

# Does Environmental Performance Predict a Facility's Financial Performance?

OECD Conference on Public Environmental Policy  
and the Private Firm

June 14-15, 2005  
Washington DC

**Nicole Darnall & Jason Jolley**  
North Carolina State University

**Bjarne Ytterhus**  
Norwegian School of Management

# Why Does the Environmental – Financial Performance Link Matter?

---

## Managerial Importance

- Managers often need financial justifications to improve the environment

# Why Does the Environmental – Financial Performance Link Matter?

---

## Managerial Importance

- Managers often need financial justifications to improve the environment

## Regulatory Importance

- Regulators may be able to encourage additional companies to improve the environment if doing so pays

# Why Does the Environmental – Financial Performance Link Matter?

---

## Managerial Importance

- Managers often need financial justifications to improve the environment

## Regulatory Importance

- Regulators may be able to encourage additional companies to improve the environment if doing so pays

## Theoretical Importance

- Are competitive advantage opportunities created by improving environmental performance?

# Dueling Perspectives

---

**Traditional view--** Friedman, 1970; Christiansen & Haveman, 1981; Conrad & Morrison, 1989; Denison, 1979; Lave, 1973; Norsworthy, Harper & Kunze, 1979

- Environmental regulations impose costs on firms
- Little incentive to be environmentally proactive

# Dueling Perspectives

---

## Traditional view--

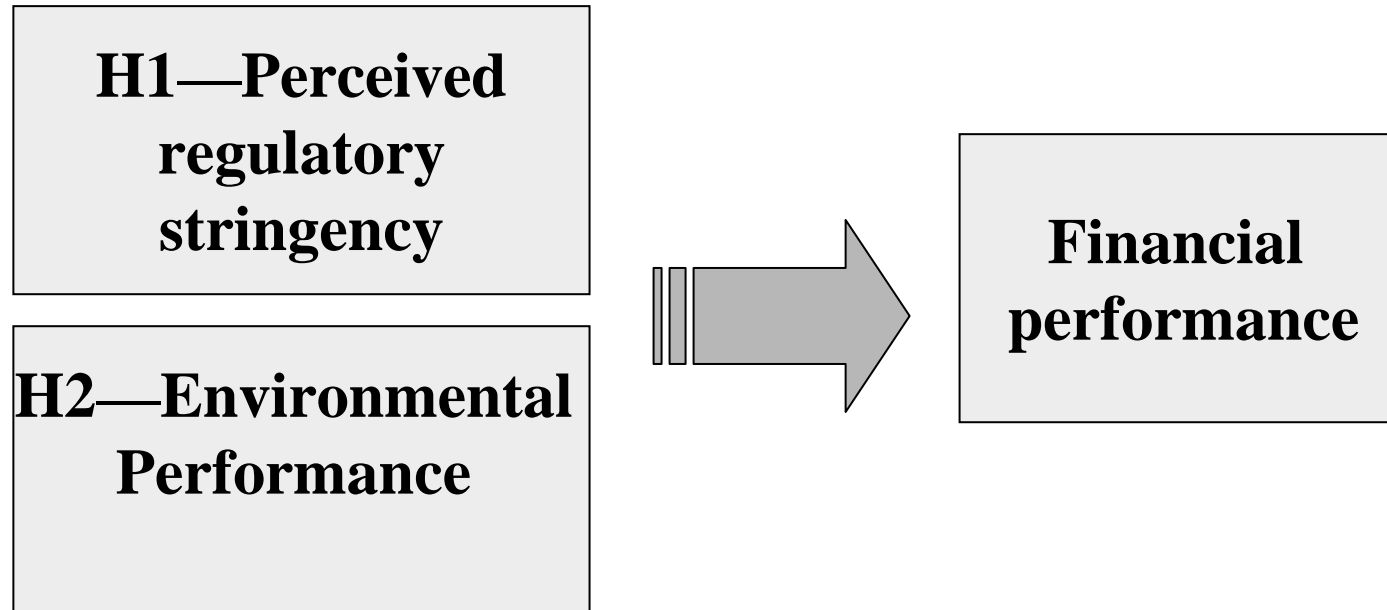
- Environmental regulations impose costs on firms
- Little incentive to be environmentally proactive

**Revisionist view--** Arora & Cason, 1995; Cohen, Finn & Naimon, 1995; Cormier et al., 1993; Hamilton, 1995; Hart & Ahuja, 1996; Khanna & Damon, 1999; Klassen & McLaughlin, 1996; Konar & Cohen, 1997; Laplante & Lanoie, 1994; Rivera, 2002; Russo & Fouts, 1997; Stanwick & Stanwick, 2000

- Proactive environmental mgt. creates strategic benefits
  - Improve operational efficiency
  - Increase recruitment opportunities and retention
  - Improve knowledge development by work in teams
  - Increase market share

# Hypotheses

---



- **Hypothesis 1:** (Traditionalist view)  
Environmental policies that are more stringent reduce organizations' financial performance
- **Hypothesis 2:** (Revisionist view)  
Organizations that reduce their impacts to the natural environment benefit financially

# Measuring Financial Performance

---

- Tough task!
- Private and publicly traded facilities
- Self-reported
- Respondent was environmental manager
- Measure had to be meaningful in multiple settings

# Measuring Financial Performance

---

- Whether the facility
  1. Earned positive profits during the last 3 years
    - Revenue has...
      - Been so low as to produce large losses
      - Been insufficient to cover costs
      - Allowed us to break even
      - Been sufficient to make a small profit
      - Been well in excess of costs

# Measuring Financial Performance

---

- Whether the facility
  1. Earned positive profits during the last 3 years
    - Revenue has...
      - Been so low as to produce large losses
      - Been insufficient to cover costs
      - Allowed us to break even
      - Been sufficient to make a small profit
      - Been well in excess of costs
  2. Increased value of shipments during the last 3 years
    - Value of shipments have...
      - Significantly decreased
      - Decreased
      - Stayed about the same
      - Increased
      - Significantly increased

# Measuring Perceived Regulatory Stringency

---

- Asked how facility would describe the environmental policy regime to which it was subject
  - Not particularly stringent, obligations can be met with relative ease
  - Moderately stringent, requiring some managerial and technological responses
  - Very stringent, requiring a great deal of influence on decision making within the facility
  
- Self-reported generalized measure
- Measures *perception*

# Measuring Environmental Performance

---

## ■ Whether the facility:

Reduced its environmental impacts in the last 3 years

- Use of natural resources
- Solid waste generation
- Wastewater pollution
- Local or regional (neighboring countries) air pollution
- Global air pollution

# Measuring Environmental Performance

---

## ■ Whether the facility:

Reduced its environmental impacts in the last 3 years

- Use of natural resources
- Solid waste generation
- Wastewater pollution
- Local or regional (neighboring countries) air pollution
- Global air pollution

