



# Environmental Policy and Corporate Behaviour

Presentation by

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# Project Context

- Considerable OECD work on ‘Corporate Environmental and Social Responsibility’ (e.g. Guidelines for MNE’s, Corporate Governance Principles, ....)
- Focus is exclusively normative – what companies ‘should do’ and not what they ‘are doing’ (and why)
- Some case study work on what companies ‘are doing’ (but usually anecdotal, informal and unrepresentative)
- Empirical research project to analyse the effects of public environmental policy (and other factors) on corporate environmental behaviour

# Research Questions (1): EMS and Performance

- What factors encourage an industrial facility to introduce an environmental management system or EM tools?
- Do environmental management systems and tools have a distinct influence on environmental performance and innovation?
- If so, what are the implications (if any) for public environmental policy design?
  - which policies affect decision-making
  - ‘direct’ vs ‘indirect’ influences
  - potential for strategic behaviour and signalling

## Research Questions (2): Research and Innovation

- What factors encourage an industrial facility to invest in environment-related research and development?
- What factors encourage an industrial facility to meet its environmental objectives through investment in ‘changes in production processes’?
- Does the public environmental policy framework affect these two decisions?
  - degree of policy stringency
  - inspection frequency
  - policy instrument choice

# Research Questions (3): Environmental and Commercial Performance

- Is there a positive relationship between environmental performance and commercial performance at the level of the industrial facility?
- Is there a positive relationship between environmental management and commercial performance at the level of the industrial facility?
- If so - what are the implications (if any) for public policy design?

# Data Collection (1)

- Population: Manufacturing facilities with more than 50 employees in seven OECD countries (United States, Canada, France, Norway, Hungary, Germany, Japan)
- Stratified sampling across four classes of facility size (by employee numbers) and manufacturing sector (national codes)
- Sampling frame was exhaustive (or drawn randomly from an exhaustive database) in all but one case (permitted facilities)
- Questionnaire extensively pre-tested with over 100 facilities in three countries (Japan, Germany and Canada) and distributed to BIAC membership for review

## Data Collection (2)

- Postal survey distributed in early 2003, targeted at chief executive officers and environmental managers (identified where possible)
- Inclusion of stamped return envelope and contact details if any queries
- Two sets of reminders (along with additional questionnaires) – usual postal, but some telephone.
- Sample: > 4,000 facilities, 50 employees or more, all manufacturing sectors

# Questionnaire

- Characterisation of facility-level attributes (sector, size, stock market listing, etc...)
- Commercial conditions (markets, competition, sales, profitability)
- Perception of public environmental policy framework (regulatory stringency, policy instruments, etc...)
- Facility management (environmental and other) structure, practices and tools

# Response Rates

- Response rate approximately 25% - with considerable variance across countries
- For a postal survey targeted at business “satisfactory”:
  - inclusion of small firms;
  - all sectors;
  - not official data collection; and,
  - cross-section of countries.
- Equal to (or better than) comparable surveys undertaken in similar circumstances

## Number of Facilities in Sample

	CDN	FRA	DEU	HUN	JPN	NOR	USA	Total
50-99	76	85	351	66	661	155	96	1490
100-249	68	81	278	198	508	102	130	1365
250-499	62	39	130	101	178	36	130	676
>500	50	64	139	101	152	16	133	655
Total	256	269	898	466	1499	309	489	4186

