The U.S.-Mexican Border Crossing for Trucks: 20 Years After NAFTA

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Practical Effects of Non Tariff Barriers
Organization of talk

- NAFTA borders:
  - U.S.-Mexico
  - U.S.-Canada
- Security after 9/11
- Homeland Security’s CT-PAT
- Modeling institutional and security border frictions
NAFTA
Bilateral Trade
U.S.-Mexico

Billions of US Dollars

US Exports to Mexico
US Imports from Mexico
Total Bilateral Trade
U.S.-Mexico Bilateral Trade during NAFTA

Billions of US Dollars

- US Exports to Mexico
- US Imports from Mexico
- Total Bilateral Trade
Surface Exports to Mexico 2007-2009 (Shipment Value in U.S. $ Millions)

Source: U.S. Bureau of Transportation Statistics, U.S. Department of Transportation
Truck trade with Canada and Mexico, 2004-2012 (million Jan. 2004 dollars)

BTS: North American Transborder Freight Data
http://transborder.bts.gov/programs/international/transborder/index/Index_Interface.html
NAFTA Border Crossing
Current Situation
Objectives

- Conceptual framework for understanding the economics of cross-border trucking problems:
- Determine the extent of inefficiencies at Laredo, the prominent border crossing
- Quantify times and costs
- Define and analyze factors that explain the difference between the economically efficient solution and reality
- Estimate the impact of border-related inefficiencies on trade flows and welfare
The Context U.S. - Mexican Border
Laredo, Texas
World Trade Bridge
Value (U.S.$) of Top Ten Commodities Transported from Mexico to the U.S. by Truck (2009)

<table>
<thead>
<tr>
<th>Rank</th>
<th>Commodity</th>
<th>Value (U.S.$)</th>
</tr>
</thead>
<tbody>
<tr>
<td>85</td>
<td>Electrical machinery and equipment and parts thereof</td>
<td>$42,216,608,267</td>
</tr>
<tr>
<td>84</td>
<td>Nuclear reactors, boilers, machinery &amp; mechanical appliances</td>
<td>19,836,623,441</td>
</tr>
<tr>
<td>87</td>
<td>Vehicles, other than railway or tramway rolling stock</td>
<td>10,647,803,730</td>
</tr>
<tr>
<td>90</td>
<td>Optical, photographic, cinematographic, measuring, medical instruments</td>
<td>6,863,313,911</td>
</tr>
<tr>
<td>98</td>
<td>Special classification provisions</td>
<td>4,116,115,195</td>
</tr>
<tr>
<td>94</td>
<td>Furniture, bedding, mattress supports, cushions and similar stuffed furnishings</td>
<td>3,785,123,373</td>
</tr>
<tr>
<td>7</td>
<td>Edible vegetables and certain roots and tubes</td>
<td>3,130,569,686</td>
</tr>
<tr>
<td>8</td>
<td>Edible fruit and nuts; Peel of citrus fruit or melons</td>
<td>2,272,550,633</td>
</tr>
<tr>
<td>39</td>
<td>Plastics and articles thereof</td>
<td>2,029,558,486</td>
</tr>
<tr>
<td>71</td>
<td>Natural or cultured pearls, precious or semiprecious stones, precious metals; metals clad with precious metal, and articles thereof; imitation jewelry; coin</td>
<td>1,963,315,386</td>
</tr>
</tbody>
</table>

**Top Ten Total by Truck**

- $96,861,582,108

**Total, All Commodities by Truck**

- $117,787,364,033

**Total, All Commodities, All Modes**

- $176,537,048,132
Value (U.S. $ of Top Ten Commodities Transported from U.S. to the Mexico by Truck (2009))

