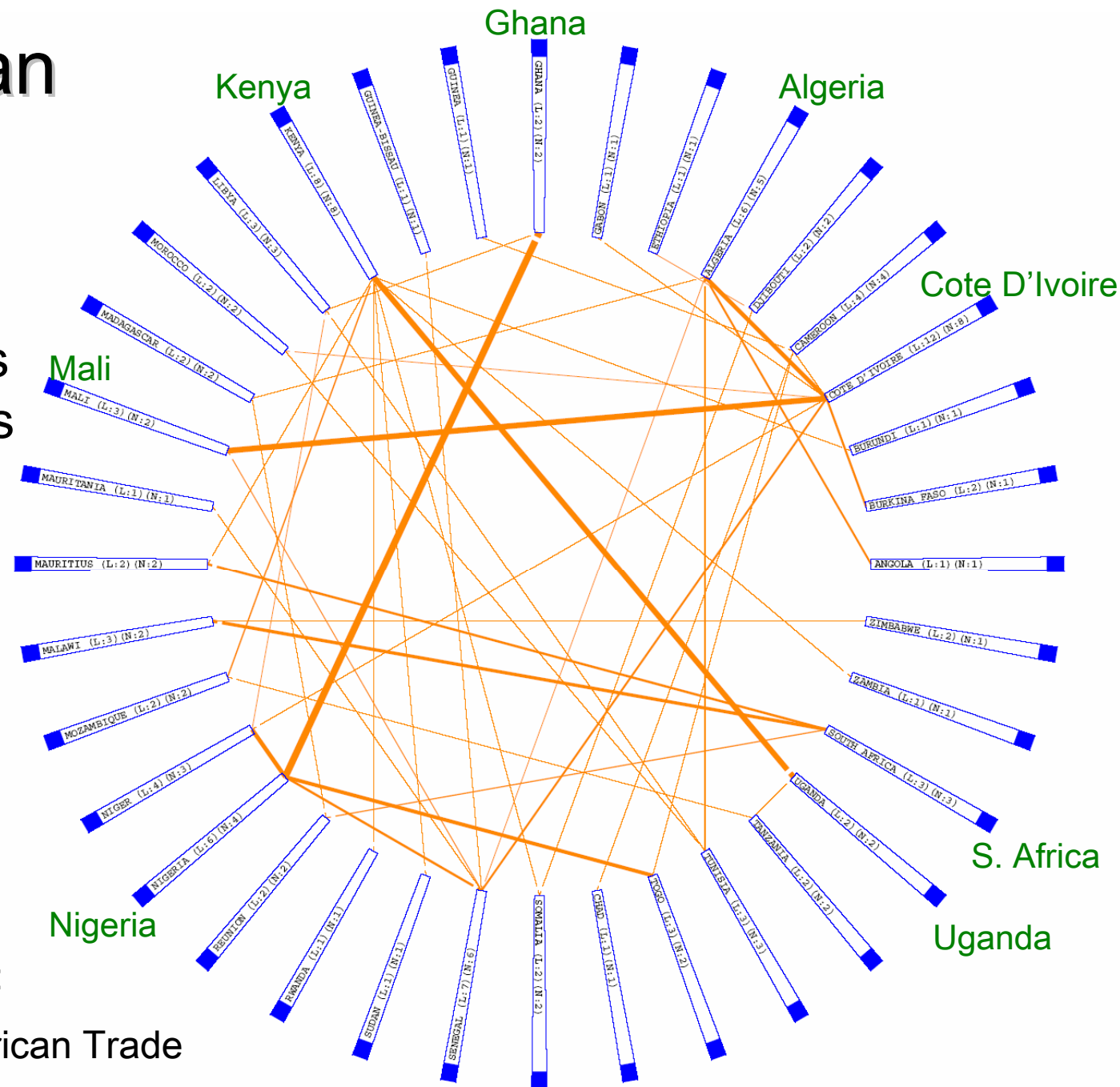
84.65% of Africa trade  
discounting trade between US  
& Euro-12



