

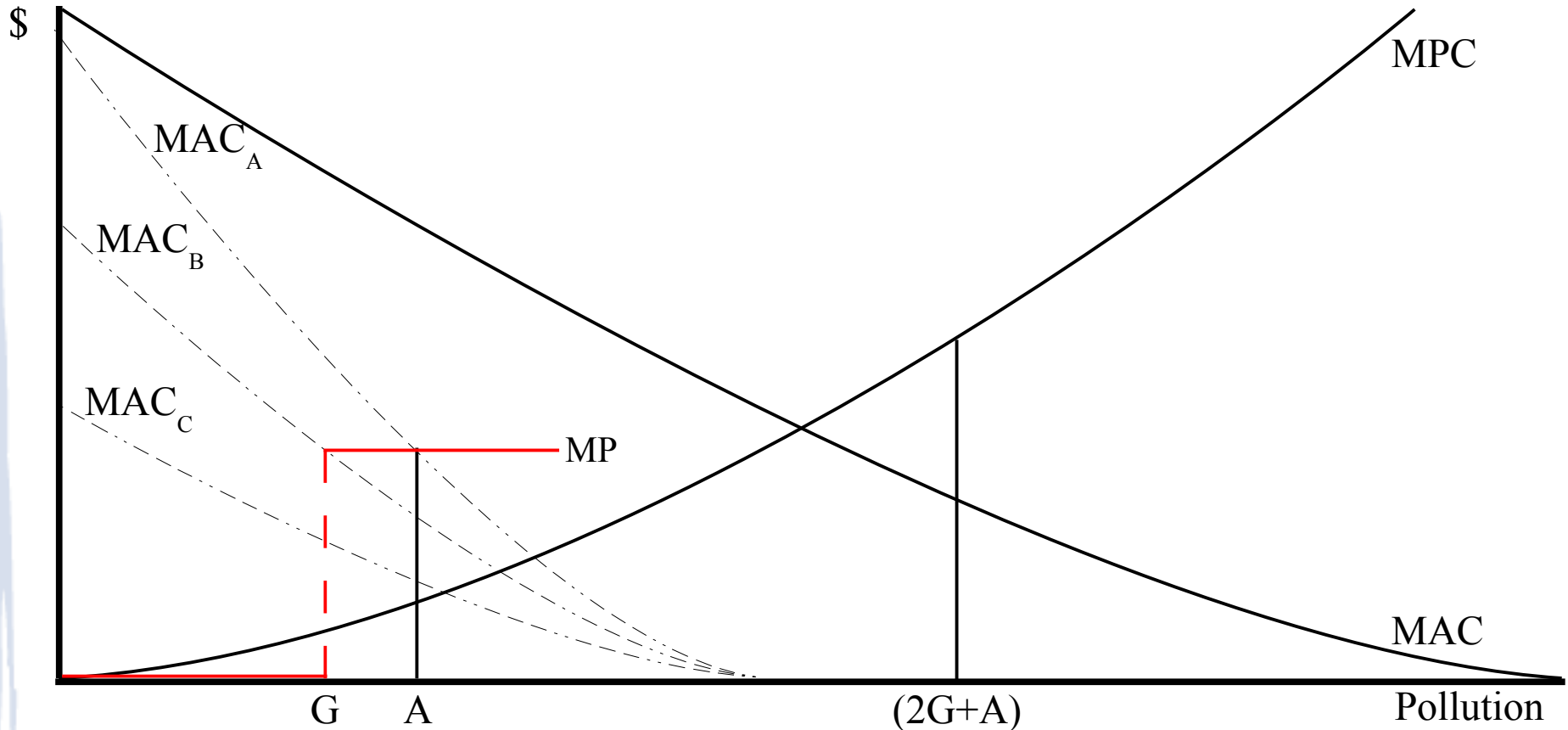
# Can Private Standards Solve China's Environmental Crisis?

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# A Role for Voluntary Standards?