## ■ Self-reported measures

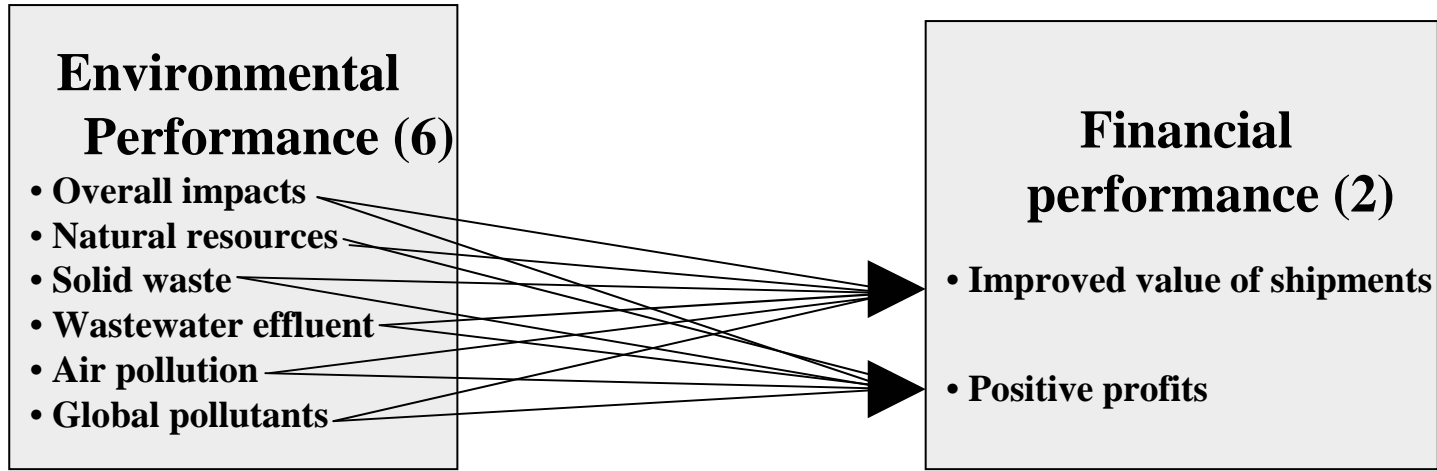
5 point Likert scale

- Significant decrease
- Decrease
- No change
- Increase
- Significant increase

## ■ Potential bias

# Models

---

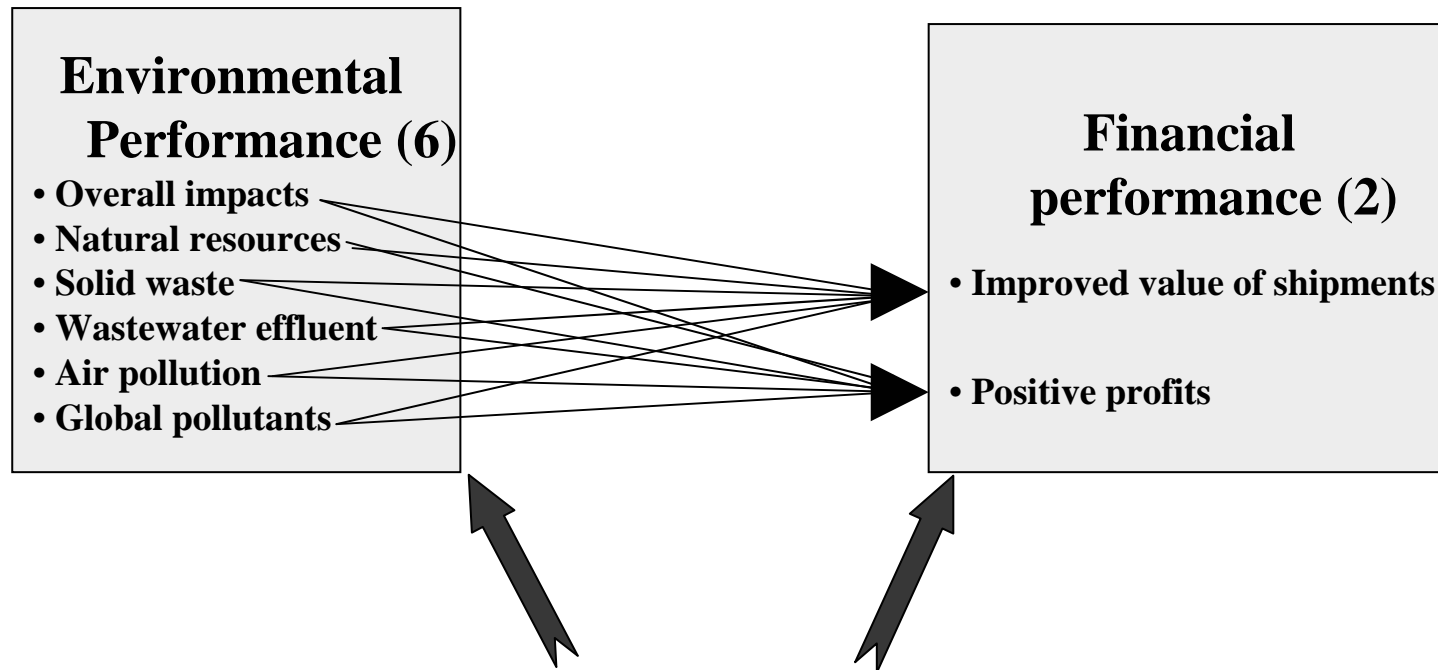


# Control Variables

---

- **Market concentration**
  - Number of competitors is (1)  $< 5$ , (2) between 5-10, (3)  $> 10$
- **Size**
  - Number of facility employees
  - Number of firm employees
- **Location of customer in supply chain**
  - End, middle, other facilities within the company
- **Market scope**
  - Local, national, regional (neighboring countries), global
- **Shareholder focus**
  - Whether firm is traded on the stock market
- **International focus**
  - Whether head office located in foreign country
- **Country, Industrial sector dummies**

# Modeling Concerns



Unobservable factors that are correlated with both variables may explain the hypothesized relationships

- *Are facilities simply operating more efficiently at the onset?*

➔ Need to evaluate motivations!

