

*“Push” and “Pull” Impacts of NAFTA on
Environmental Responsiveness and
Performance in Mexican Industry**

Authors:

Priscilla S. Wisner / Marc J. Epstein

Presentation:

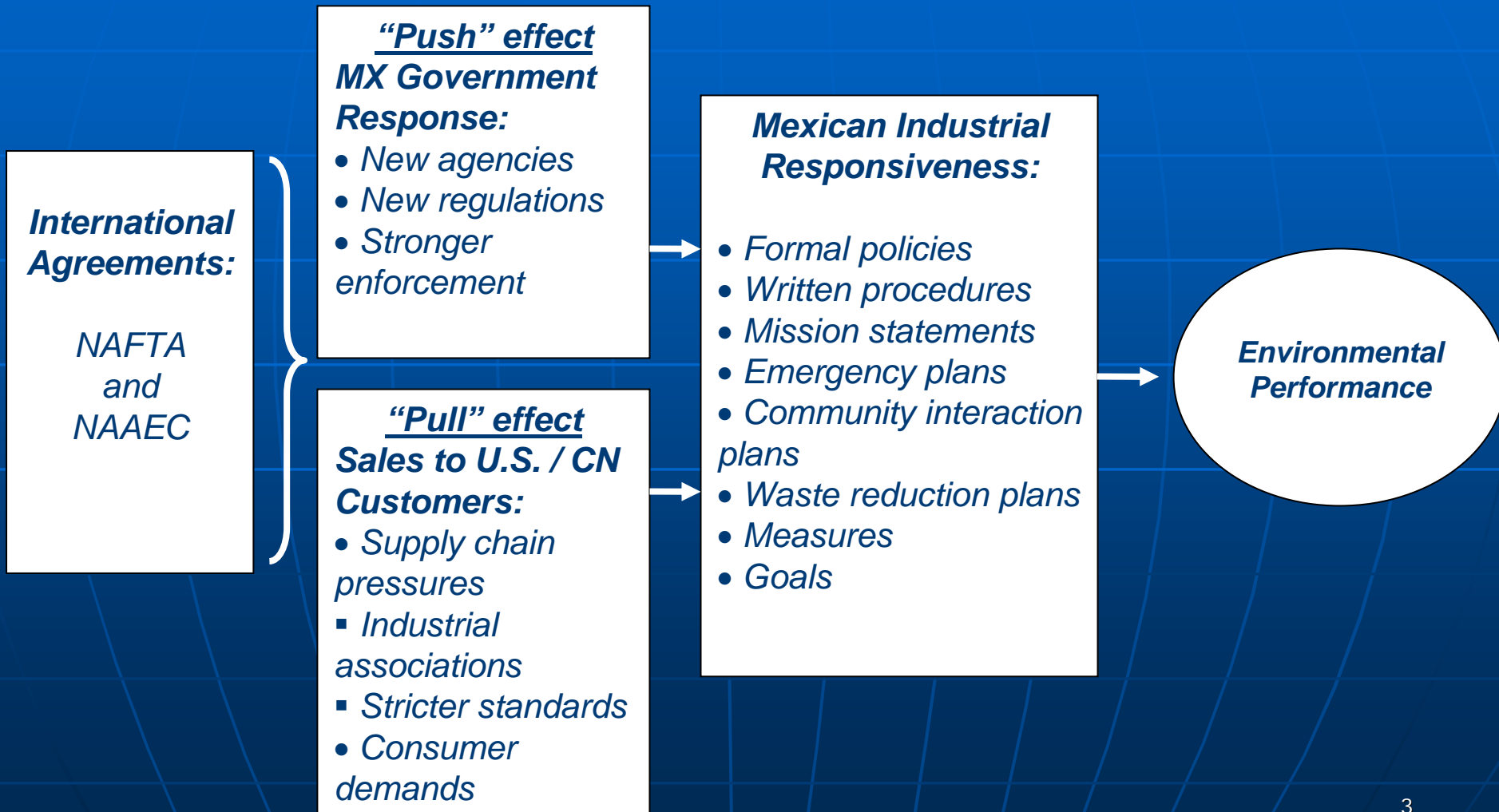
Third North American Symposium on Assessing
the Environmental Effects of Trade
November 30, 2005