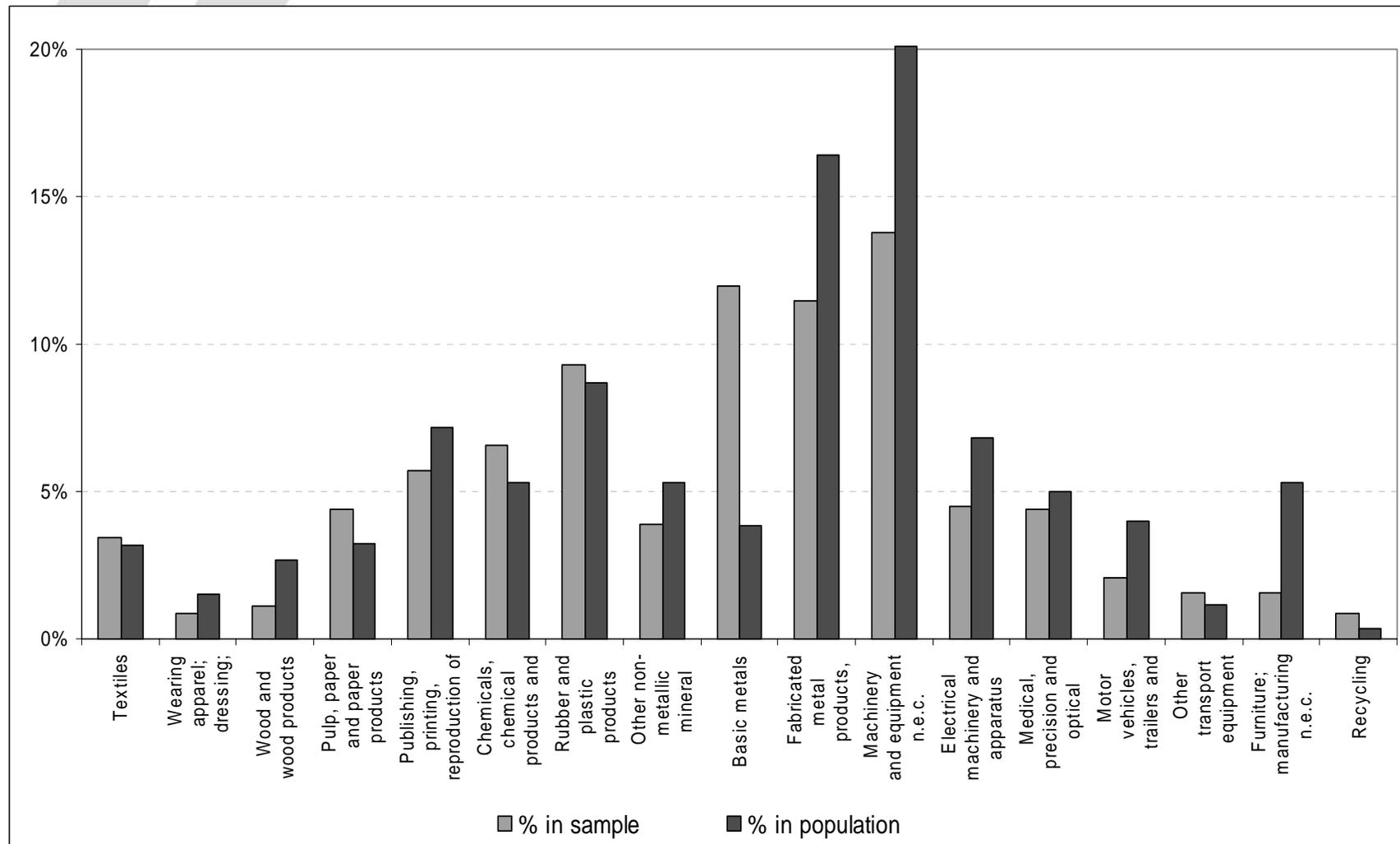
# Descriptive Data

	N	Mean	Std. Dev.
Person Responsible for Env. (1/0)	4171	0.70	0.46
EMS (1/0)	4002	0.56	0.65
Year implemented	1207	1999.58	3.26
Certification of EMS (1/0)	1302	0.86	0.35
Environmental dptmt? (1/0)	4104	0.48	0.50
Budget for env R&D? (1/0)	4077	0.09	0.29
Actions related to wastewater (1/0)	3468	0.74	0.44
Actions related to local/reg'l air pollution (1/0)	3135	0.62	0.48
Change in wastewater (range 1 – 5)	3283	2.54	0.73
Change in local/reg'l air pollution (range 1 – 5)	2848	2.53	0.69
Impact of technology standards (range 1 – 3)	3010	2.07	0.71