# Motivations

---

- Hypothesis 3 (Institutional view)
  - Organizations reduce their environmental impacts because of regulatory pressures and pressures from corporate influences

# Motivations

---

- Hypothesis 3 (Institutional view)
  - Organizations reduce their environmental impacts because of regulatory pressures and pressures from corporate influences
- Hypothesis 4 (Economic view)
  - Organizations reduce their environmental impacts because they seek to increase their internal efficiencies

# Motivations

---

- Hypothesis 3 (Institutional view)
  - Organizations reduce their environmental impacts because of regulatory pressures and pressures from corporate influences
- Hypothesis 4 (Economic view)
  - Organizations reduce their environmental impacts because they seek to increase their internal efficiencies
- Hypothesis 5 (Resource-based view)
  - Organizations reduce their environmental impacts because they have stronger internal competencies at the onset

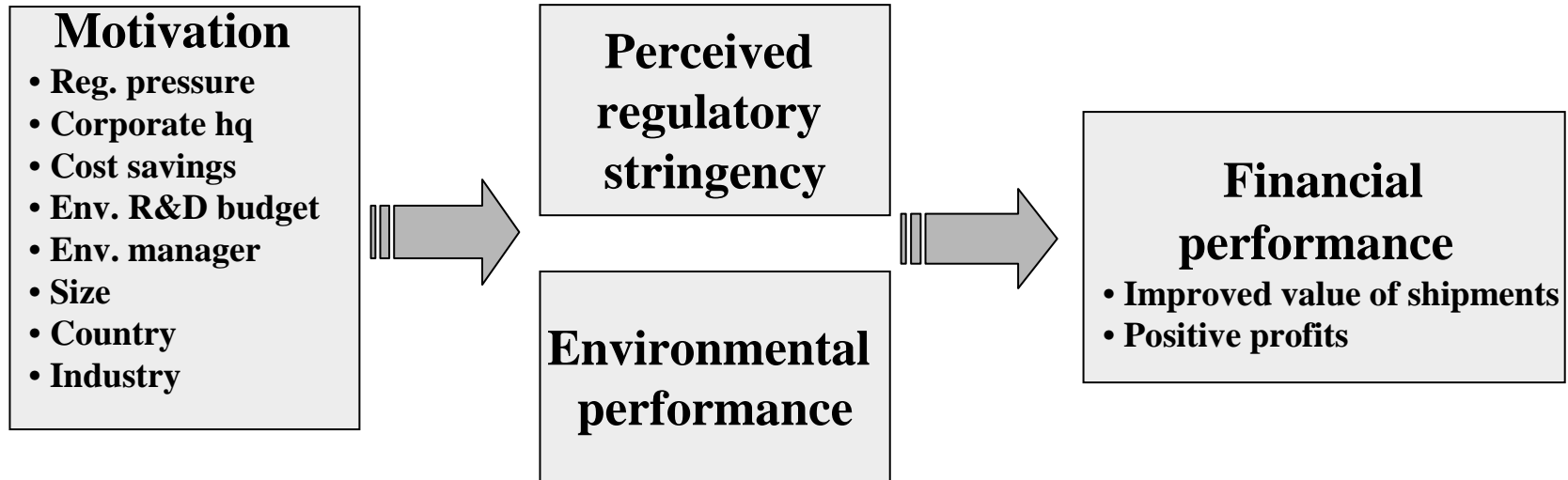
# Measuring Motivations

---

- H3—Regulatory pressures & corporate influences
  - Regulatory pressures → factor analysis of:
    - Importance of public authorities on facility's env. practices
    - Importance of preventing/controlling environmental accidents
    - Importance of achieving regulatory compliance ( $\alpha = .70$ )
      - *Not important, moderately important, very important*
- Whether or not the facility had a corporate office
- H4—Importance of cost savings associated with undertaking environmental practices
  - Not important, moderately important, very important
- H5—Internal competencies
  - Whether facility had environmental R&D budget
  - Whether facility had person in charge of environmental affairs