Overview of Study

Research questions

- ❖ *Has NAFTA influenced environmental management practices and therefore performance in Mexican industry?*
- ❖ *What is the relative influence of government versus market pressures on environmental management practices in a developing country?*

Conceptual Model



Data Set Information

- Data from 221 Mexican plants
 - Data collected by World Bank / ITESM researchers
 - Respondents were managers at Mexican manufacturing facilities located primarily in Monterrey, Guadalajara, Mexico City
 - Data collected through structured interviews (in Spanish) and plant visits
 - Four industries that accounted for majority of MX industrial pollution (food, chemicals, minerals, and metals)

Data Sample

Panel A: Descriptive Data by Industry Sector - Means and *Standard Deviations*

	Scale	All	Food	Chemical	Non-metallic Minerals	Metals
Number of respondents		221	60	57	47	57
Regulatory Influence	1 - 5 (none - high)	4.11 (1.33)	4.12 (1.38)	4.11 (1.36)	3.87 (1.24)	4.30 (1.34)
% exporting to the U.S. or Canada	0 , 1 (no , yes)	38%	25%	35%	53%	44%
Responsiveness	1 - 3 (low - high)	1.82 (0.82)	1.72 (0.76)	1.98 (0.83)	1.79 (0.81)	1.79 (0.88)
Performance	1 - 5 (poor - world class)	2.54 (0.88)	2.57 (0.91)	2.40 (0.94)	2.45 (0.77)	2.72 (0.84)
Size	1 - 3 (< 100 - > 250 empl.)	1.91 (0.82)	2.07 (0.80)	1.93 (0.80)	1.62 (0.80)	1.96 (0.84)

Panel B: Correlation Matrix

	Mean	1	2	3	4	5
1 Regulatory Influence	4.11					
2 Exporting	0.38	0.05				
3 Responsiveness	1.82	0.26***	0.31***			
4 Performance	2.54	0.07	0.26***	0.47***		
5 Size	1.91	0.07	0.19**	0.34***	0.31***	
6 Sector	n/a	0.01	0.22**	0.01	0.07	-0.08

