# The TRI

## and effects on the “Top 10 Polluters”

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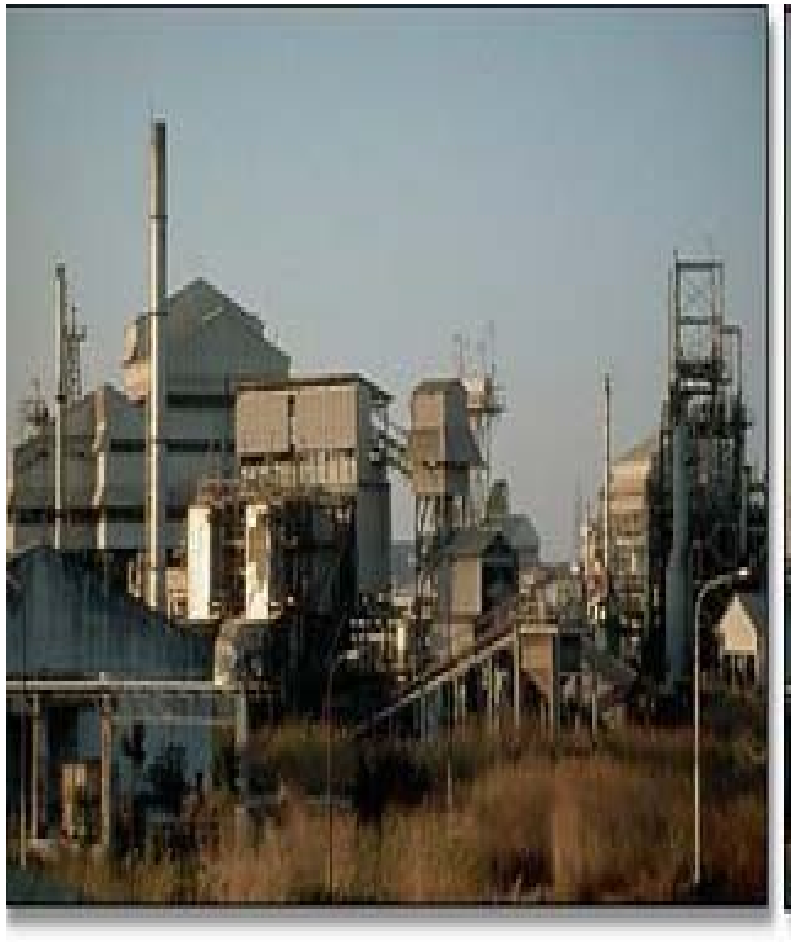
# EPCRA

Amy Ng

- In 1984, thousands of people in India die from toxic air pollution
- Similar case in W. Virginia
- Demand for “beyond the fence line” information
- EPRCA/SARA Title III



# TRI

- EPCRA Section 313: creation of TRI
- 1990 Pollution Prevention Act
- GOALS/PURPOSE- empower citizens, give public knowledge, hold companies responsible
- Annual reports- Scorecard/RTKNET/websites