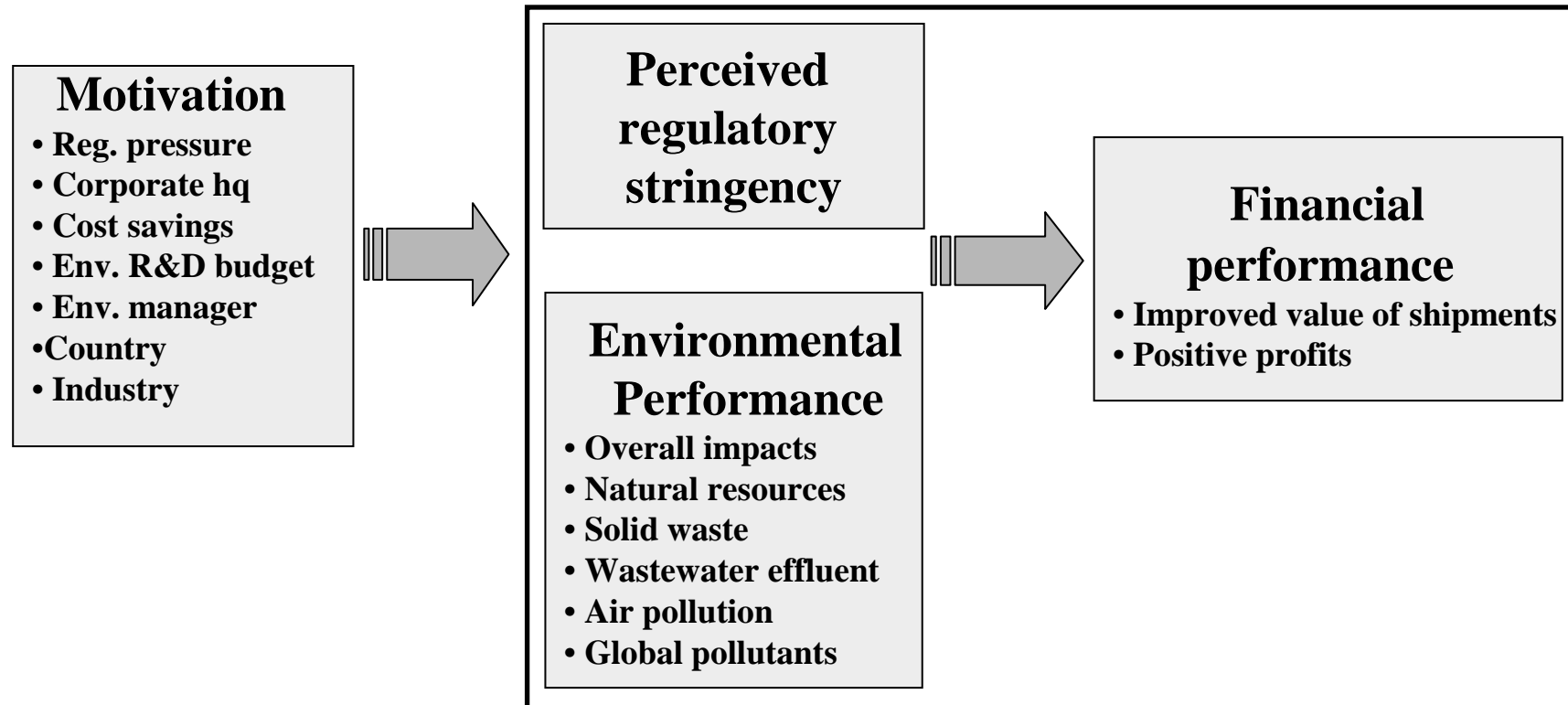
# Empirical Models

---

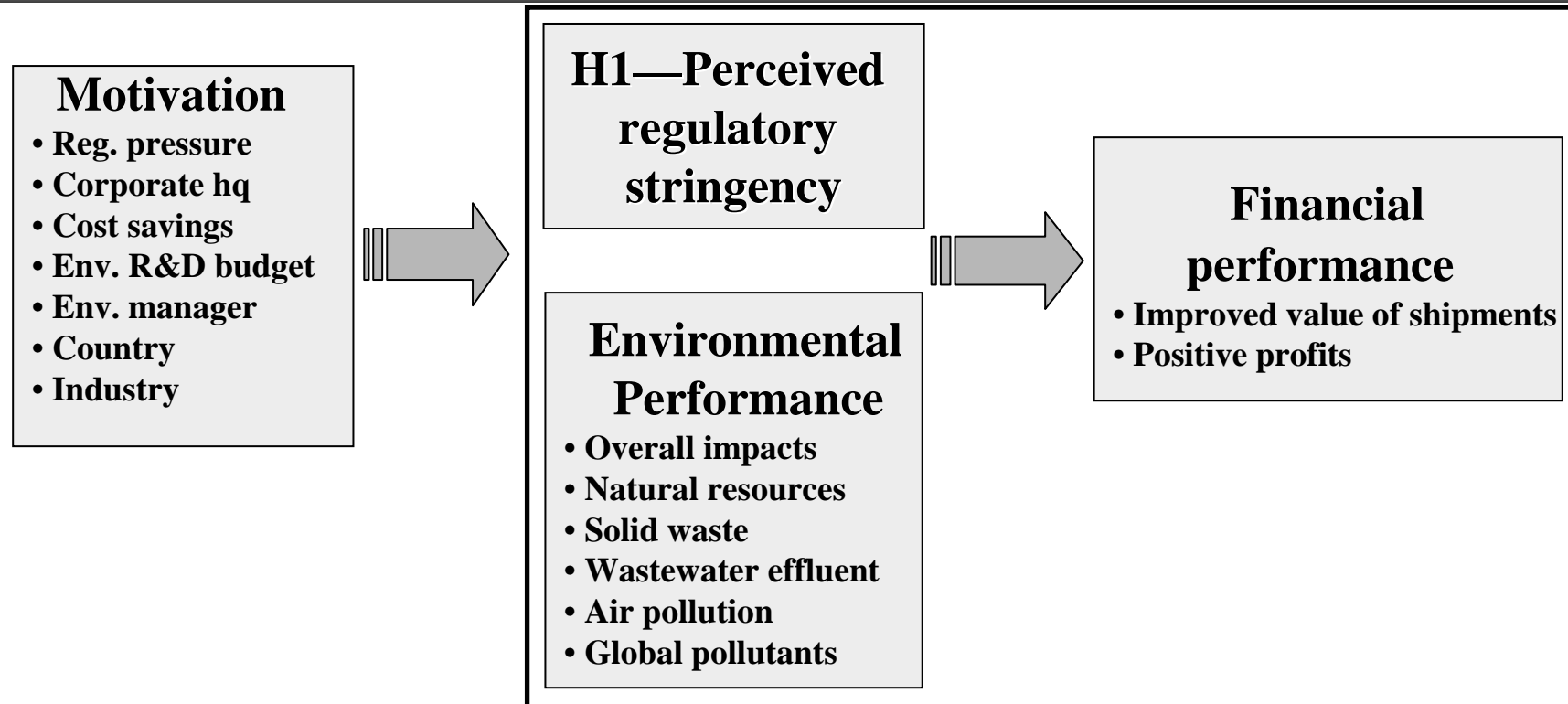


- 2-stage estimation models
- Included size, industry and country control variables in both stages

# Results

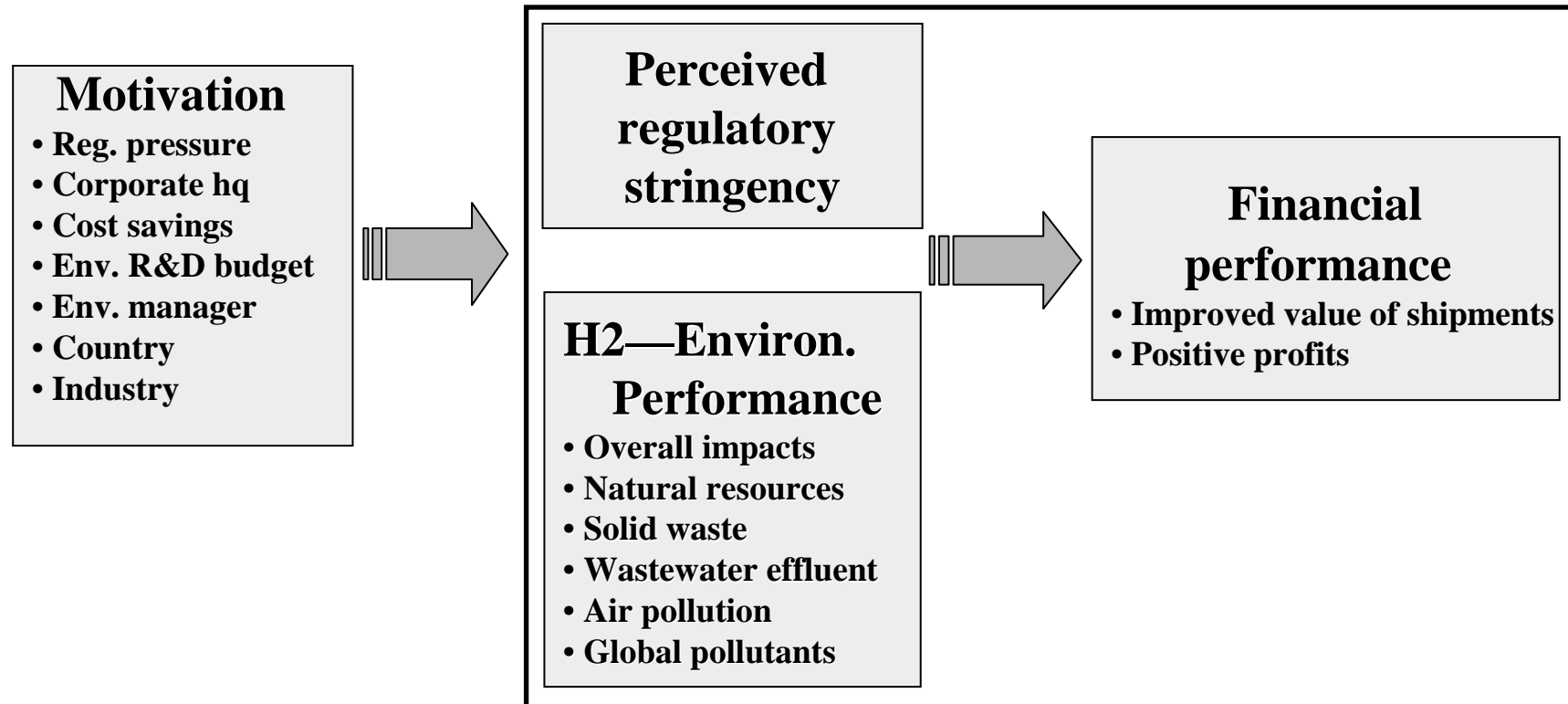


# Results



- **Hypothesis 1:** (Traditionalist view)  
Environmental policies that are more stringent reduce organizations' financial performance
  - Improved VOS: Confirmed for 1 of 6 env. performance measures (NR)
  - Positive Profits: Confirmed for 6 of 6 env. performance measures

