PROCEDURAL REQUIREMENTS AND
US EPA'S DECISION-MAKING

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In the Asbestos Ban of 1989, there are two main decisions: (1) EPA decision whether to ban a product (this can be referred to as the standard-setting), and (2) its decision when to ban the product (this can be referred to as the priority-setting). Accordingly, given the Administrative Procedures Act (APA) mandate to consider participation by external parties seriously, external parties could affect the priority-setting process as well as the standard-setting process in important and predictable ways. Using probit and ordered probit models, this study will infer the role of the active involvement of special interest groups in the form of written comments when making these two regulatory decisions.

I. INTRODUCTION

Over the last two decades, the state of the environment has been a serious concern among the public. The public has shown substantial support for using environmental regulation to improve perceived environmental problems. However, the question of how much regulation should be imposed is not settled and remains controversial. Some argue environmental regulations are too stringent, restraining economic activity; others argue they are not stringent enough, leaving human health and the environment in danger.

Considering these competing arguments, procedural requirements under the Administrative Procedures Act (APA) of 1946 provide external groups that would be affected by regulation opportunities to participate in the decision-making process in the form of written comments.[1] Under APA, a regulatory agency is

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[1] There may be other forms of participation in the decision making process except written

required to consider written comments seriously and, thus, the agency is likely to be influenced in its decision making by them. One can argue, however, that the agency might be governed by other factors as well, such as the costs and benefits of a proposed regulation. In contrast, it has been widely argued that interest groups affected by regulation might be more likely to comment when the costs and benefits of the regulation are high.[2] In other words, there may be correlation between the comment variable and the costs and benefits of regulation (Van Houtven and Cropper, 1996). Thus, in this paper, as is prescribed by APA, I focus merely on the role of participation by external parties in the form of written comments when making regulation.

In accordance with the requirement of APA, Environmental Protection Agency (EPA) banned the manufacture, import, processing, and distribution in commerce of certain asbestos-containing products in 1989.[3] In this regulation, EPA reviewed 39 asbestos-containing products, which are mostly automotive, construction, and paper products, and eventually decided to ban 27 products in 3 separate stages, leaving 12 products unregulated. As is evident from the Asbestos Ban, there are two main decisions: (1) EPAs decision whether to ban a product (this can be referred to as the standard-setting), and (2) its decision when to ban the product (this can be referred to as the priority-setting). Accordingly, given the APA mandate to consider participation by external parties seriously, external parties could affect the priority-setting process as well as the standard-setting process in important and predictable ways. Thus, this paper will focus on the following interrelated issues: (1) Was participation by interested parties important in the standard-setting process? Did comments from environmental groups (or firms) reduce (or increase) the probability of banning asbestos-containing products? (2) Were EPA decisions influenced by the extent of participation by external parties in the priority-setting process?

In the next section, characteristics of the Asbestos Ban will be briefly reviewed, and procedural requirements under APA and past analyses of the decision-making process will be discussed. Subsequently, in Section 3, the types of external participation will be laid out along with a description of the econometric models for banning asbestos-containing products and setting priorities. Empirical findings and their implications will be presented in Section 4. Finally, the results of this study will be summarized in Section 5.

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comments. It is extremely difficult, however, to verify and measure them outside the agency. In addition, written comments are considered most importantly by APA (Cropper et al, 1992).

[2] Firms are more likely to comment when the costs of regulation are high, whereas environmental groups are more likely to comment when the benefits of regulation are high.

[3] This regulation is referred to as the Asbestos Ban.