http://www.epa.gov/triexplorer/

http://www.epa.gov/enviro/

- PBT chemicals- lower thresholds
- The importance of TRI data

# Economic Theory

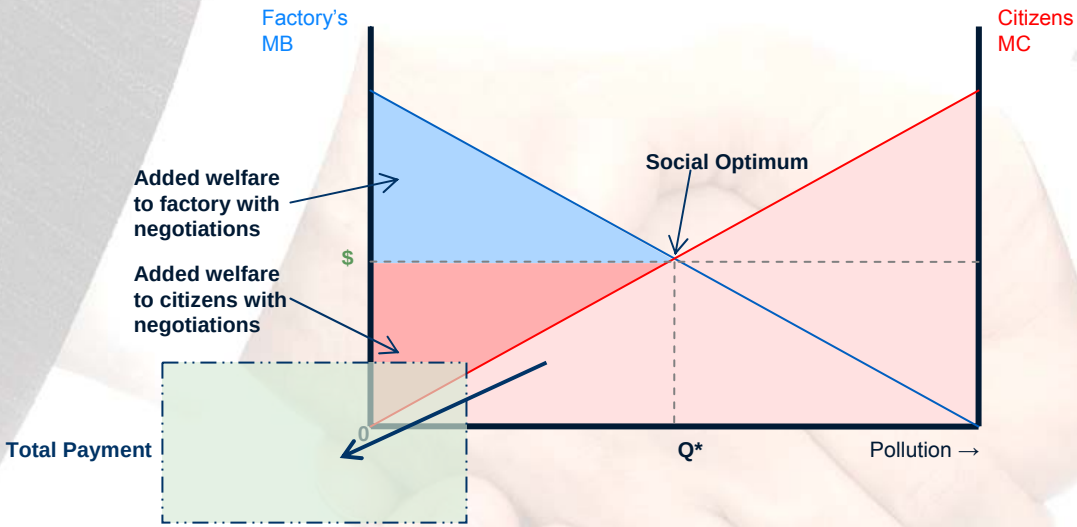
David Lum

- Coase Theorem
- Theory of Loss Aversion
- Graphical Demonstration
- Relation to TRI

# Coase Theorem

- Coase Theorem – Tradable Permits
  - Basic assumptions:
    - Well defined property rights
    - No/Little Transaction cost
    - Perfect Information
  - Says that with basic assumptions satisfied, market will reach its own social optimum

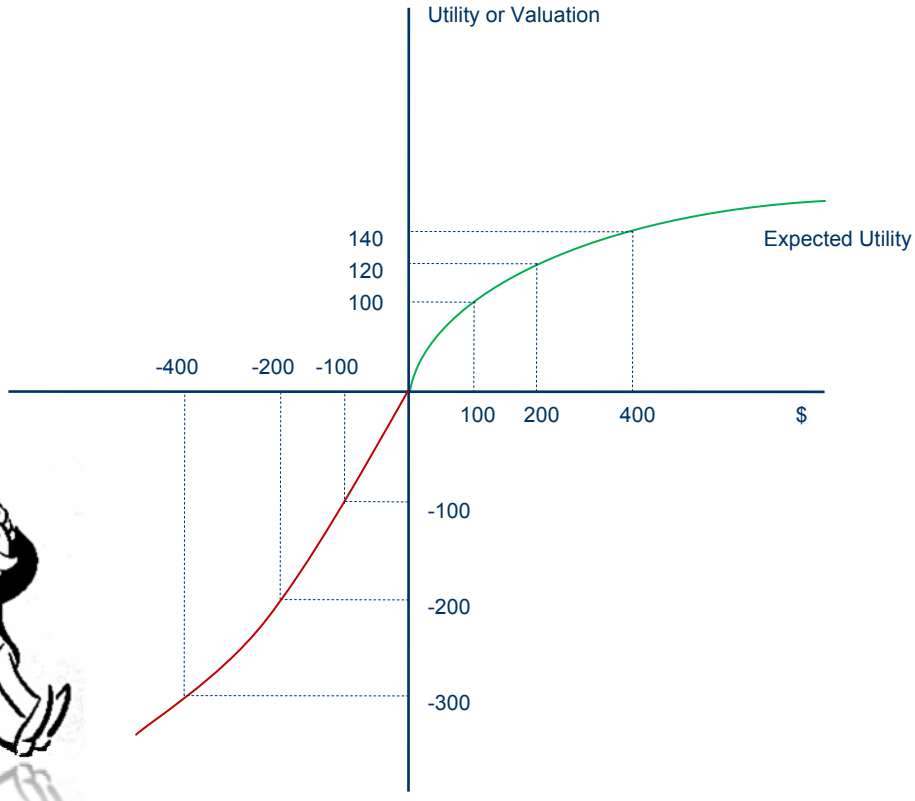
# Coase Theorem Graphically



# Theory of Loss Aversion

- Kahneman and Tversky 1991
- People tend to strongly prefer to avoid losses than acquire gains.
  - Losses are said to be twice as powerful
  - Describes risk adverseness
- Risk adverse people try to reduce their risky behavior