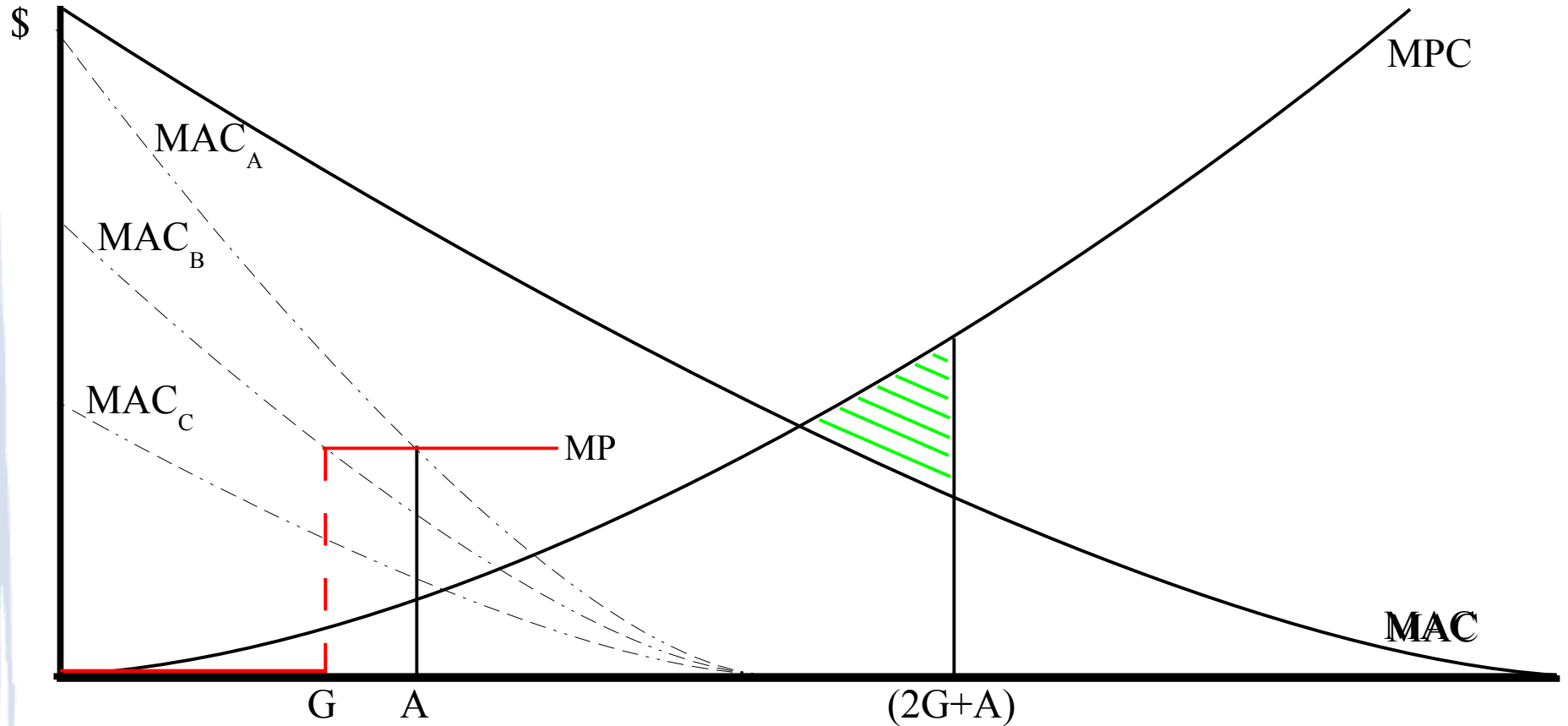
- China has earned reputation for putting development ahead of sustainability
- Under voluntary programs, firms can be motivated to over-comply with environmental regulations
  - Lower threat of future regulation (Lyon and Maxwell, 2003)
  - Earn price premium in the output market (Eriksson, 2004)