Impact of performance standards (range 1 – 3)	3380	2.24	0.68
Impact of env-related input taxes (range 1 – 3)	3390	2.11	0.72
Impact of pollution charges (range 1 – 3)	3228	2.08	0.74
Impact of environmental liability (range 1 – 3)	3472	2.26	0.71
Approximate age of your facility	3749	36.13	21.58
Change in sales from facility (range 1 – 5)	4045	2.92	1.08
Assessment of profitability (range 1 – 5)	4017	3.46	0.99
Firm listed on a stock exchange? (1/0)	4139	0.17	0.37
Employed by your facility in last three years	3832	352.28	880.9

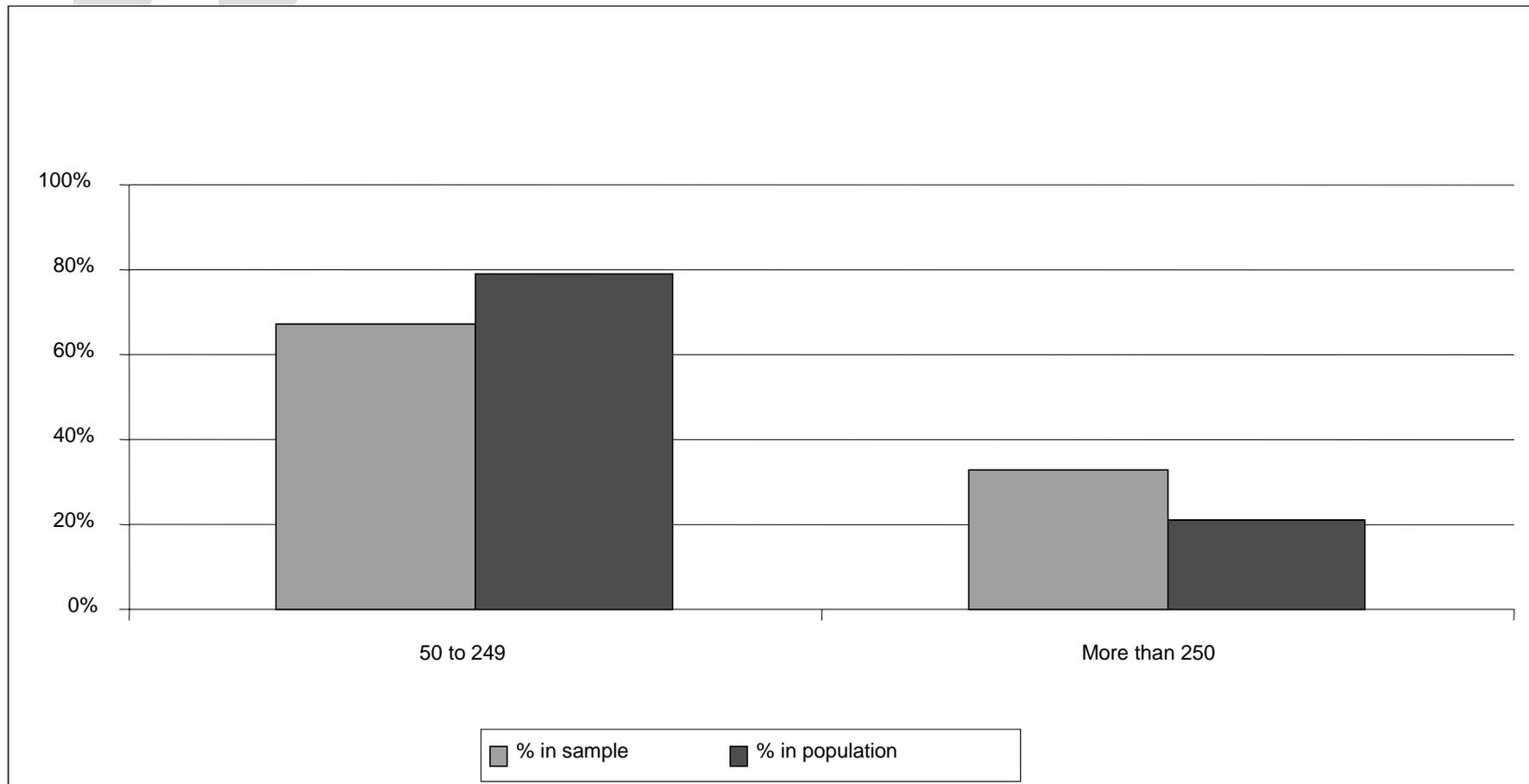
# Representativity (1)

