

# Environmental Implications of Trade Liberalization on North American Transportation Services: The Case of the Trucking Sector

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# Trucking

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1. Contributes to NAFTA growth
2. 6.7 million truck crossings on U.S.-Canada border and 5.7 million truck crossings on U.S.-Mexico border
3. Diesel fuel-significant source of air pollution in non-attainment border areas  
( 1 diesel engine yields PM=112 cars,  
Nox=131 cars)

# Goal of Study

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- Assess whether policies work to address truck delays at the border and related air pollution with econometric analysis and data from the U.S.-Canada and U.S.-Mexico borders.

# Policies to Evaluate

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- (1) Customs and Trade Partnership Against Terrorism: Free and Secure Trade (FAST) Preclearance to reduce commercial congestion at ports (idling, wait time)
  - (2) Fuel Policy, (3) Diesel Technology Policy
- In all cases, the policies were not uniformly implemented in time nor location

# Model Outline

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- Air Quality at border ports as a function of traffic flow volume, border city characteristics, policy (trade, transportation or environmental policy)

# Empirical Approach

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- Reduced form for econometric estimation
- Ports indexed by  $i$
- Time indexed by  $t$
- Log of Air Quality as function of log terms
- Transportation (trucks, buses, cars, containers)

$$AQ_{it} = \beta_0 + \beta_1 AQ_{base,t} + \beta_2 T_{it} + \beta_3 X_{it} + \varepsilon_t$$

# Data

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- Panel Set from 1993-2007 of Transportation flows (trucks, passenger vehicles, containers (empty, loaded), buses-95% of traded flow)
- Air quality at ports, and border cities on each side of both U.S.-Canada and U.S.-Mexico borders (O<sub>3</sub>,NO<sub>x</sub>,SO<sub>2</sub>,PM)

# Data

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- Trade flow value
- Border wait times -Customs &Border Patrol

Ports in study represent 95% of traded transportation flow



Variable	Label		Parameter Estimate	Standard Error	t Value	Pr >  t
Intercept	Intercept	1	-13.70753	17.97578	-0.76	0.449
air_us	Concentration	1	0.53467	0.3984	1.34	0.106
air canada	[ ]	1	2.612	4.61225	0.57	0.057
value	trade	1	-7.68E-07	0.00000169	-0.45	0.051
COV	wait	1	-0.00816	0.03033	-0.27	0.082
POV	wait	1	0.04647	0.05527	0.84	0.009
FAST	FAST	1	-0.27305	0.5647	-0.48	0.031
monthly_avg_truck	TRUCKS	1	-0.22621	2.1711	-0.1	0.017
monthly_avg_BUSES	BUSES	1	0.73333	0.28932	2.53	0.014
monthly_avg_PV	PERSONAL_VEHICLES	1	-0.48149	1.32807	-0.36	0.018
month_avg_EMPTY_CONTAIN		1	0.1731	1.85434	0.09	0.026
month_avg_LOAD_CONTAIN		1	2.10726	2.11627	1	0.324

# Fuel Policy

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- Where low sulfur was available for more than just trucks (late 2006) along U.S.-Canada border, gas variable has negative and not statistically significant variable. Other variables: Canadian baseline, empty containers yield positive and significant coefficients

# Diesel Technology

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- NO<sub>x</sub>: U.S.-Canada border has negative and significant coefficient on trucking and loaded containers
- NO<sub>x</sub>: U.S.-Mexico border has negative and stat. significant coefficient on trucking and empty containers
- PM and So<sub>2</sub> have negative and statistically significant coefficient on trucking for both borders

# Policy Impacts

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Policy	U.S.-Canada Border	ports	U.S.-Mexico Border	ports
FAST	CO,O3,PM,NO	6	CO,O3,PM,NO	8
Fuel	SO2	4	-	0
Diesel Tech	Nox, PM	6	PM	2
Port/roads	CO, PM	1	CO, PM	2

# Conclusions

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- Scale increase (trade transport volume) has positive impact on air pollution
- Policies from trade, transportation and environmental policies can reduce particular air pollutants in specific ports
- Extending time series to include recent programs such as the Diesel Elimination Retrofit Collaborative (2007) would augment analysis

# Conclusions

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- Variation between El Paso 1 and 2 ports suggests role of fee (\$10) to reduce congestion for peak hours  
(formal congestion pricing could make a difference).