<table>
<thead>
<tr>
<th>Rank</th>
<th>Description</th>
<th>Value</th>
<th>Percentage</th>
</tr>
</thead>
<tbody>
<tr>
<td>85</td>
<td>Electrical machinery and equipment and parts thereof</td>
<td>$50,612,889,471</td>
<td>37.7%</td>
</tr>
<tr>
<td>84</td>
<td>Nuclear reactors, boilers, machinery &amp; mechanical appliances</td>
<td>$21,595,980,024</td>
<td>16.1%</td>
</tr>
<tr>
<td>87</td>
<td>Vehicles, other than railway or tramway rolling stock</td>
<td>$11,080,647,279</td>
<td>8.3%</td>
</tr>
<tr>
<td>90</td>
<td>Optical, photographic, cinematographic, measuring, medical instruments</td>
<td>$7,143,155,181</td>
<td>5.3%</td>
</tr>
<tr>
<td>94</td>
<td>Furniture, bedding, mattress supports, cushions and similar stuffed furnishings</td>
<td>$4,958,989,364</td>
<td>3.7%</td>
</tr>
<tr>
<td>98</td>
<td>Special classification provisions</td>
<td>$4,485,700,134</td>
<td>3.3%</td>
</tr>
<tr>
<td>7</td>
<td>Edible vegetables and certain roots and tubes</td>
<td>$3,246,464,060</td>
<td>2.4%</td>
</tr>
<tr>
<td>73</td>
<td>Articles of iron and steel</td>
<td>$2,503,156,759</td>
<td>1.9%</td>
</tr>
<tr>
<td>62</td>
<td>Articles of apparel and clothing accessories, not knitted or crocheted</td>
<td>$2,244,881,213</td>
<td>1.7%</td>
</tr>
<tr>
<td>39</td>
<td>Plastics and articles thereof</td>
<td>$2,154,240,298</td>
<td>1.6%</td>
</tr>
</tbody>
</table>

**Top Ten Total by Truck**

| Total | $110,026,103,783 | 82.0% |

**Total, All Commodities by Truck**

| Total | $134,224,191,876 |

**Total, All Commodities, All Modes**

| Total | $215,914,854,328 |
Current Situation
What drives economic distance?
- Geographic distance (~$1.33/mile)
- Payments at the border ($300—$650 per truckload)
- Delays at the border (2—5 days)

Result: border frictions add thousands of miles of economic distance
Institutions that Benefit from Border Crossing Inefficiencies

- Mexican brokers
- The Laredo - Nuevo Laredo drayage industry
- U.S. banks that finance the construction of warehouses
- State and municipal governments on both sides who receive toll payments
- The Mexican states that receive a share of Customs tax collections
- The entire regional economy that provides jobs, goods and services
Canadian Border

- Much more efficient crossing
- No mechanism like Mexican brokers: shippers are bonded, guaranteeing payments for taxes or fees later
- (Mostly) shared language, cultural heritage, legal and political systems yield a more tightly integrated border
- 9/11, however, changed security
Customs-Trade Partnership Against Terrorism: C-TPAT

- System to improve security while minimizing border delays
- Voluntary private-public partnership
Goals of C-TPAT

- Stop terrorists and weapons
- Facilitate flow of legitimate trade
- Focus on higher-risk shipments
- Internalize principles of supply chain security
- Support other CBP initiatives (Free and Secure Trade, Smart Box, Container Security Initiative)
C-TPAT: Graduated Security for Shippers

- First applicant: no special benefits
- Tier 1
  - small reduction in inspections
  - front of line treatment
  - assigned a supply chain security specialist
  - invited to C-TPAT supply chain security conference
- Tier 2: Tier 1 benefits plus...
  - significant reduction in inspections
- Tier 3: Tier 2 benefits plus...
  - fewer inspections per year
Border Security and Delays between Canada and the United States

- Ontario Chamber of Commerce (2004):
  - Southbound delays 30-60 minutes
  - Northbound delays 10 min-4 hours
  - Estimate $1,100/yr for Ontarians

- Nguyen and Wigle (2009):
  - Delays cost Canada 1.0-1.8% of welfare

- Georges, Mérette and Zhang (2011):
  - Model adds detailed FDI features
  - Post-9/11 measures cost Canada 2.3% welfare
  - Removing measures slightly reduces U.S. welfare (-0.11%)
Macroeconomic Effect of Border Crossing Inefficiencies