# Loss Aversion Graphically




# Relation to TRI

- Firms will informally bargain for their interest
  - Interest being to stay off top 10
- Loss Aversion
  - People tend to spend more effort fighting with high polluting firms than rewarding efficient ones
  - However, relative valuations are not the same, people can have different valuations

# TRI Effect on Pollution

Alana Lemarchand

- Previous Reports, Similar Programs
- TRI Data Overview
- The Scorse Report

# Previous Reports, Similar Programs

- Several studies establish a negative relationship between TRI reporting and stock prices (1995, 1998, 2001)
- Similar “Right to know” programs have successfully affected firm emissions
  - Indonesia (2000)
  - Canada, green consumerism (2002)
  - L.A. restaurants: decrease of food-borne illnesses (2003)

# TRI Data Overview

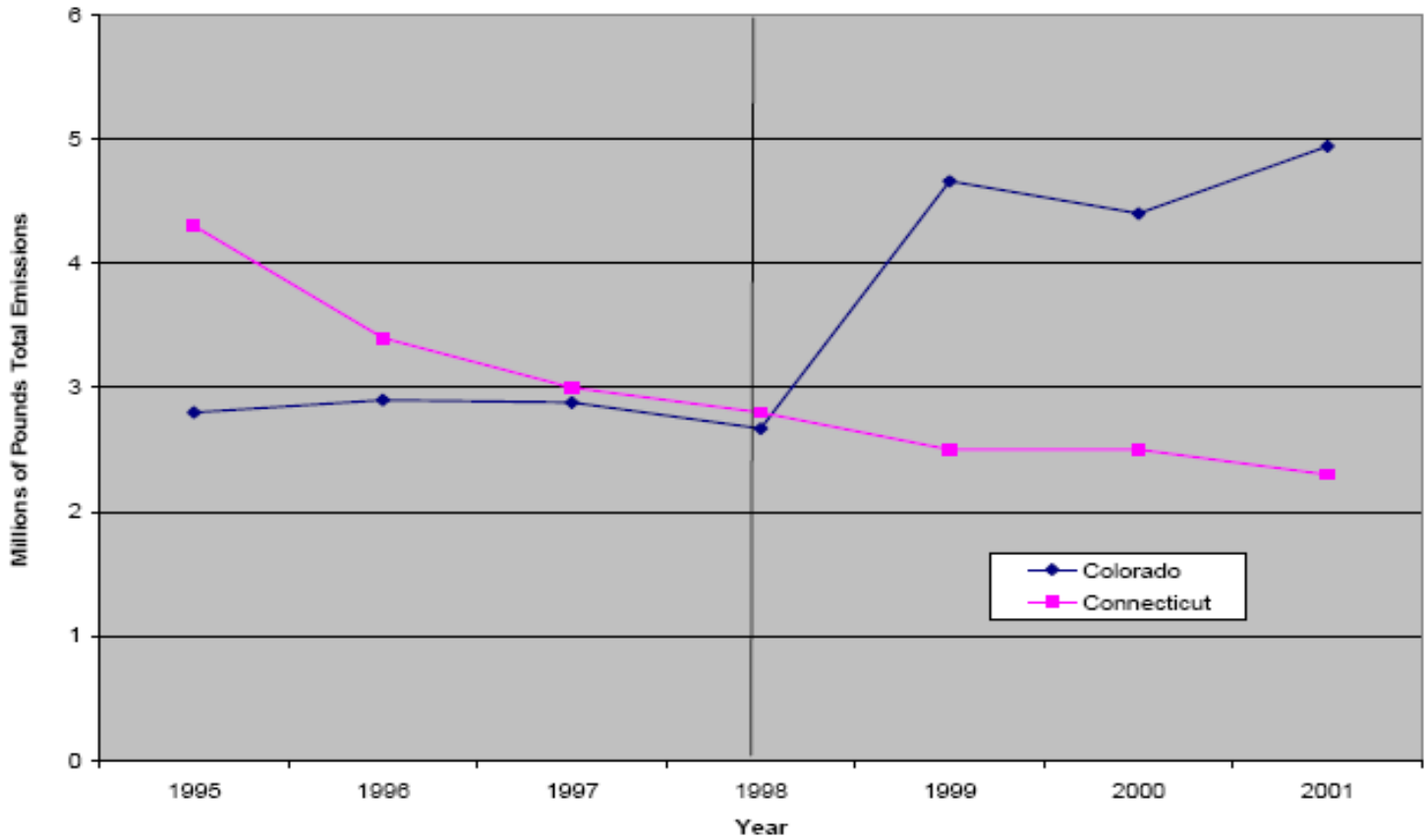
- The coverage of new firms beginning in 1998 provide “exogenous shock”
- Emissions had shrunk to 2 billion lbs but jumped to 7 billion lbs with addition of high polluting industries
- In the 2000-2001 reports, the new firms ended up lowering the “highest polluter” rankings of the existing firms