II. THE ASBESTOS BAN AND PROCEDURAL REQUIREMENTS UNDER APA

1. The Asbestos Ban

By the 1980s, asbestos had become widely used because of two charac-teristics: it is extremely effective in insulation and it is resistant to wear. It has been used where heat protection is important, such as fire-protective clothing and in friction materials, such as automobile brakes. Despite its desirable industrial properties, according to recent medical studies,[4] the high levels of worker exposure to asbestos and the low doses experienced by the non-occupationally exposed are potentially hazardous. Moreover, because asbestos fibers are colorless, odorless, frequently invisible, and able to travel extended distances in the environment, people can be exposed unknowingly to asbestos fibers, sometimes long after asbestos fibers have been released into the environment. More seriously, exposure to asbestos fibers can occur at all stages of the life cycle of asbestos-containing products, and asbestos fibers can persist for a very long time in the environment.

Due to its unique characteristics, asbestos has been linked with numerous ailments, including asbestosis (a chronic fibrotic lung disease caused by the inhalation of asbestos), lung cancer, mesothelioma (a cancer of the pleura or peritoneum), and cancers of the gastrointestinal tract. The primary adverse health effect of exposure to asbestos fibers is, in particular, lung cancer and mesothelioma. Over 90 percent of individuals who contract these diseases die from them.[5]

Under the Toxic Substances Control Act (TSCA) EPA determined that asbestos presents an unreasonable risk of injury to human health and the environment, and that only the staged-ban approach would adequately control the asbestos exposure risk posed by the product categories affected by this rule.[6] It eventually decided to ban 27 of 39 products in three separate stages, leaving 12 products unregulated in 1989. A list of these products for each stage of the ban is presented in Appendix.

2. Procedural Requirements under APA

The procedural requirements in the rulemaking process prescribed in the Administrative Procedures Act (APA) are as follows (McCubbins, Noll, and Weingast, 1987):

1. Agencies must issue a notice of proposed rulemaking in the Federal Register,

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[4] U.S. EPA, the RIA of Controls on Asbestos and Asbestos Products: Final Report, 1989.

[5] ibid.

[6] Federal Register, Vol.54, No132, July.12.1989.

and do so without prejudice or bias in favor or any particular action.
2. Agencies must solicit comments from all interested parties on the proposed rule.
3. Agencies must allow participation in the rulemaking process, with the extent often mandated by the enabling statute as well as by the courts.
4. Agencies must deal with the arguments and evidence presented to them and provide a rationalizable link between the arguments and evidence raised in all comments and their final rules.

In sum, publication of the proposed rule in the Federal Register was followed by a comment period, during which external parties could respond. The APA requires agencies to consider the arguments and evidence raised in public comments when drafting final rules. A comment period is typically 60 to 90 days, but it is usually extended to induce more and better-prepared participation of special-interest groups. The notice of a comment period is also published in the Federal Register.

The content of comments is not all alike. Some express their sentiment on certain aspects of the proposed rule. Others provide empirical data and studies to support their contentions. In many cases, however, comments, both for and against the proposed rule, represent competing interests that are balanced by regulators in the decision-making process. In other words, comments indicate the importance of the involvement of special-interest groups in the regulatory process, and the agency seeks regulatory outcomes that balance conflicting interests. Comments are placed with all other materials pertinent to a rulemaking in a docket, which is then completely open for review by the public. The final rule is issued after the agency has reconsidered its proposed rule in light of comments and any new findings it has collected.

Considering the requirement of APA, the agency may set the stringency of its standard to maximize the net support for a regulation from external parties (Peltzman, 1976). Most recently, Cropper et al. (1992) examine the determinants of pesticide regulation under the Federal Insective, Fungicide, and Rodenticide Act (FIFRA). Their analysis indicates that intervention by special-interest groups was important in the regulatory process: comments by grower organizations significantly reduced the probability of cancellation, whereas comments by environmental advocacy groups increased the probability of cancellation.

III. ECONOMETRIC MODELS

1. Sources of External Pressures

There are two links explaining the influence of external pressures on the agencys decisions: the direct link between pressures sent and the agencys decisions, and the indirect link through which the agency makes decisions in

anticipation of the likely pressures that its decisions would elicit from external groups (Arnold, 1979). In this paper, I focus on the direct link because it is very difficult to estimate the agencys anticipation of the external reactions to decisions, given the available data. The agency responds to outside pressures, primarily from two sources (Asch and Seneca, 1989):

Industry Pressures. Industries (or firms) that would be affected by the proposed rules attempt to avoid or modify them.

