

*Panel Session 1*

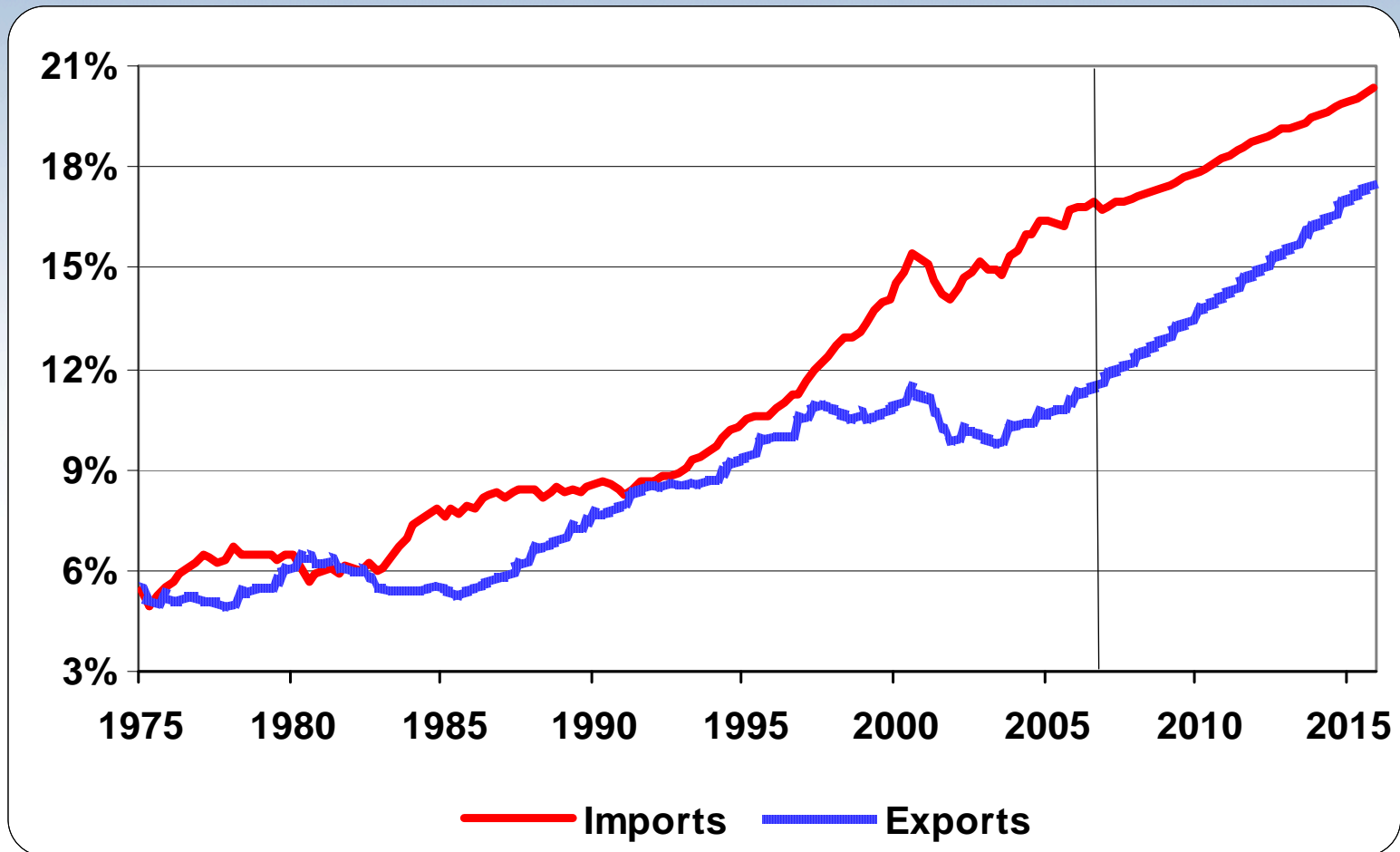
*Economic Costs of Business Interruption  
to the Supply Chain*