- GTAP model appropriate framework for analysis
- Micro effect of Laredo border inefficiencies apparently minimal: 1-2 percent money to brokers
- Time is a more important variable: Hummels estimates that each day saved in shipping is worth 0.8% ad valorem for manufactured goods. 2-5 days are equivalent to 1.6% - 4%
Our first approach: no security effects

- Time lost at the border is a deadweight loss
- Costs of Mexican brokers treated as a tariff (tms) or export tax (txs) on Mexican trade
- Policies applied to sectors where trucking dominates (food & ag, other prim. Prod’n, motor vehicles & parts, electronic equip., other mfg)

<table>
<thead>
<tr>
<th>Variable shocked*</th>
<th>Southbound</th>
<th>Northbound</th>
</tr>
</thead>
<tbody>
<tr>
<td>Barrier</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Lost time</td>
<td>$\Delta \text{ams}(T, \text{US, Mex}) = +3%$</td>
<td>$\Delta \text{ams}(T, \text{Mex, US}) = +0.25%$</td>
</tr>
<tr>
<td>Brokerage frictions</td>
<td>$\Delta \text{tms}(T, \text{US, Mex}) = -2%$</td>
<td>$\Delta \text{txs}(T, \text{Mex, US}) = -0.75%$</td>
</tr>
</tbody>
</table>

*T is the set of commodities shipped predominantly by truck.
Our new approach: proportionate frictions, add security

- Mexican frictions proportionate to otp’s importance:
  \[
  F(T, US, Mex) = \frac{vtwr(otp, T, US, Mex)}{\sum_M vtwr(M, T, US, Mex)}
  \]

- Security treated as lost time, assume U.S. entry twice as costly as Canadian or Mexican entry, apply to all goods trade

- Sensitivity analysis on ams shock: 1, 2, and 4 percent (0.5, 1 and 2 for Canada, Mexico)
## Welfare (million $2007)

<table>
<thead>
<tr>
<th>Sim</th>
<th>Lost time</th>
<th>Broker friction</th>
<th>Security friction</th>
<th>USA</th>
<th>Mexico</th>
<th>Canada</th>
<th>World</th>
</tr>
</thead>
<tbody>
<tr>
<td>1</td>
<td>Original</td>
<td>Original</td>
<td>None</td>
<td>2,362</td>
<td>3,461</td>
<td>-224</td>
<td>3,465</td>
</tr>
<tr>
<td>2</td>
<td>Proportionate</td>
<td>Proportionante</td>
<td>None</td>
<td>324</td>
<td>509</td>
<td>-29</td>
<td>573</td>
</tr>
<tr>
<td>3</td>
<td>Original</td>
<td>Original</td>
<td>Low</td>
<td>5,635</td>
<td>5,832</td>
<td>2,204</td>
<td>9,574</td>
</tr>
<tr>
<td>4</td>
<td>Original</td>
<td>Original</td>
<td>Mid</td>
<td>8,927</td>
<td>8,220</td>
<td>4,670</td>
<td>15,750</td>
</tr>
<tr>
<td>5</td>
<td>Original</td>
<td>Original</td>
<td>High</td>
<td>15,561</td>
<td>13,038</td>
<td>9,709</td>
<td>28,288</td>
</tr>
</tbody>
</table>
Results and Conclusions

- Mexican brokers cost Mexico $3.5 billion, US $2.4 billion (2007 dollars). 2003 study found $1.8 billion and $1.3 billion, respectively (1997 dollars).

- Security isn’t free. Rough estimate of NAFTA-wide cost is $8 billion - $32 billion per year.

- Reducing frictions promotes better utilization of transport equipment, savings in other capital investments, infrastructure construction, maintenance, and pollution.
Remaining work

- Waiting on new shipper survey data
- Better parameterization of security frictions, by partner and direction of trade
- Better measures of proportion of GTAP sectoral trade by truck
Thank you! Questions?