# Why are Voluntary Standards Necessary?



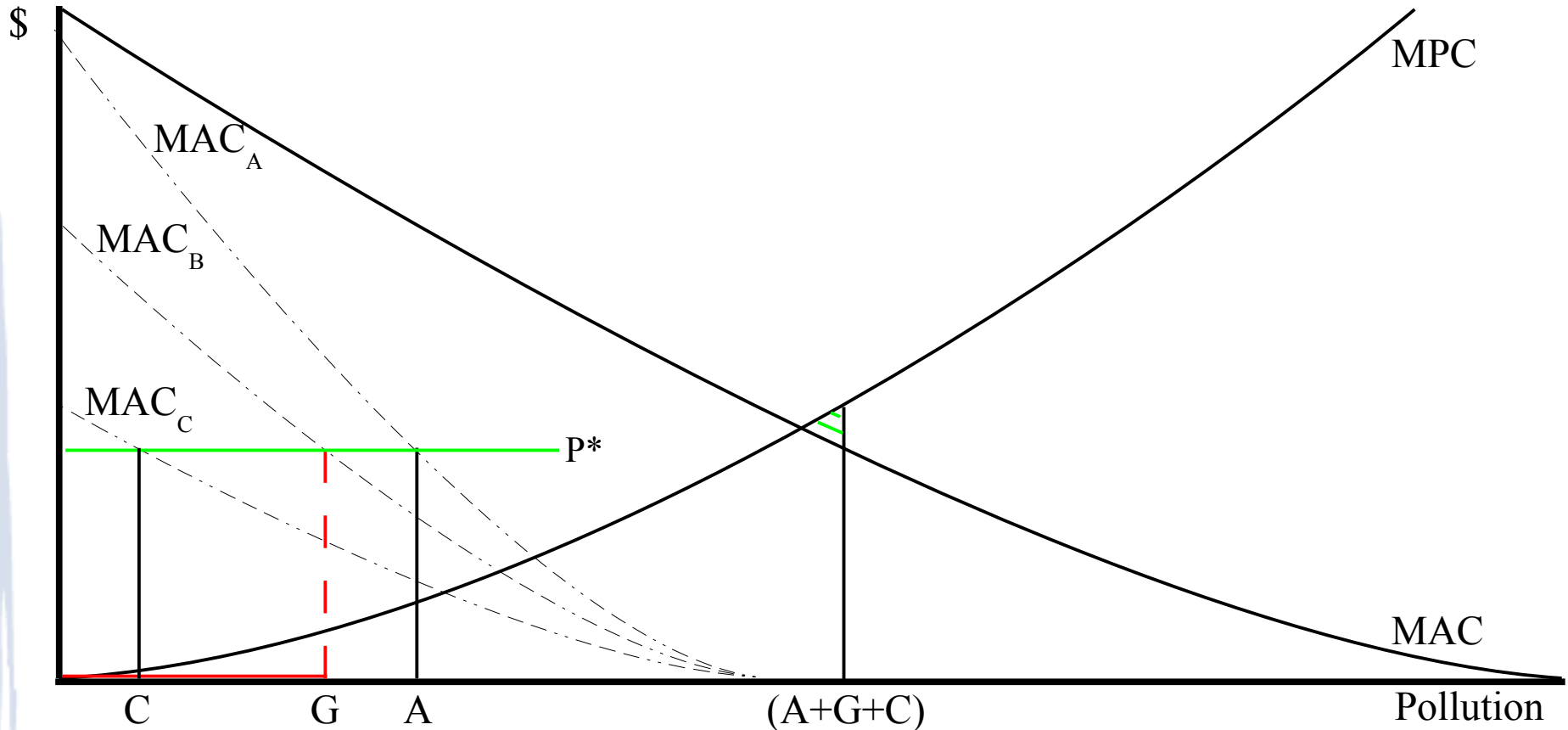
- Emissions generally controlled with quantitative standards enforced by penalties (Beyer, 2006)

# Room for Improvement



- Potential Pareto improvements exist if standard is violated or set too high

# Negotiating Over-Compliance



- Firms and consumers negotiate an effective payment for emissions reductions in the output market

# Information Asymmetry in Output Markets

- Firms' emissions are credence attributes of products in the output market
  - Adverse selection: Firms with high MAC's may misrepresent their type to attract “green” consumers
  - Moral hazard: Consumers must be sure clean firms follow through on emissions reductions

# ISO 14000

- ISO 14000 is the most popular voluntary environmental program in the world (~39,000 in China)
  - Regarded as a globally viable alternative to command and control regulation
- Employs third-party certification (14001) of firm environmental management system (EMS)
  - ISO 14001 reveals firm abatement technology but not emissions levels

# How Can ISO 14000 Address China's Environmental Crisis?

- What motivates ISO 14001 certification among Chinese firms?
- Can ISO 14001 help China overcome regulatory shortcomings?
  - Is cost/complexity a barrier to adopting ISO 14001?
  - How can ISO 14001 resolve the asymmetric information problem when it does not signal emissions levels?