***Presented to***



**Paul Bingham  
Global Insight, Inc.  
May 18, 2007**

## Background: Imports and Exports Continue to Increase as a Share of the U.S. Economy

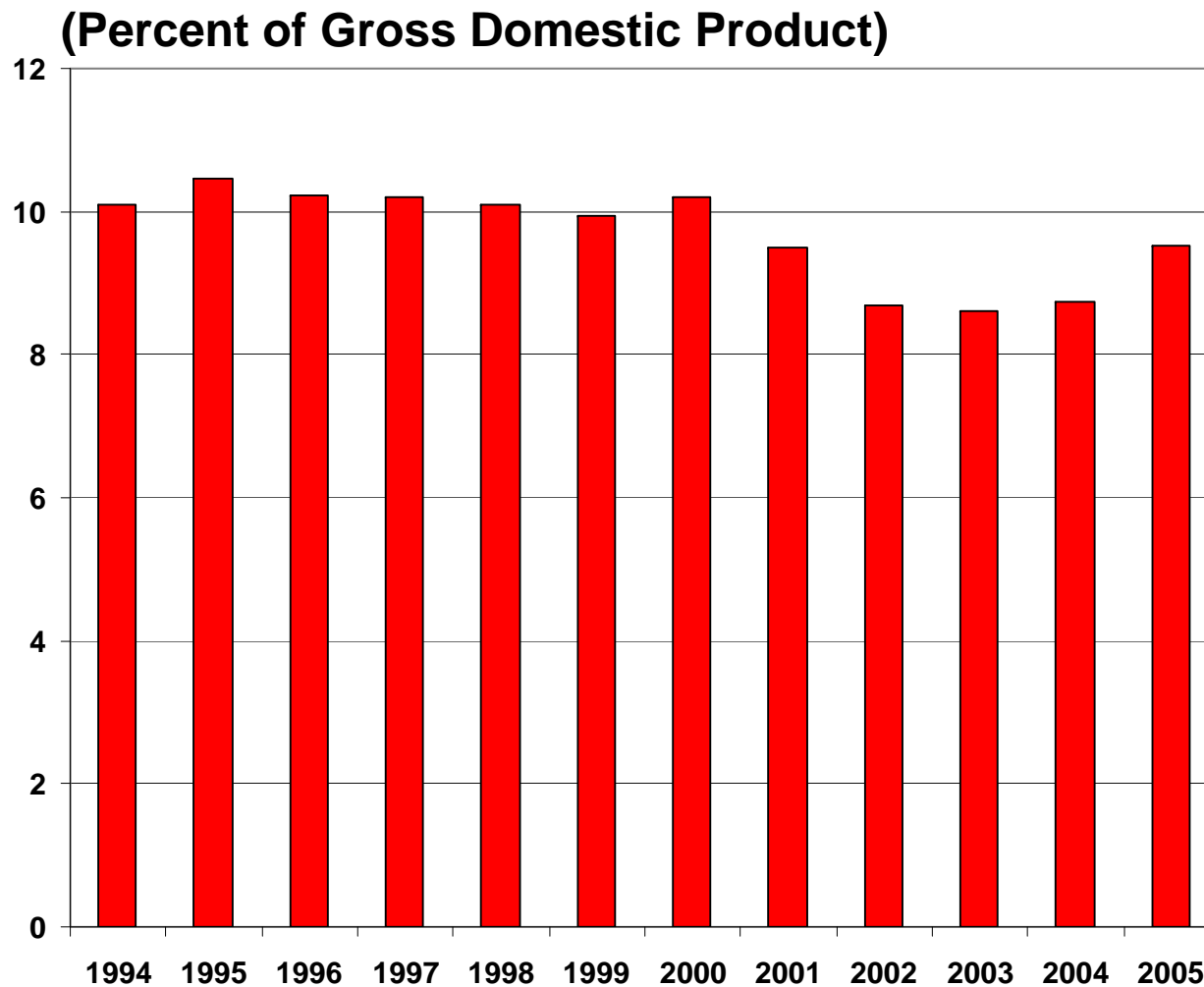


# ***The Role of Supply Chains in the U.S. Economy***

- ◆ U.S. economic growth is predicated on continued trade growth
- ◆ While, the importance of trade in the economy increases, the relative importance of components of U.S. trade vary
  - Example: the relative importance of NAFTA surface trade to the U.S. economy is diminishing in comparison with the growing importance of Asian seaborne containerized supply chains.
- ◆ Trade in lighter weight, higher value products carried in containers continues to outpace trade growth in bulk commodity categories, increasing the relative importance of container ports to the economy
- ◆ Efforts to benefit from economies of scale through use of larger container ships, cranes, and trains reduces the number of potential alternative ports quickly available in case of interruption