Pressures from the Public or Environmental Groups. Environmental groups affected by proposed rules are also likely to participate in some instances, turning potential rules to their advantage.

It is important to note that the argument that industry opposes, and the public supports regulation is an obvious oversimplification because of the diversity of interests within an industry or citizenry (Magat et al., 1986). However, for instance, support from unaffected firms is likely to be overshadowed by opposition from the portion of the industry whose relative position is worsened. Furthermore, characterizing industry comments as simply a means of increasing influence on the agencys decisions is also a simplification, because some industry comments may contain information useful to the agency in making decisions. Because firms are not likely to provide information supportive of more stringent standards, however, their comments will seek to relax the standards or to oppose the standards themselves.

2. Descriptive Statistics for Data Used

As mentioned above, only formal written comments that were submitted during the comment period and are contained in the public docket are included in the analysis. Three features of these public comments should be noted: First, written comments submitted by foreign entities are ignored in this study because it is difficult to assess their influence on EPAs decisions. Second, some comments, particularly those from environmental groups, are general, in other words, they are not product-specific. It is likely that they simply reinforce EPAs proposed regulation as a whole. Accordingly, these general comments are excluded in the analysis. Finally, some entities commented on several products. For example, Ford Inc. opposed bans on drum brake linings, disc brake pads, and friction materials. All these comments are included in the analysis. Summary statistics of public comments are presented in [Table 1].

3. Econometric Models for Banning Asbestos-Containing Products

The model that I will attempt to use can be formally written as:

$$p(Ban_i) = P(\beta_1 + \beta_2' S_i + \epsilon_i > 0)$$

[Table 1] Entities Commenting in the Regulatory Process[7]

Entity	Number of Comments	Percentage of All Comments
Environmental Groups[8]	75	31.65%
Firms	118	49.79%
Foreign	32	13.50%
Others[9]	12	5.06%
Total	237	100%

where S_i is a vector of variables indicating intervention in the decision-making process by firms and environmental groups. More specifically, S_i can be a vector of variables indicating whether there was at least one comment from each group for product i. I expect participation by environmental groups (or consumers and workers) to increase the probability of banning, and participation by firms and producer organizations to reduce the probability of banning.

Alternatively, S_i can be a vector of variables indicating the number of comments that EPA received from each group for product i, assuming that the number of comments represents the strength of external pressures. If this is the case, final decisions may depend on the relative strength of pressures from environmental groups and firms.[10]

Probit models can be employed to estimate the above models. The regression relationship defines an unobservable variable y_i^*, as

$$y_i^* = X_i'\beta + \varepsilon_i \tag{1}$$

where X_i is two vectors of S_i explained above. What we observe is the outcome of a discrete choice (ban versus not ban) of the product i, which is a reflection of an underlying regression. The observable binary variable y_i is related to y_i^* in the following way

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[7] The data contained in the public docket in Washington D.C. have been sorted out by the author.

[8] This includes consumer groups and workers associations.

[9] This includes other government authorities.

[10] However, this may be an oversimplifying assumption because it overlooks the asymmetry in lobbying strength across the entities that submitted comments. The impact of a comment submitted by a big firm (or a big environmental group) is likely to be different than that of a comment submitted by a small firm (or a small environmental group). Therefore, a better measure of the strength of external pressures needs to be identified. I considered having separate dummy variables for large and small organizations. However, the information in the public docket was insufficient to distinguish small firms (or environmental groups) from large firms (or environmental groups), so this must be left for further analysis in the future.