# Intra-African Trade

1980

All Commodities  
50 Largest Links



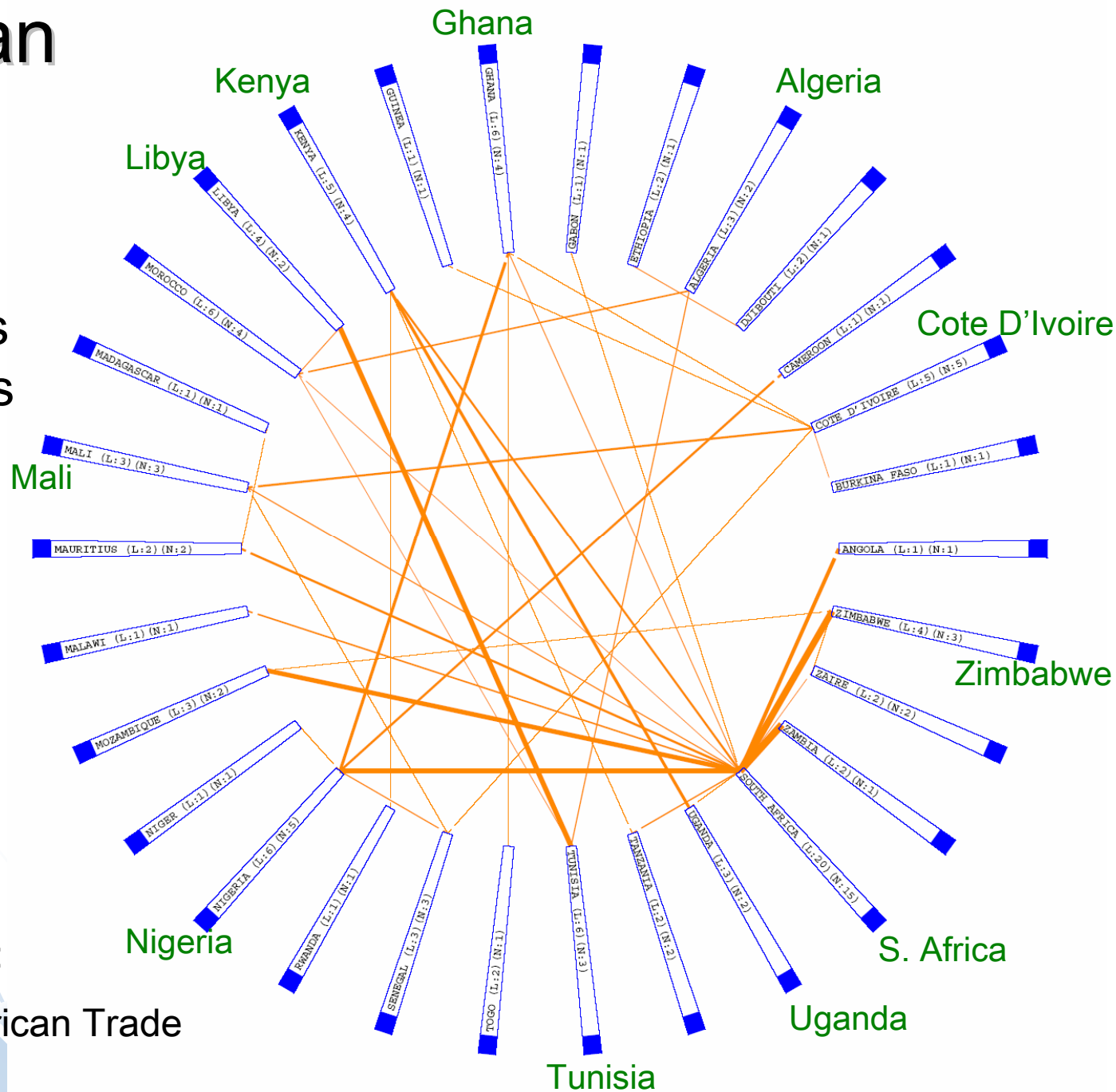
These links represent:

77.52% of All Intra-African Trade

# Intra-African Trade

2001

All Commodities  
50 Largest Links



# Africa in World Trade

| Percent of<br>World Trade for:                            | 1980  | 2001  |
|-----------------------------------------------------------|-------|-------|
| Intra-Africa<br>Trade                                     | 0.11% | 0.13% |
| Africa Trade<br>including Trade<br>with US and<br>Euro-12 | 5.48% | 1.92% |

# Summary and Next Steps

- Nodes: Additional characteristics
  - Empire and “Civilization”
  - World Development Indicators and Economic System
  - Etc.
- Links: Additional transactions
  - Tourism and Air Travel
  - Internet usage and Phone calls
  - Migration
- Layering Structures
  - E.g., Combining trade linkages and cultural information
- Dynamic Modeling
  - E.g., Visualizing change over time or thresholds