# Results

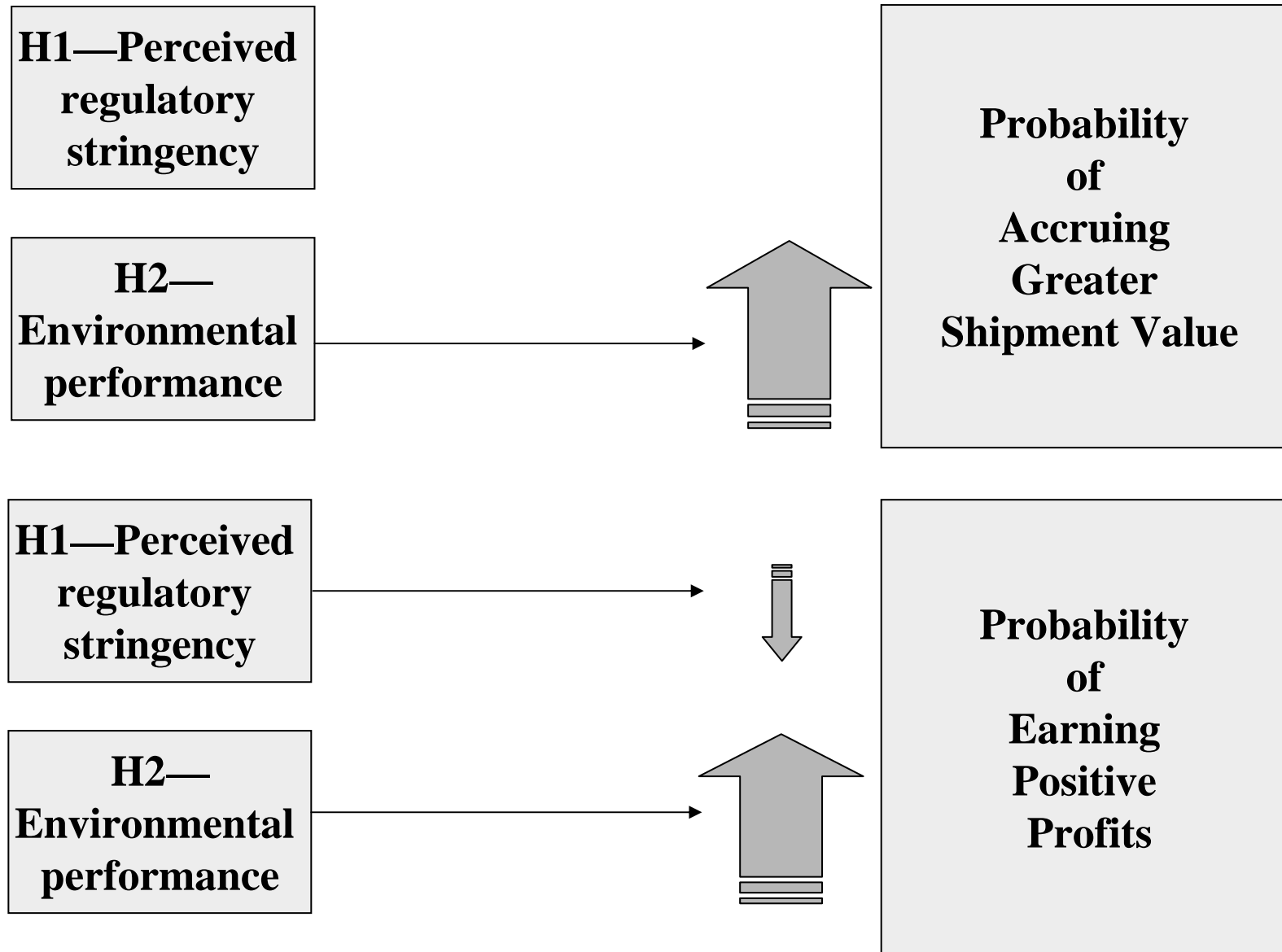


## ■ Hypothesis 2: (Revisionist view)

Organizations that reduce their impacts to the natural environment benefit financially

- Improved VOS: Confirmed for 5 of 6 env. performance measures
- Positive Profits: Confirmed for 6 of 6 env. performance measures