# Polluter Rank is Relative…


# The Scorse Report

- Econometric analysis of effect of rankings on emissions of “original” top 10 polluters by state
- One example compared effect of ranking on emissions in two states
  - Connecticut: addition of new firms had minimal effect on rankings
  - Colorado: addition of new firms had significant effect on rankings

# Top 10: Colorado vs. Connecticut



# Model of Impact of Rank on Pollution

- $\Delta$emissions = $\beta_1 \text{Rank}_{\text{Base}} + \beta_2 \text{Rank}_{\text{Change}}$ + controls
- Null hypothesis: $\beta_2 = 0$
- Alternative hypothesis: $\beta_2 > 0$
- $\beta_1 > 0$: lower ranked polluters (with greater number rank) have lower incentive to reduce emissions
- $\beta_2 > 0$: lower ranking due to exogenous shock will lower incentive to reduce emissions

# Illustration of Rank Change Effect

- $\Delta$emissions = 1*$Rank_{Base}$ + 6*$Rank_{Change}$ + controls
- For Firm A ranking changed from 2 to 13:
  - $Rank_{Base}$ = 2
  - $Rank_{Change}$ = 11
- $\Delta$emissions =1*2 + 6*11 = 2 + 66 =68
- * $\Delta$emissions are in 1,000 lbs

# Effects on Emissions for Top 100

| | OLS (1-4) | | | | Fixed Effects (5-8) | | | |
|---|---|---|---|---|---|---|---|---|
| | (1) | (2) | (3) | (4) | (5) | (6) | (7) | (8) |
| Base Ranking ($R^B$) | 1.1 (.2)*** | 1.4 (.3)*** | .47 (.1)*** | .61 (.2)*** | 2.0 (.3)*** | 3.8 (.9)*** | 1.7 (.3)*** | 1.0 (.7) |
| Exogenous Change in Ranking ($R^{CH}$) | 5.6 (1.6)*** | 6.0 (1.6)*** | 5.4 (1.5)*** | 5.7 (1.6)*** | 6.2 (2.0)*** | 7.6 (2.3)*** | 6.4 (2.0)*** | 6.0 (1.8)*** |
| Emissions Change (t-1) | .. | -.2 (.1) | .. | -.2 (.1) | .. | -.4 (.2)** | .. | .1 (.04)*** |
| Top 10 Dummy | .. | .. | -157.8 (34.3)*** | -184.1 (40.1)*** | .. | .. | -136.4 (31.2)*** | -90.2 (44.7)** |
| No. obs | 17427 | 17427 | 17427 | 17427 | 17447 | 17447 | 17447 | 16790 |
| $R^2$ | .05 | .07 | .05 | .08 | .003 | .002 | .005 | .003 |
| No. Groups | n/a | n/a | n/a | n/a | 4652 | 4652 | 4652 | 4598 |
| SIC dummies | Y | Y | Y | Y | N | N | N | N |
| State dummies | Y | Y | Y | Y | N | N | N | N |
| Year dummies | Y | Y | Y | Y | Y | Y | Y | Y |