**Consequently an interruption to supply chains using gateway container ports is increasingly significant to the U.S. economy**

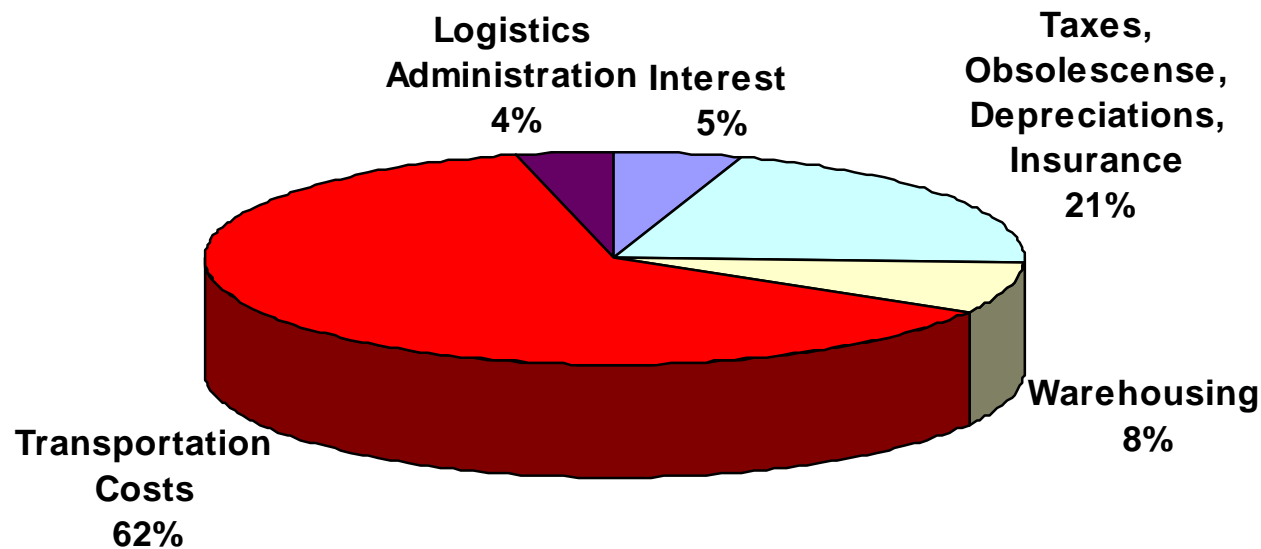
# *Total Logistics Costs Now Increasing as Share of GDP*



Source: Council of Supply Chain Management Professionals, 2006

# Transportation Is Still Most of Total Logistics Costs

(Percent of 2005 Total U.S. Logistics Costs)



Source: Council of Supply Chain Management Professionals, 2006

# Factors Affecting Supply Chain Interruption Costs

## Fundamental to Size of Economic Impacts are:

### ◆ Anticipation

- ◆ Interruptions that can be anticipated, even by hours / days (e.g. lock-out, strike, storm) may have costs reduced by advanced action

### ◆ Duration

- ◆ Interruption impacts are a non-linear function of time. Initial costs of most few-hour disruptions are very low followed by substantially escalating impacts from days to a week to several months after which the overall system will adjust and further impacts will increase at diminishing rates

### ◆ Seasonality

- ◆ Interruption in Peak Season (e.g. October) has greater impact than one of same length and scope in Slow Season (e.g. February)

### ◆ Economic Geographic Scope

- ◆ Interruption impacts increase with share of system capacity affected

These factors are obviously interrelated

# ***Supply Chain Interruptions have both 'Direct' and 'Indirect' Impacts on the U.S. Economy***

**Direct** - the lost economic activity of the port(s) due to a disruption measured as the lost employment of port personnel and the depreciated value of damaged / destroyed port assets (if any)

**Indirect** impacts include:

- lost revenue and employment of associated industries such as port service providers and other parts of the transportation network – ocean carriers, rail freight, and trucking
- The lost output and employment from lower U.S. exports
- The lost output and employment due to the cut-off of imports of intermediate goods to domestic manufacturers
- The indirect effects on output and employment in all industries caused by these first-round indirect effects
- Economy-wide effects on prices, consumer spending, and real Gross Domestic Product (GDP)