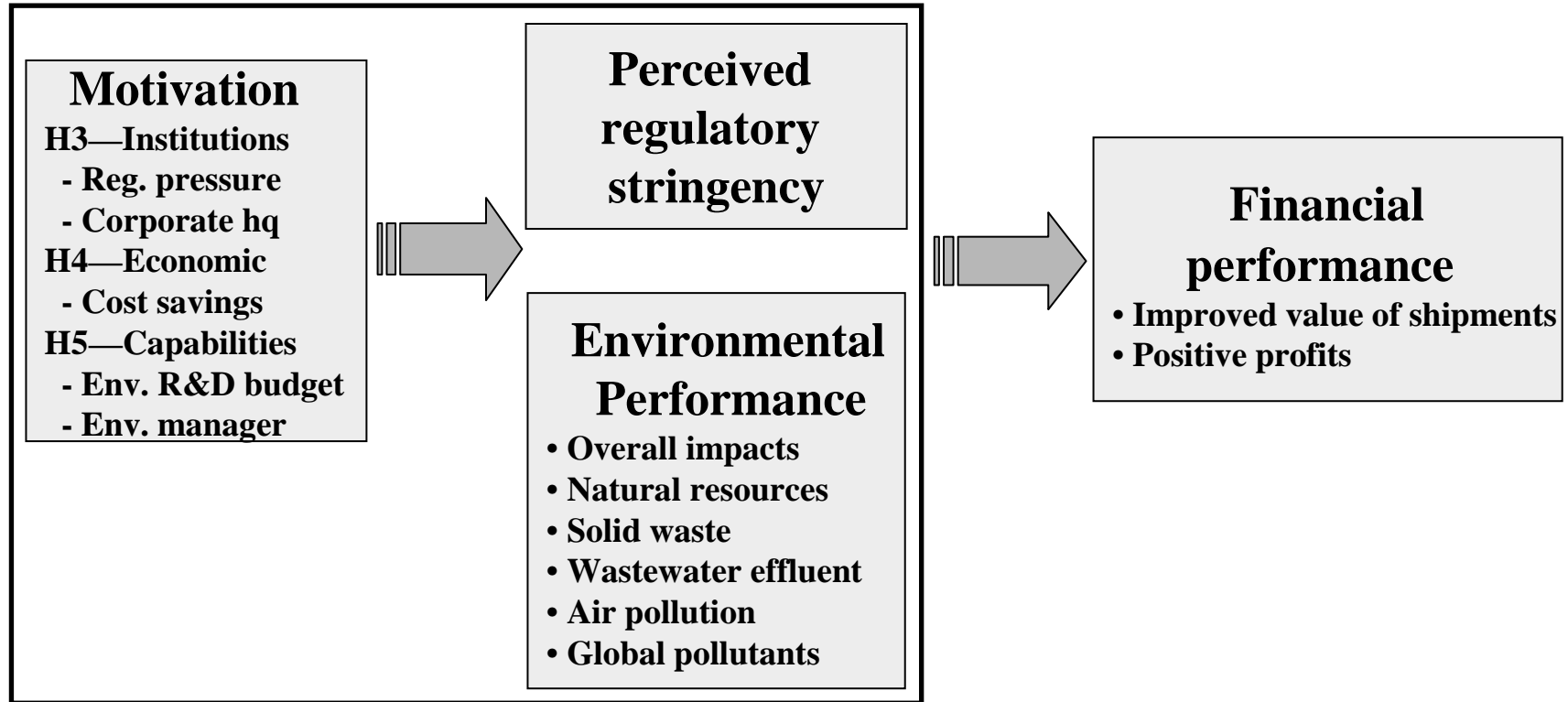
# Results



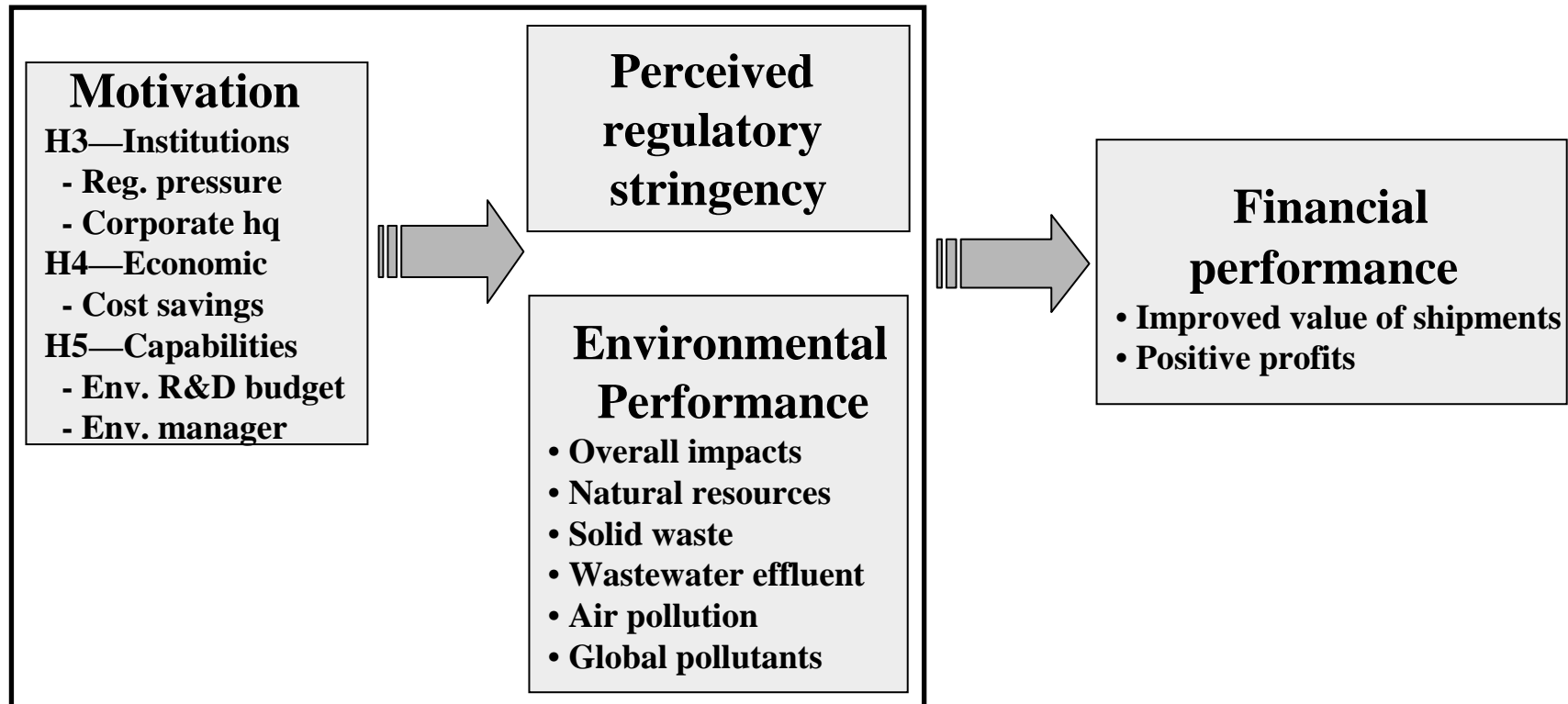
# Important Control Variables

Control Variables	Environmental Performance Model	
	Improved Value of Shipments	Positive Profits
Mkt. concentration is < 5 competitors		+
Mkt. concentration is b/t 5-10 competitors		+
Number of employees in the firm	+	+
Customer = end of supply chain		+
Customer = middle of supply chain	-	+
Market scope = local	-	-
Market scope = national	-	-
Market scope = neighboring counties		
Firm is traded on stock market		+
Firm's head office is in a foreign country		
Canada	+	+
France	+	+
Germany		
Hungary	+	+
Japan	-	-
Norway	+	