$$y_i = 1 \quad \text{if} \quad y_i^* > 0,$$
$$= 0 \quad \text{if} \quad y_i^* \leq 0, \tag{2}$$

and $y_i = 1$ and $y_i = 0$ indicate that product i is banned and otherwise, respectively. From (1) and (2)

$$P(y_i = 1) = P(y_i^* > 0) = P(\varepsilon_i > -X_i'\beta) = 1 - F(-X_i'\beta) = P_i \tag{3}$$

where F is the cumulative distribution function for ε_i. The likelihood function is

$$L = \prod_{y_i=0}(1 - P_i) \times \prod_{y_i=1} P_i \tag{4}$$

It is important to note that the parameters of the model are not necessarily the marginal effects that we are accustomed to analyzing in ordinary regressions. The marginal effects in probit models indicate the effect of a unit change in X on the probability that $y = 1$ (or a product is banned). For the normal distribution, the marginal effects are

$$\partial E(y_i)/\partial X_{ij} = \phi(X_i'\beta)\beta_j \tag{5}$$

where $E(y_i)$ is $P(y_i = 1)$, X_{ij} is the jth element of the vector X_i, β_j is the jth element of the parameter vector β, and $\phi(\cdot)$ is the standard normal density.[11] The marginal effects will vary with the values of the regressors. In interpreting an estimated model, two alternative ways will be used to calculate the marginal effects. One is to calculate the marginal effects at the means of the regressors:

$$\frac{\partial E(\hat{y})}{\partial X_j} = \phi(\bar{X}'\hat{\beta})\hat{\beta}_j \tag{6}$$

where $\bar{X}$ is the vector of the means of the regressors and $\hat{\beta}$ is the vector of the MLEs from (4). The other approach is to calculate the marginal effect of a regressor for each observation, then aggregate all these values, and take an average of them. This is referred to as the averaged aggregate marginal effect. This can be expressed as

$$\frac{\partial E(\hat{y_i})}{\partial X_{ij}} = \frac{\sum_{i=1}^{N} \phi(X_i'\hat{\beta})\hat{\beta}_j}{N} \tag{7}$$

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[11] The estimated asymptotic variance matrix of the marginal effects is
$AsyVar[\hat{f\beta}] = \phi[I - (\hat{\beta}'x)\hat{\beta}x']V[I - (\hat{\beta}'x)\hat{\beta}x']'$ (Greene, 1993).

where N is the number of observations.

4. Econometric Models for Setting Priorities

In specifying the stage-setting model, I posit that EPA considers the number of comments in determining when to ban an asbestos-containing product (or at what stage to ban an asbestos-containing product). More specifically, the hypothesis is that product i has greater probability of being banned in an earlier stage if EPA receives relatively more (or less) comments from environmental groups (or firms). Formally,

$$y_i^* = \beta_1 + \beta_2 NF_i + \beta_3 NE_i + \varepsilon_i$$

where NF_i (or NE_i) is the number of written comments submitted by firms (or environmental groups). The weights attached to each of external variables can be estimated using the ordered probit approach.[12] The assumed relationship is

$$y_i^* = X_i' \beta + \varepsilon_i$$

where y_i^* is once again the unobservable variable, but which is now related to the observable alternative categories of choice, which are the banning stages. X_i is the number of comments lodged by firms and by environmental groups. What we observe is each stage, and we can write

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\begin{aligned}
y_i &= 0 && \text{if} && y_i^* \leq 0 \\
&= 1 && \text{if} && 0 < y_i^* \leq \mu_1 \\
&= 2 && \text{if} && \mu_1 < y_i^* \leq \mu_2 \\
&= 3 && \text{if} && \mu_2 \leq y_i^*
\end{aligned}
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and $y_i = 0, 1, 2, 3$ indicate that product i is not banned, product i is banned in stage 3, 2 and 1, respectively. The μ's are unknown parameters to be estimated together with β. Because the μ's are free parameters, there is no significance to the unit distance between the set of observed values of y. They merely provide a ranking. The probabilities that enter the log-likelihood function are

$$P(y_i = j) = P(y_i^* \text{ is in the jth range}) \qquad j = 0, 1, 2, 3.$$

With the normal distribution, we have the following probabilities:

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[12] Maddala (1983), pp. 46-49.

$$P(y_i = 0) = \varPhi(-X_i'\beta)$$
$$P(y_i = 1) = \varPhi(\mu_1 - X_i'\beta) - \varPhi(-X_i'\beta)$$
$$P(y_i = 2) = \varPhi(\mu_2 - X_i'\beta) - \varPhi(\mu_1 - X_i'\beta)$$
$$P(y_i = 3) = 1 - \varPhi(\mu_2 - X_i'\beta)$$

where $\varPhi$ is the cumulative standard normal. In order for all of the probabilities to be positive, we must have $0 < \mu_1 < \mu_2$. The maximum likelihood method can be used to obtain estimates of the parameters β and μ.

IV. EMPIRICAL FINDINGS

1. Simple Probit Model: Decisions on Whether to Ban[13]

[Table 2] provides the results of applying a probit model to EPAs decisions on asbestos-containing products. As discussed earlier, there are two models based on comment variables: One uses a zero-one variable indicating the presence of, at least, one comment from each interest group, namely environmental groups or firms; the other uses an integer-valued variable that reflects the number of comments that EPA received from each group during a comment period. Each model includes a constant term. For each model, the marginal effects of regressors are presented in [Table 3]. Both the usual marginal effect measure and the averaged aggregate marginal effect measure are presented.[14]

Although the coefficients for the firm variables in models 1 and 2 are not all significant, the signs of the coefficients support the hypothesis that the probability of banning increases with the participation of environmental groups (or with the number of environmental group comments) and decreases with the participation of firms (or with the number of firm comments).[15] The signs thus show that EPA responds to external pressures communicated in the form of written comments. Comments from environmental groups appear to be more important than those from firms in both models given the p-values. In other words, the coefficient for the environmental group variable is statistically significant at the 1% significance level for both models. This may be attributed to the fact that health risks associated with exposure to asbestos have been well known, and thus public concerns have been mounting over the past years.

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[13] This study reports the results based on the probit analysis. The ratio of the logit coefficients to the probit coefficients is slightly larger than the 1.6 suggested by Amemiya (1981). The results of the logit and probit model are nearly identical.

[14] The averaged aggregate marginal effects are preferable in part because some asbestos-containing products generated a lot of public comments while others did not; thus the means of the public comment variables are not pertinent values of these variables for each asbestos-containing product. This argument is also supported by Greene(1993).

[15] It should be noted that given the insignificant firm comment variable we can not say with adequate confidence that they are anything but zero.

[Table 2] Parameter Estimates of Decisions on Whether to Ban[16]

Variable Name	Model 1	Model 2
Constant	-1.2173 (0.12799)	-1.1191 (0.07745)*
Environmental Group Comment	2.6265 (0.00008)**	
Firm Comment	-0.0868 (0.91428)	
Number of Environmental Group Comments		0.9011 (0.00883)**
Number of Firm Comments		-0.0808 (0.49541)
Log Likelihood	-9.9470	-6.2836
Percentage Correctly Predicted	90.63	93.75
Pseudo R2	0.6430	0.9652

[Table 3] Marginal Effects of Decisions on Whether to Ban[17]

Variable Name	Model 1	Model 2
Constant	0.2035 (0.4241)	0.1216 (0.0002)
Environmental Group Comment	0.4391 (0.9150)	
Firm Comment	-0.0145 (-0.0302)	
Number of Environmental Group Comments		0.0979 (0.0002)
Number of Firm Comments		-0.0088 (-0.00002)

In Model 1, the marginal effects suggest that the probability that a product is banned after receiving a comment from environmental groups (about 44%) is greater than the probability that the product is not banned after receiving a comment from firms (about 1.4%).