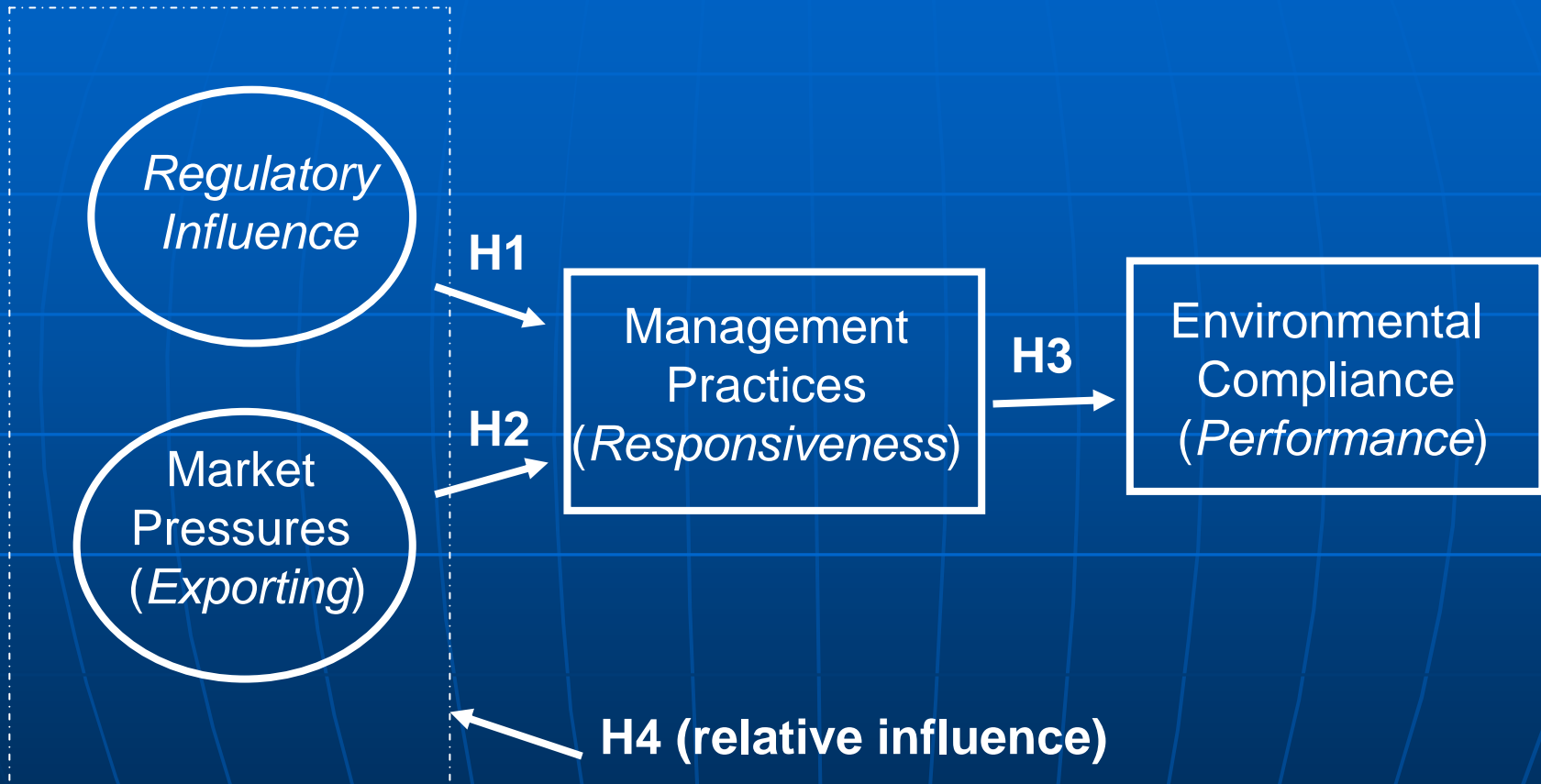
** p < 0.01

*** p < 0.001

Data Limitations

- Potential common-method bias
- Data definition and collection was not designed for this study
- Unable to identify companies or respondents to collect additional information
- Data is at a point in time, rather than time series
- Data is Mexico facilities only

Hypotheses Tested



→ Model was controlled for size, using number of employees

Statistical Results

X² Analysis

Hypothesis:		χ^2	p-value
H1	“Push” effect: Regulatory Influence → Responsiveness	12.78	0.0004
H2	“Pull” effect: Exporting to U.S./CN → Responsiveness	8.03	0.0046
H3	Responsiveness → Environmental Performance	32.40	0.0001

Regression Analysis

Panel A: ANOVA (Dependent Variable: Responsiveness)						
Model	Sum of Squares	df	Mean Square	F	Significance	
Regression	24.260	3	8.087	14.721	0.000	
Residual	99.977	182	0.549			
Total	124.237	185				
R ²	19.5%					
Adjusted R ²	18.2%					

Panel B: Coefficients						
	Predicted Sign	Unstandardized Beta	Standard Error	Standardized Beta	t-statistic	p-value (two-tailed)
Intercept		0.715	0.207		3.449	0.001
Regulatory Influence	+	0.098	0.039	0.166	2.495	0.013
Exporting	+	0.427	0.111	0.259	3.833	0.000
Size		0.262	0.068	0.260	3.850	0.000

Incremental F Statistic: 7.52 (significant at 0.0001)

Exporters v. Domestic Sales Only

Variable	Scale	Sales Patterns	
		Mexico only	Exports to U.S. / Canada
Regulatory Influence	1 - 5 (none - high)	3.92	4.06 *
Responsiveness	1 - 3 (low - high)	1.56	2.07***
Planning elements (#)	0 - 8 elements	2.55	4.26***
Performance	1 - 5 (poorest - world class)	2.24	2.72***
Size	1 - 3 (< 100 empl. - > 250 empl.)	1.75	2.06**

* $p < 0.05$

** $p < 0.01$

*** $p < 0.001$

Key Conclusions / Contributions

- Regulations “push” industrial firms to implement environmental management practices
 - The stronger the pressure, the stronger the practices
- Customers in markets with stronger environmental cultures “pull” industrial firms to implement environmental management practices
- In a developing economy with weaker regulatory mechanisms, market forces dominate regulatory influence in implementing environmental management practices
- Did NAFTA have an effect on industrial environmental practices? Yes.