# Results



# Results

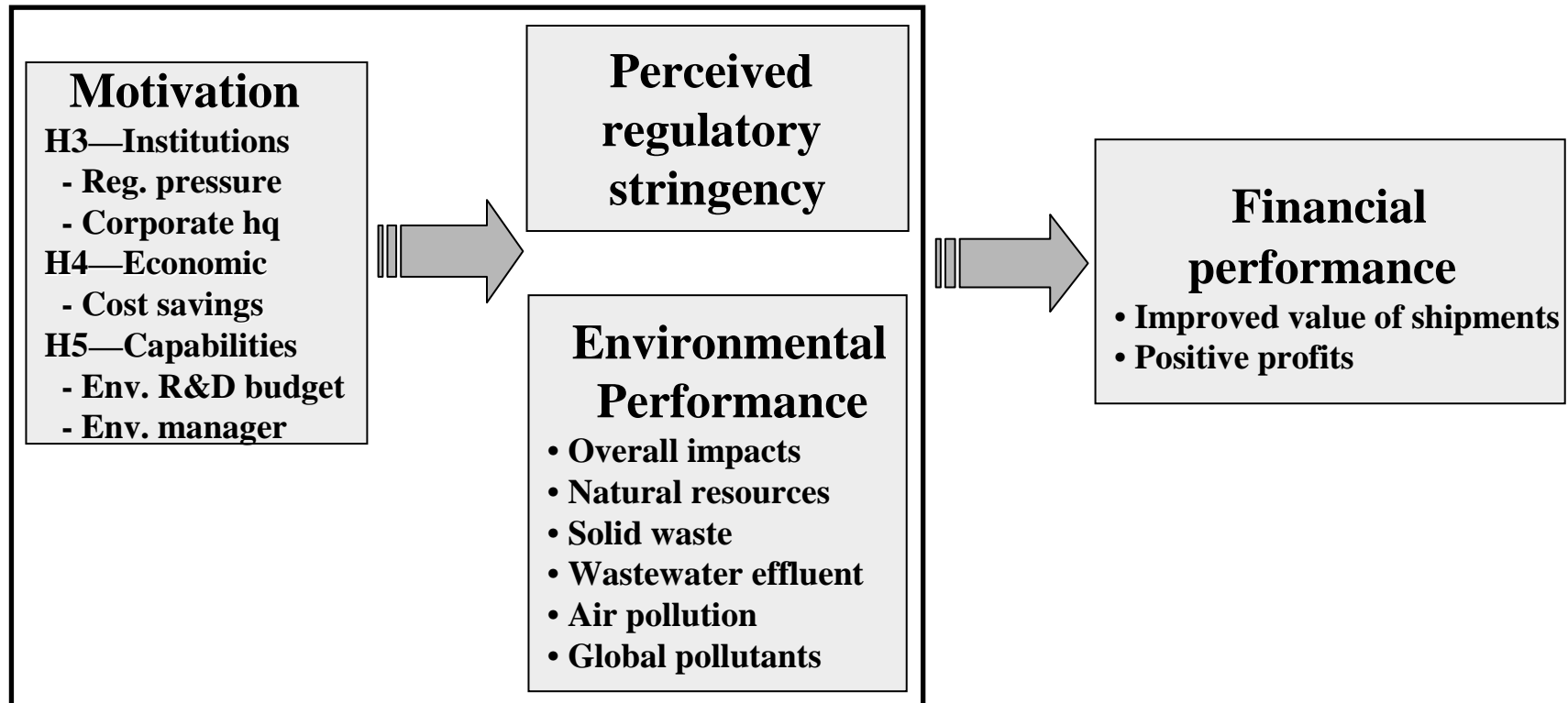


## ■ Hypothesis 3: (Institutional view)

Organizations reduce their environmental impacts because of regulatory pressures and pressures from corporate influences

- Improved VOS: regulatory (5 of 6—solid waste); corporate (5 of 6—water)
- Positive Profits: regulatory (5 of 6—solid waste); corporate (5 of 6—water)

# Results

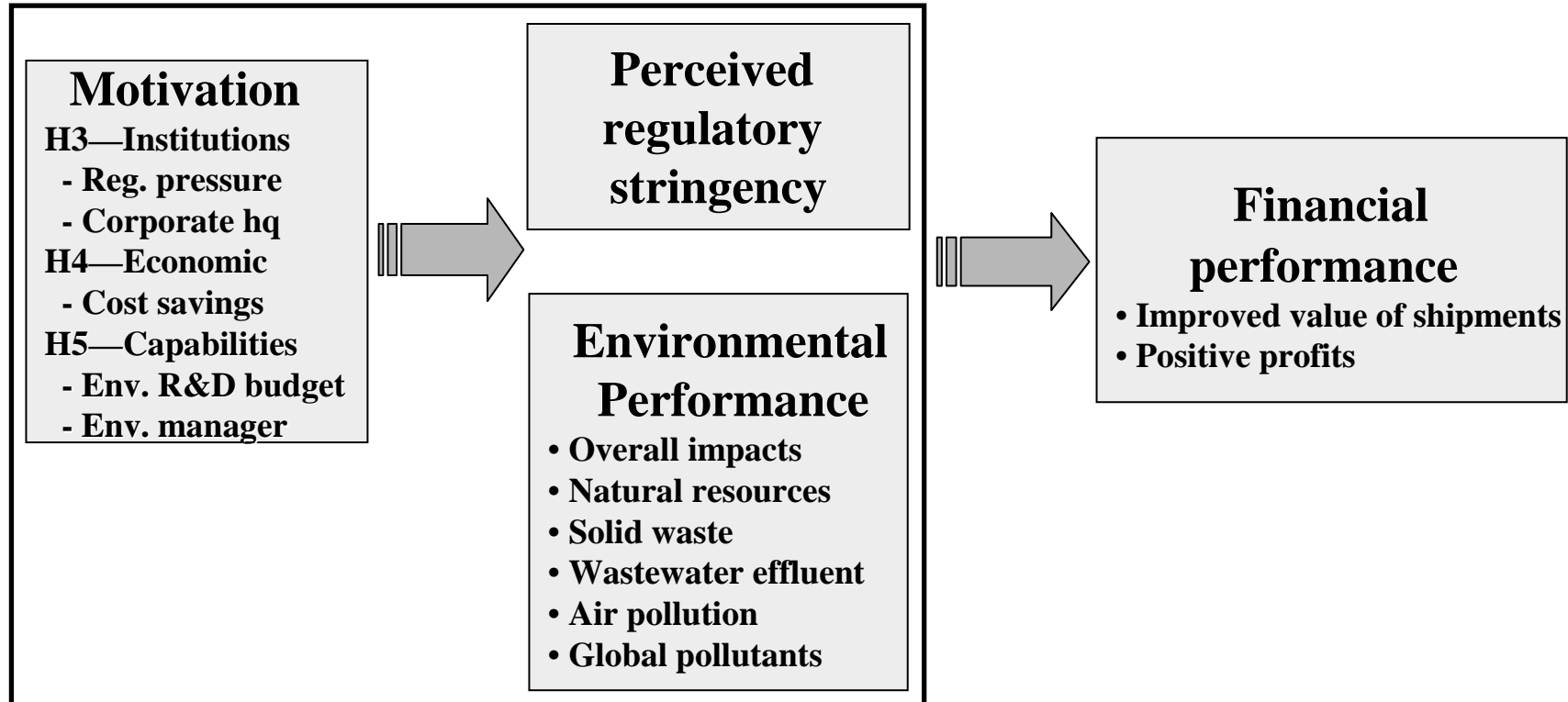


## ■ Hypothesis 4: (Economic view)

Organizations reduce their environmental impacts because they seek to increase their internal efficiencies