# The Evidence So Far

- Adoption closely related to customer type (Nishitani, 2010; Curcovic et al., 2005)
  - Helps exporting firms reach foreign markets (Christmann and Taylor, 2001; Prakash and Potoski, 2005)
  - Assumed to match clean firms and green consumers
- Evidence on ISO 14001 and emissions reduction is mixed (Potoski and Prakash, 2005 vs. Barla, 2007)

# Empirical Strategy

- Estimate determinants of adoption to interpret firm motivations
- Estimate two logit models (King et al., 2005):
  - Does the firm have an EMS (environmental protection department)?
  - Is the firm ISO 14001 certified, conditional on having an EMS?
    - Isolate the role of certification

# Data

- Enterprise survey on corporate social responsibility conducted by IFC + NBS in 2006
- Total of 1,264 respondents from 12 different cities across China
  - Information on firm's environmental activities including ISO 14001 certification and other management practices
  - Largely cross-sectional

# Firm Characteristics

	Environmental Protection Department				ISO 14001			
	(1)	(2)	(3)	(4)	(1)	(2)	(3)	(4)
Firm Age	1.02 (1.51)	1.02 <sup>c</sup> (1.69)	1.02 (1.53)	1.02 (1.53)	1.00 (0.11)	1.01 (0.54)	1.01 (0.73)	1.01 (0.61)
Average Employment	1.00 <sup>b</sup> (2.23)	1.00 <sup>b</sup> (2.14)	1.00 <sup>b</sup> (2.16)	1.00 <sup>b</sup> (2.17)	1.00 (1.31)	1.00 (0.85)	1.00 (0.71)	1.00 (0.88)
Average Employment <sup>2</sup>	1.00 <sup>b</sup> (-2.14)	1.00 <sup>b</sup> (-2.00)	1.00 <sup>b</sup> (-2.00)	1.00 <sup>b</sup> (-2.04)	1.00 (-1.08)	1.00 (-0.54)	1.00 (-0.44)	1.00 (-0.49)
Management College Edu (60%+)	2.28 <sup>a</sup> (3.03)	2.32 <sup>a</sup> (3.06)	2.40 <sup>a</sup> (3.17)	2.26 <sup>a</sup> (3.91)	0.76 (-0.71)	0.77 (-0.67)	0.78 (-0.62)	0.85 (-0.42)

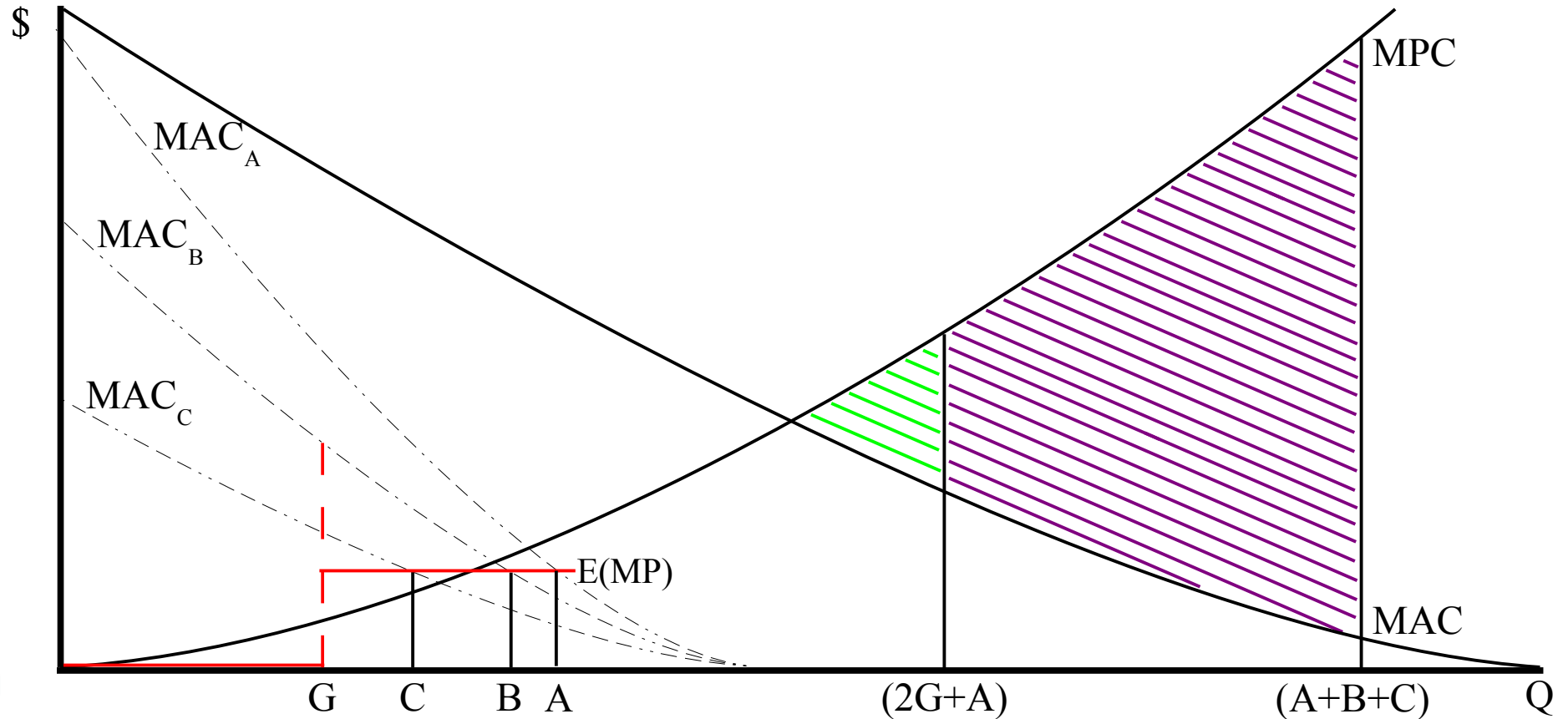
- Firm characteristics like size and human capital are important for EMS adoption, not certification
  - Certification costs may be relatively small