- Sample not statistically representative – however, reasonable representation from:
  - polluting sectors
  - smaller facilities
  - new and old plants
  - without EMS, R&D, person responsible, etc...

# Representativity (2) – Germany by Sector



# Representativity (3) – Germany by Size



# Data Reliability

- Self-reported data – raises concern about potential for bias, particularly for environment-related data.
- However, considerable cause for comfort:
  - most environmental data is self-reported (even official sources)
  - preliminary corroboration is reassuring (to be completed)
  - no significant differences between ‘early’ and ‘late’ respondents
  - relative not absolute is of primary relevance (i.e. is bias skewed)
  - for some variables it is ‘perception’ which is of relevance
  - significant variance in responses for many of the dependent variables

# Variation in Data (1)



	<u>Reported Actions</u>	<u>Reported Decrease</u>
Wastewater Effluent	74.30%	43.10%
Loc/Reg Air Pollution	62.50%	42.90%
Solid Waste	81.80%	55.80%
Global Pollutants	38.10%	33.80%
Natural Resources	76.30%	52.90%

## Variation in Data (2)

	Minimum Value	Maximum Value	Coefficient of Variation
<b>Environmental Performance</b>			
Change in use of natural resources	1	5	30.67%
Change in solid waste generation	1	5	31.41%
Change in wastewater effluent	1	5	28.68%
Change in global pollution	1	5	24.24%
Change in local or regional air pollution	1	5	27.16%
<b>Impact of Policy Instruments</b>			
Impact of tech-based standards	1	3	34.24%
Impact of performance-based standards	1	3	30.27%
Impact of emission/effluent taxes/charges	1	3	35.50%
Impact of input taxes	1	3	33.88%
Impact of subsidies/tax preferences	1	3	39.61%
<b>Policy Stringency</b>			
Description of environmental policy regime	1	3	39.59%
Inspection Frequency	0	106	188.68%

# Research Questions Addressed

- The determinants of having in place an environmental management system or tools (Henriques et al 2005);
- The determinants of undertaking various investments to reduce environmental impacts and self-assessed environmental performance (Johnstone et al. 2005);
- The determinants of investing in environment-related research and development (Arimura et al. 2005);
- The determinants of improving environmental performance through changes-in-production-processes rather than end-of-pipe abatement (Fronzel et al. 2005); and,
- The links between commercial strategies and performance and environmental actions (Darnall et al. 2005).

## Next Steps and Possible Further Work

- Corroboration of the policy and environment-related data with other sources
- Address issues of perception to the greatest extent possible – i.e. inclusion of institutional location of respondent
- Working within sub-samples, including:
  - small and medium-sized enterprises
  - single-facility firms
  - sectoral level analyses
  - country-specific analyses

## Objectives of the Conference

- Review empirical work undertaken in these areas, drawing upon wide range of research
- Assess the implications of the research results for public policy design
- Bring together researchers, policymakers and business representatives
- Discuss policy research needs and project design for potential future research agenda