## ***Consequences Anticipated from Extended Interruption to Existing Supply Chains Using Seaports***

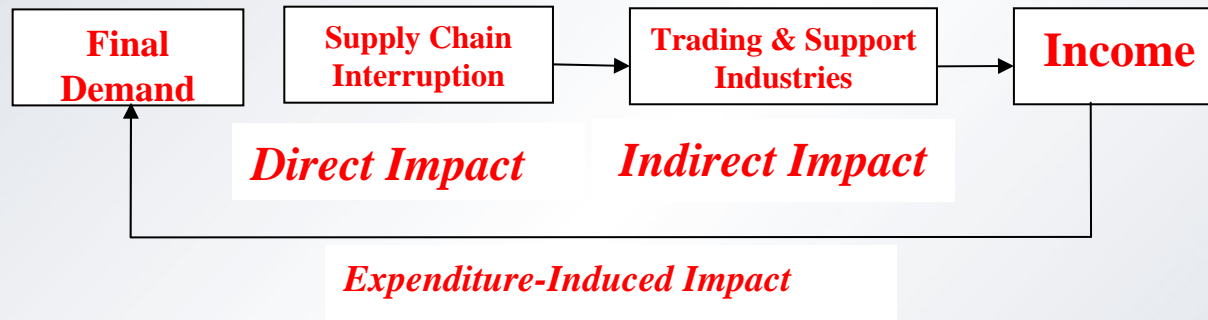
- ◆ **From diversion or lower productivity, the velocity of international supply chains will be slower, raising total delivered costs.**
- ◆ **Cost increases pressure retailers and other importers to re-align sourcing for cost minimization, including shifting between country-of-origin for supply, and/or product substitution**
- ◆ **Importer revisions to supply chains will be gradual as many of the investments and resources already committed are not easy to change overnight; change happens progressively over time.**
- ◆ **Increased costs will be mostly passed through to customers, reducing spending on imports and ultimately reducing economic performance through changes in trade.**

# ***Estimating Permanent Economic Impacts of Interruption***

**Estimating economic impacts of supply chain interruptions requires**

- ◆ **Considering the extent to which the impacted activity represents a permanent economic loss to the economy**
- ◆ **Quantifying the extent to which losses can be recovered by:**
  - (1) the advancement / delay of shipment dates in anticipation of an interruption,**
  - (2) alternative routing to lessen the effects on shippers, and**
  - (3) accelerated production following the end of the interruption**
- ◆ **Advance planning can help facilitate these loss-minimizing steps**

# Framework for Estimating Economic Impacts



# Example Estimate of Economic Impact of Interruptions

(3 sample duration interruptions in Q1 of U.S. West Coast container ports)

<b>Interruption Duration</b>	<b>5-Day</b>	<b>10-Day</b>	<b>20-Day</b>
FTE Jobs Lost	- 155,000	- 162,000	- 364,000
Personal Income	- \$0.6 Billion	- \$1.2 Billion	-\$7.3 Billion
U.S. Real GDP	< - \$1 Billion	- \$2.1 Billion	- \$15.6 Billion

Source: Global Insight, Inc.; Note: FTE is Full Time Equivalent job

# ***Infrastructure and Logistics Can Amplify or Reduce Economic Impacts of Disruptions to Supply Chains***

- ◆ **Ports and Maritime Terminals**
  - ◆ **Reserve capacity limitations, either operational and physical**
- ◆ **Inland Rail and Truck Transport Infrastructure**
  - ◆ **Geographic concentration of port corridors and terminals**
  - ◆ **Lack of slack capacity (safety stock of throughput service capacity)**
  - ◆ **Trucking networks more dynamic than fixed rail networks; both face capacity limitations, especially in the short run**
  - ◆ **Degree of uniqueness of port trucking and rail operating practices is correlated with the costs for substitutes**
- ◆ **Lean logistics practices**
  - ◆ **Using trucks and terminal storage as warehousing**

# ***Summarizing Supply Chain Interruption Impacts***

- ◆ **Seaport gateways serving international supply chains are increasingly important to U.S. trade and the economy**
- ◆ **The nature of an interruption is critical to estimating its cost**
- ◆ **Supply chain interruptions have the potential for significant permanent impacts on the economy within just a few weeks duration**
- ◆ **Underlying capacity and productivity challenges may amplify impacts of any interruption or help mitigate them**
- ◆ **Planning can help reduce economic cost of interruptions**



## *Thank You*

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# Discussion

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