# Regulatory Environment

	Environmental Protection Department				ISO 14001			
	(1)	(2)	(3)	(4)	(1)	(2)	(3)	(4)
Gov't Inspections: 10+ /year	2.84 <sup>b</sup> (2.18)	2.78 <sup>b</sup> (2.12)	2.64 <sup>b</sup> (2.01)	2.58 <sup>c</sup> (1.92)	0.92 (-0.15)	0.86 (-0.26)	0.86 (-0.26)	0.80 (-0.26)
Gov't Inspections: Weak	0.51 <sup>c</sup> (-1.89)	0.49 <sup>b</sup> (-2.04)		0.50 <sup>b</sup> (-1.97)	4.44 <sup>a</sup> (2.68)	4.12 <sup>a</sup> (3.63)		4.26 <sup>a</sup> (2.57)
Gov't Inspections: Not Effective			0.23 <sup>a</sup> (-2.94)				2.09 (0.79)	
# Applicable Gov't Standards	1.34 <sup>a</sup> (4.79)	1.32 <sup>a</sup> (4.40)	1.32 <sup>a</sup> (4.37)	1.32 <sup>a</sup> (4.22)	1.51 <sup>b</sup> (2.16)	1.42 <sup>b</sup> (1.83)	1.36 <sup>c</sup> (1.70)	1.42 <sup>b</sup> (1.97)

- Firms certify ISO 14001 where regulation is ineffective
  - Greater gains from negotiating abatement in output market

# Potential Gains Under Weak Enforcement



- Poor enforcement of regulations encourages firms to rationally violate the standard

# Market Environment

	Environmental Protection Department				ISO 14001			
	(1)	(2)	(3)	(4)	(1)	(2)	(3)	(4)
Largest Customer: Foreign	1.12 (0.41)	1.02 (0.08)	1.04 (0.15)	0.95 (-0.20)	2.20 <sup>c</sup> (1.81)	1.85 (1.38)	1.61 (1.07)	1.76 (1.22)
Customer Environmental Standard		1.72 <sup>b</sup> (2.26)	1.70 <sup>b</sup> (2.20)	1.48 (0.86)		2.61 <sup>c</sup> (1.89)	2.84 <sup>b</sup> (2.00)	0.24 (-1.45)
Customer Quality Inspections				1.57 (1.06)				0.09 <sup>b</sup> (-2.49)
CESxCQI				1.22 (0.38)				20.03 <sup>a</sup> (2.60)

- ISO 14001 response to demands for environmental protection from customers
- Ex-post monitoring is strongly complementary

# Conclusions

- ISO 14001 matches clean firms with green consumers in the output market
  - Direct costs of certification appear low, but may also require costly ex-post monitoring
  - Can also substitute for effective environmental regulation
- More theoretical work is needed to compare ISO 14001 or similar programs to regulatory instruments