Huber-White Standard Errors Clustered at the Facility Level in ( ): *= 90% confidence, **=95%, ***=99%

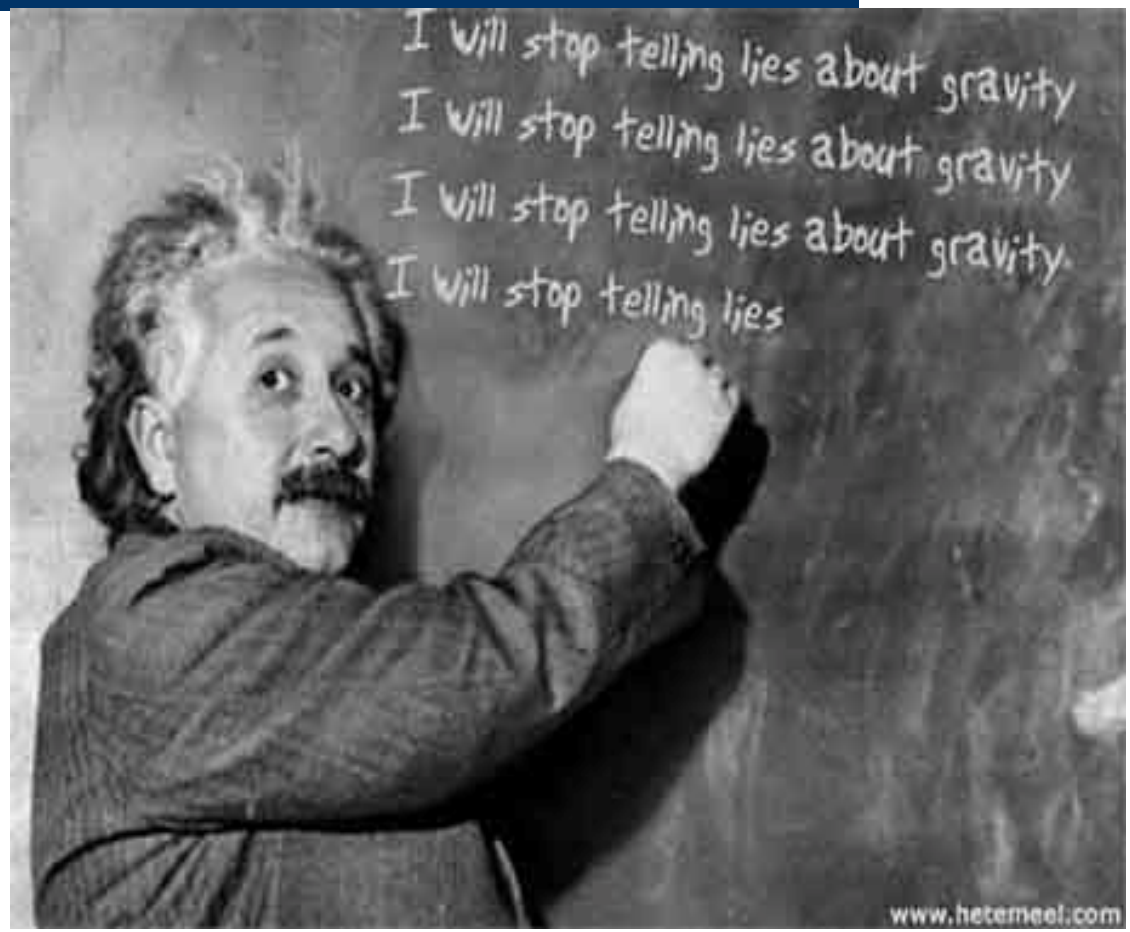
# Problems with TRI

**Milana Ruffin**

- Self-reporting of firms
- Influence of external factors
- Dropping ranks

# Problems with TRI

- Self-reporting of firms
- Will they have an incentive to lie?