Nodes

Links

All

Highlighted Nodes

=

and

Highlighted Nodes

=

☒ Link Filter

Amount

AT LEAST

0

ONLY

Amount

AT LEAST

0

Link type

MajorCategory

MinorCategory

Export

Import

☐ Off ☒ or ☐ and

☐ Off ☒ or ☐ and

☐ Off ☒ or ☐ and

☐ Off ☒ or ☐ and

☒ Off ☒ or ☐ and

☐ Trade

☐ Food

☐ Fuels

☐ Machinery & transport

☐ Other

☐ Total

☐ 0-Food

☐ 00-Live animals

☐ 01-Meat preparations

☐ 0111-Beef

☐ 0113-Pork

☐ 0114-Poultry

☐ 03-Fisheries

☐ 0341-Fish

☐ 0344-Fish frozen fillets

☐ 036-Crustaceans

☐ 04-Cereals

☐ Afghanistan

☐ Albania

☐ Algeria

☐ Angola

☐ Areas nes

☐ Argentina

☐ Armenia

☐ Australia

☐ Austria

☐ Azerbaijan

☐ Bahamas

☐ Afghanistan

☐ Albania

☐ Algeria

☐ Angola

☐ Areas nes

☐ Argentina

☐ Armenia

☐ Australia

☐ Austria

☐ Azerbaijan

☐ Bahamas

☒ Draw Link if

Amount

AT LEAST

0

ONLY

Amount

AT LEAST

0

Link color

MinorCategory

Link style

Directional

Link width

Amount

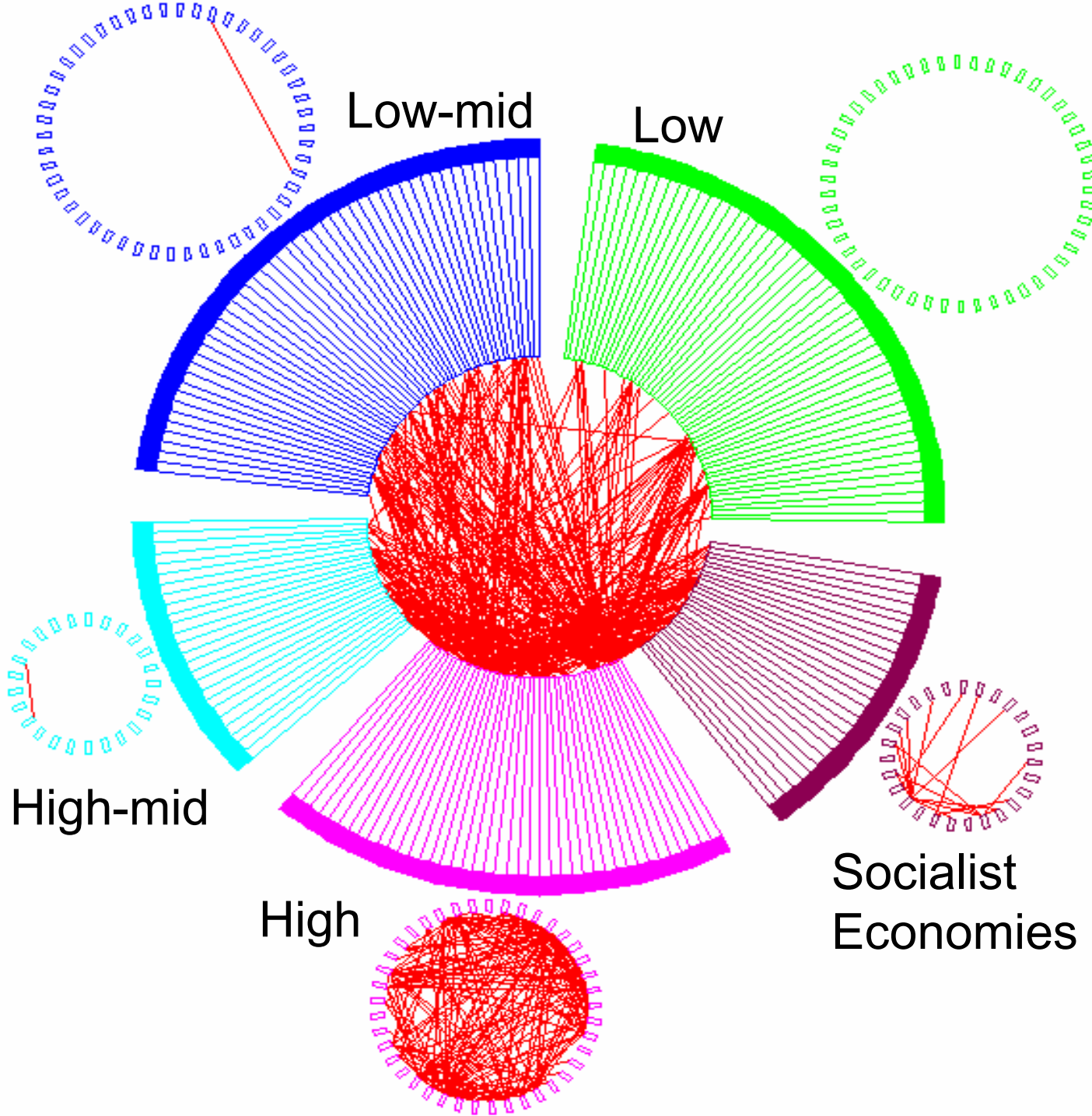
OK

Cancel

Apply

# Telephone Calls 1995

by World Bank  
Estimated  
Income Levels



- Classic display of the relationships predicted by dependency theory.

- Richest countries and even semi-rich (Socialist economies): internally and globally integrated.

- Poorer regions: not well integrated with each other and links only to the rich.

# Schedule 2005-06

- Data uploaded to [www.princeton.edu/~ina](http://www.princeton.edu/~ina)
- Interactive production of Netmap
- Conference March 2006
- Publication of Observing Trade Fall 2006
- Expansion of data and further pubs, 2006-2010.

[www.princeton.edu/~ina/gkg](http://www.princeton.edu/~ina/gkg)