[Table 2] shows the percentage of EPA decisions correctly predicted for

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[16] The number of observations is 32. p-values are in parentheses and * and ** indicate that the value is significant at the 10% and 1% level, respectively.

[17] Averaged aggregate marginal effects are presented without parentheses, whereas usual marginal effects are with parentheses.

models 1 and 2. The figures suggest that Model 2, which has integer-valued variables, predict slightly better than Model 1. For both models, a Pseudo R^2 based on the formula given by Zavoina and McElvey (1975) is presented. The Pseudo R^2 figures suggest that Model 2 fits better than Model 1.[18] For models 1 and 2, the hypothesis that the explanatory variables, except the constant, have no impact on the choice probabilities P_i, that is, the $\beta_2 = \beta_3 = 0$ is tested. The test statistic is

$$LR = -2[\ln \hat{\ell}(\Omega) - LN \hat{\ell}(\omega)]$$

where $\hat{\ell}(\Omega)$ is the value of the likelihood function evaluated at the maximum likelihood estimates and $\hat{\ell}(\omega)$ is the maximum value of the likelihood function under the hypothesis that $\beta_2 = \beta_3 = 0$. If the hypothesis is true asymptotically, the test statistic has a $\chi^2_{(k-1)}$ distribution. The test statistics for models 1 and 2 are 21.2895 and 28.6164, respectively. For each model, the hypothesis is rejected at the 5% significance level.[19]

2. Ordered Probit Model: Decisions on When to Ban[20]

The results of the ordered probit analysis are presented in [Table 4]. For instance, the coefficient on the number of environmental group comment variable (0.2060) suggests that if EPA receives more comments from environmental groups, a product has an approximately 21% probability of being banned in earlier stage, in other words sooner. The signs of the coefficients in Model 3 support the hypothesis that a product has a greater probability of being banned in an earlier stage if EPA receives relatively more (or less) comments from environmental groups (or firms) that support (or oppose) a ban on the product. The coefficients on external pressures, namely the number of comments from firms and the number of comments from environmental group, are both significant in this case. It seems that external pressures represented by the number of written comments play a crucial role in determining banning stages.

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[18] Although the percentage correctly predicted and a Pseudo R^2 are suggestive, it is important not to place too much emphasis on these measures of goodness of fit. The maximum likelihood estimator is not chosen in order to maximize a fitting criterion based on prediction of y, as it is in the classical regression which maximizes R^2. It is chosen to maximize the joint density of the observed dependent variable (Greene, 1993).

[19] The critical value of the $\chi^2_{(k-1)}$ distribution at the 5% significance level is 5.99.

[20] The model assumes that s are independent of X. If this is not the case, the model has a restricition.

[Table 4] Parameter Estimates of Decisions on When to Ban[21]

Variable Name	Model 3
Constant	0.0149 (0.96764)
Number of Environmental Group Comments	0.2060 (0.01315)**
Number of Firm Comments	0.0855 (0.00432)**
μ_1	1.2210 (0.00544)**
μ_2	2.1916 (0.00012)**
Log Likelihood	33.0336
Percentage Correctly Predicted	53.13
Pseudo R2	0.8543

V. CONCLUDING REMARKS

There were two main decisions in the asbestos rule: (1) EPAs decision whether to ban a product, and (2) its decision when to ban the product. In this paper, given these two sets of decisions, I focus external pressures represented by written comments as important factors in the decision-making process given the requirement of APA.

The econometric results indicate that affected parties were able to influence EPAs decisions. Intervention by firms decreased the probability of a product being banned, while participation by environmental groups increased the probability. It appears that environmental groups were more able to influence EPAs decisions to their advantage. It should be noted, however, that the statistical significance of the coefficient for the firm comment variable is relatively low.