# Problems with TRI

- **Self-reporting of firms**
  - No comprehensive auditing system
  - No penalties for inaccurate TRI reporting
- Research has shown that firms disclose environmental information strategically (Li and McConomy, 1999) In theory, public dissemination more cost-efficient than CAC regimes
- In practice, widespread accidental or strategic under-reporting of TRI emissions possible. How?

# Problems with TRI

- Redefining activities as „in-process recovery“ which does not fall under TRI as opposed to „on-site recycling“ (Natan, Miller 1998)
- Changes in analytical methods (e.g. monitoring vs published emissions factors)
- Industry collusion? Might be indicated by convergence of reported emission quantities

# Problems with TRI

- **External factors:**
- Correlation and causality: What about other factors? Global market conditions and input prices
- Example: Primary US aluminum industry post-1999 (Koehler, Spengler, 2007). Market pressures (e.g. energy prices) can account for emissions reductions, not pollution abatement investments

# Problems with TRI

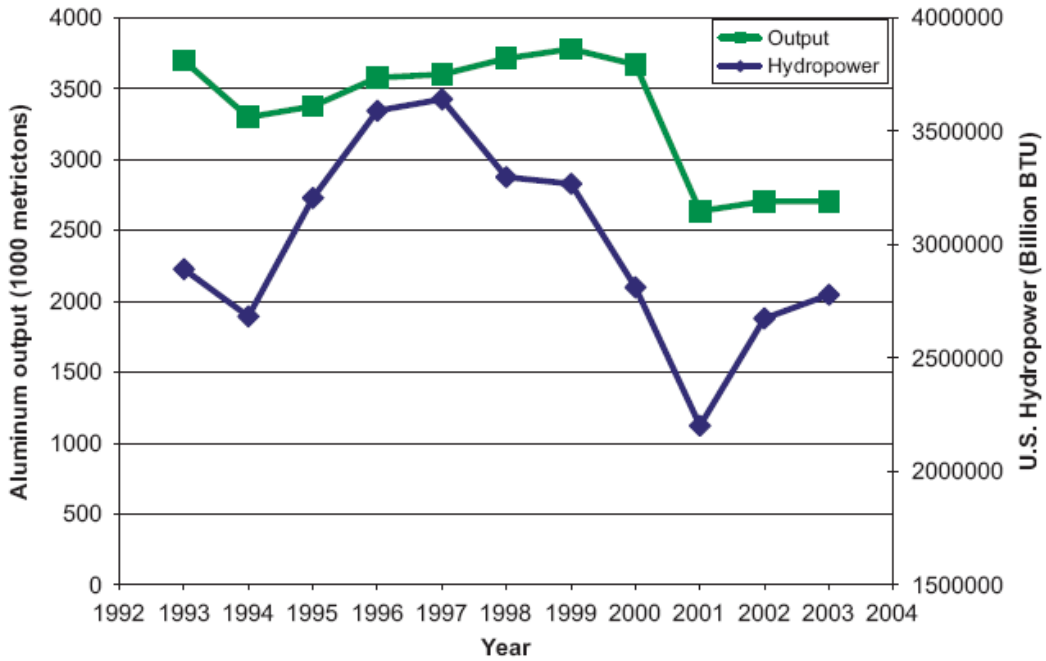



Fig. 7. Aluminum output vs. US hydropower production.

Source: Koehler, Spengler 2007

# Problems with TRI

- **Dropping Ranks**
- No major firm wants to be part of the ‘dirty dozen’
- BUT: The more a facility’s ranking dropped the less facilities reduce their emissions.
- The dilemma with reputational capital
- Solution: Separate lists?

# THANK YOU FOR YOUR ATTENTION!

- We have a surprise for you! ☺