- Improved VOS: Confirmed for 3 of 6 env. performance measures
  - (waste water, air, global pollutants)
- Positive Profits: Confirmed for 5 of 6 env. performance measures (air)

# Results



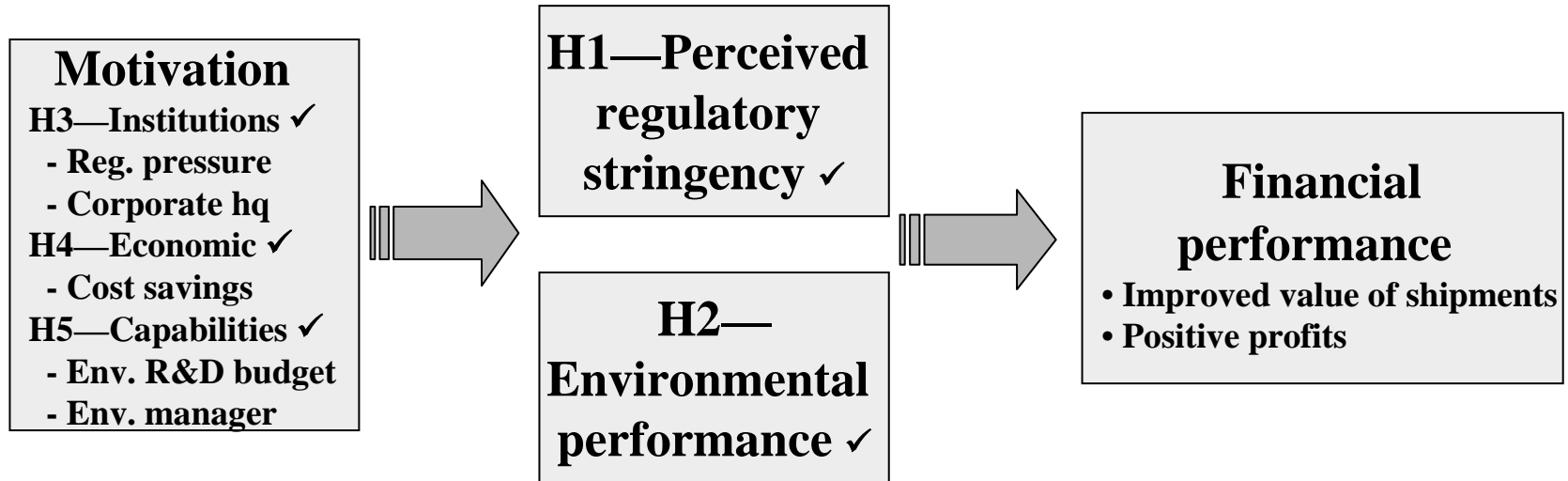
## ■ Hypothesis 5: (Resource-based View)

Organizations reduce their environmental impacts because they have stronger internal competencies at the onset (env. R&D, env. manager)

- Improved VOS: Confirmed for 6 of 6 env. performance measures
- Positive Profits: Confirmed for 6 of 6 env. performance measures

# Results

---



- Evidence for all 5 hypotheses

# Summary

---

- Revisionist view appears to dominate traditional economic view

# Summary

---

- Revisionist view appears to dominate traditional economic view
  
- Motivators for environmental improvement
  - Regulatory pressures
  - Corporate pressures
  - Perceived ability to improve cost savings
  - Internal capabilities
    - Biggest influence!

# Summary

---

- Revisionist view appears to dominate traditional economic view
- Motivators for environmental improvement
  - Regulatory pressures
  - Corporate pressures
  - Perceived ability to improve cost savings
  - Internal capabilities
- Essential to control for motivations to understand environmental-financial performance link

# Conclusions

---

## ■ Managerial Implications

- Build support for a company to implement or expand a its environmental performance strategies

# Conclusions

---

## ■ Managerial Implications

- Build support for a company to implement or expand a its environmental performance strategies
- PROBLEM?
  - Many companies do not understand the potential benefits of improving their environmental performance

# Conclusions

---

## ■ Managerial Implications

- Build support for a company to implement or expand a its environmental performance strategies
- PROBLEM?
  - Many companies do not understand the potential benefits of improving their environmental performance

## ■ Public Policy Implications

- How do we encourage the “invisible hand”?

# Conclusions

---

## ■ Managerial Implications

- Build support for a company to implement or expand a its environmental performance strategies
- PROBLEM?
  - Many companies do not understand the potential benefits of improving their environmental performance

## ■ Public Policy Implications

- How do we encourage the “invisible hand”?
  - Disperse additional information about the potential financial benefits firms may accrue by reducing environmental impacts
  - Reliable system to identify good environmental stewards
    - Partner with NGOs to facilitate these actions
    - Will help financial intermediaries and consumers

# Conclusions

---

## ■ Managerial Implications

- Build support for a company to implement or expand a its environmental performance strategies
- PROBLEM?
  - Many companies do not understand the potential benefits of improving their environmental performance

## ■ Public Policy Implications

- How do we encourage the “invisible hand”?
  - Disperse additional information about the potential financial benefits firms may accrue by reducing environmental impacts
  - Reliable system to identify good environmental stewards
    - Partner with NGOs to facilitate these actions
    - Will help financial intermediaries and consumers
- Facilitate development of firms’ internal capabilities
- Traditional regulatory pressures matter

# Strengths

---

- Confirms many prior studies
  - But also controls for motivations to improve environmental performance

# Strengths

---

- Confirms many prior studies
  - But also controls for motivations to improve environmental performance
  
- Breadth of research
  - Adds needed international dimension
  - Evaluates public and private companies
  - Considers large and small companies
  - Combines multiple perspectives

# Limitations

---

- Focus on broader population reduced specificity
    - Publicly traded and private firms, large and small
    - Multiple countries
- ➔ *Sacrificed ability to utilize other data sources*

# Limitations

---

- Focus on broader population reduced specificity
  - Publicly traded and private firms, large and small
  - Multiple countries

➔ *Sacrificed ability to utilize other data sources*
- Self-reported data
  - Potential misrepresentation of environmental and financial performance

➔ *Less likely to have variation among facilities*

# Future Research

---

- Time series panel data
- In-depth country-specific analyses
  - Greater access to other self-reported data sources
    - Environmental data
    - Financial data
  - Eliminate problems associated with lack of common metrics across countries
    - ➔ *May reduce breadth*
    - ➔ *Would increase confidence of results*

**Do industrial sectors differ in their ability to derive financial benefits from environmental actions?**