The number of written comments that represents external pressures influenced EPAs decisions on setting stages. EPA was driven by the extent of participation by external parties when setting stages. In other words, a product had a greater probability of being banned in an earlier stage if it generated relatively more comments from environmental groups. It should be noted, in the priority-setting process, that the coefficients on the number of environment comments variable and the number of firm comments variable are both significant.

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[21] The parameters are estimated by the LIMDEP program. p-values are in parentheses. ** indicates that the value is significant at the 1% level.

APPENDIX

Products Considered for Asbestos Ban in the Final Rule

NOT BANNED :

Missile Liner
Asbestos Diaphragms
Sealant Tape
Asbestos Thread,
Asbestos Packing
Asbestos-Reinforced Plastics
Sheet Gaskets/PTFE[22]
Beater-Add Gaskets/2[23]
High Grade Electrical Paper
Acetylene Cylinders
Battery Separators
Arc Chutes

BANNED IN STAGE 1 (Aug. 27, 1990) :

Pipeline Wrap
Asbestos/Cement Corrugated Sheet
Asbestos/Cement Flat Sheet
Roofing Felt
Flooring Felt
Vinyl/Asbestos Floor Tile
Asbestos Protective Clothing

BANNED IN STAGE 2 (Aug. 25, 1993) :

Automatic Transmission Components
Beater-Add Gaskets
Clutch Facings
Sheet Gaskets
Disc Brake Pads For LMV[24] (OEM[25])
Drum Brake Linings (OEM)
Commercial /Industrial Friction Products

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[22] Specialty industrial gaskets

[23] Specialty industrial gaskets

[24] Light- and Medium- weight Vehicles

[25] Original Equipment Market

BANNED IN STAGE 3 (Aug. 26, 1996) :

Brake Blocks
Drum Brake Linings (Aftermarket)
Disc Brake Pads For LMV (Aftermarket)
Non-Roof Coatings
Asbestos/Cement Pipe
Asbestos/Cement Shingle
Millboard
Specialty Paper
Commercial Paper
Rollboard
Corrugated Paper
Disc Brake Pads For HV[26] (Aftermarket)
Roof Coatings

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[26] Heavy Vehicles

REFERENCES

Amemiya, T. (1981), Qualitative Response Models: A Survey, *Journal of Economic Literature*, 14, 1483-1536.

Arnold, D. R. (1979), Congress and the Bureaucracy: A Theory of Influence, New Haven, Yale University Press.

Asch, P. and J. J. Seneca (1989), Determinants of Health and Safety Regulation, New Series Working Paper, No. 1989-06, Rutgers University, Department of Economics.

Cropper, Maureen L. and Evans, William N. and Bererdi, Stephan J. and Ducla-Soares, Maria M. and Portney, Paul R., The Determinants of Pesticide Regulation: A Atatistical Analysis of EPA Decision Making, *Journal of Political Economy*, 100, 1992, 175-197.

Greene, W. H. (1993), Econometric Analysis, New York, Macmillan Publishing Co.

Maddala, G. S. (1983), Limited Dependent and Qualitative Variables in Econometrics, New York, Cambridge University Press.

Magat, W. and A. J. Krupnick and W. Harrington (1986), Rules in the Making: A Statistical Analysis of Regulatory Agency Behavior, Baltimore, The Johns Hopkins University Press.

McCubbins, M. D. and R. G. Noll and B. R. Weingast (1987), Administrative Procedures As Instruments of Political Control, *Journal of Law, Economics, and Organization*, 3, 243-277.

Peltzman, S. (1976), Toward a More General Theory of Regulation, *Journal of Law and Economics*, 19, 211-240.

Van Houtven, George and Maureen L. Cropper (1996), When Is a Life Too Costly to Save? The Evidence from U.S. Environmental Regulations, *Journal of Environmental Economics and Management*, v30, n3, 348-368.

Zavoina, R. and W. McElvey (1975), A Statistical Model for the Analysis of Ordinal Level Dependent Variables, *Journal of Mathematical Sociology*, Summer, 103-120.