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# H.J. Leonard, Are Environmental Regulations Driving U.S. Industry Overseas?

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## **Book Review**

# **ARE ENVIRONMENTAL REGULATIONS DRIVING U.S. INDUSTRY OVERSEAS?**

By H. Jeffrey Leonard, Washington, D.C.: The Conservation Foundation, 1984. Pp. 155.

### **I. Introduction**

In August of 1984, The Conservation Foundation (CF) published a book written by H. Jeffrey Leonard, a CF Senior Associate. The book presents the results of a recently completed CF study which examines the accuracy of a prediction made by certain economists during the late 1970's. The economists predicted that high domestic environmental control costs would influence U.S. industries to relocate their production operations overseas.

In recent years, the prediction was adopted and adapted by some environmental critics as the basis for arguments regarding environmental policy. As interpreted by these critics, the prediction called for an easing of U.S. environmental regulations, enactment of legislation to prevent U.S. industry from relocating overseas, or international imposition of environmental regulations comparable to those in the U.S.

Leonard expresses concern over this policy debate based on an uncritical acceptance of the unverified industrial flight prediction. Perceiving that environmental policy has been formulated based on anecdotes and assumptions, Leonard seeks to test the accuracy of the industrial flight prediction. Based on the results of the CF study, he concludes, generally speaking, that the industrial flight prediction has not been and is unlikely to be fulfilled. Accordingly, adopting a policy in favor of relaxing environmental regulations or taking similar action because of a fear of "industrial flight," would be incorrect.

## II. Discussion

### A. Background

Leonard's book begins with an account of the debate of the late 1970's over the effects of costly environmental regulations on locational decisions of U.S. industry. Some economic theorists, led by Ingo Walter, predicted that multinational companies with the capability of relocating their operations overseas would be very sensitive to the costs of complying with environmental regulations. This sensitivity, they predicted, might substantially affect investment decisions and trade position. These same theorists further predicted that environmental factors would lead to a shift of pollution intensive activities from the U.S. to lower income countries not requiring expensive pollution control measures.

This presumed sensitivity to costs is consistent with the decisionmaking model of a profit maximizing firm.<sup>1</sup> Assuming a profit maximizing perspective, all expenses which do not generate revenue or reduce other expenditures, including most environmental and workplace safety related expenses, are to be minimized, and are to be considered along with other factors (such as labor costs, political stability, transportation costs, and taxes) in deciding whether a firm should relocate. Accordingly, as the costs of compliance with environmental regulation increase, industrial flight theorists conclude that the likelihood of these costs resulting in a decision to relocate also increases. A problem with this conclusion is that it fails

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1. The classic formulation of the profit maximizing perspective was set forth by Adam Smith in *The Wealth of Nations* (1776).

Every individual is continually exerting himself to find out the most advantageous employment for whatever capital he can command. . . . The produce of industry is what it adds to the subject of materials upon which it is employed. In proportion as the value of this produce is great or small, so will likewise be the profits of the employer. But it is only for the sake of the profit that any man employs a capital in the support of industry; and he will always, therefore, endeavor to employ it in the support of that industry of which the produce is likely to be of the greatest value, or to exchange for the greatest quantity either of money or of other goods.

Modern Library, Random House, Inc., (1937 ed.) at Ch. II, pp. 421 and 423. Also, see, Mansfield, *Microeconomics*, W.W. Norton and Co. (1970) pp. 114-16, 144-47.

to consider that under the profit maximization model, even when environmental costs are excessive, relocation may be imprudent if overall business conditions remain favorable. Conversely, the profit maximization model also suggests that unfavorable overall conditions might prompt relocation even though environmental costs are lower in the U.S. than elsewhere.

As originally presented, the industrial flight theory did not conclude that environmental regulations should be abandoned. The theory merely concluded that hazardous, pollution intensive activities could be expected to shift to less affluent countries not requiring expensive environmental expenditures. Critics of environmental regulation adopted the industrial flight theory to argue restraint in environmental regulations. Their argument assumes U.S. environmental regulations are responsible for U.S. balance of trade difficulties, the failure of U.S. industry to be competitive with foreign competitors, and a massive exodus of industry overseas. A repeal of harsh environmental regulations, these critics argue, might alleviate these problems.

In response to this scenario, CF commissioned the study which culminated in Leonard's book.<sup>2</sup> The purpose of the book is to investigate the narrow issue of whether environmental regulations are driving U.S. industry overseas.

### B. *Avoided Issues*

By determining that environmental regulations are not causing widespread relocations, Leonard avoids some difficult issues. Specifically, he avoids the difficult policy question of whether retention of environmental regulations is justified even though it results in some U.S. industry relocating overseas. Leonard also is able to avoid a confrontation between society's interest in a healthy economy and its interest in a healthy environment. For the moment, the more traditional macro economic perspective defenses that environmental reg-

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2. The CF study monitors and compiles available information. It does not discover new information. Use of such a data base helps explain why Leonard selects an indirect method of testing his hypotheses.

ulations are necessary to safeguard public health, to preserve the ecosystem, to assure a proper quality of life, and are economically beneficial, are left for others.<sup>3</sup>

The reader should note that all the CF study achieves, assuming it accomplishes what it sets out to do, is an evaluation of whether industrial flight, in response to the costs of environmental regulation, has occurred or is likely to occur. The study does not attempt to assess whether current environmental regulations are adequate or excessive.

Another topic ignored by the CF study is whether environmental regulations should be curtailed when they reduce the profits of industrial polluters. Even if environmental regulations do not cause industry to relocate, they nevertheless may reduce these profits. Thus, the overall policy debate is not concluded until this issue, among other things, is decided. Accordingly, regardless of the persuasiveness of Leonard's findings, they are not likely to conclusively influence the outcome of debates on environmental policy. The narrow scope of his topic severely limits the impact of his conclusions. The difficult questions avoided by Leonard's study remain unanswered.

Leonard's topic choice completely avoids any direct response to the policy arguments of environmental critics. He prefers to attack the industrial flight theory relied upon as a justification for these policy arguments. Barring any complete survey of recent writings on environmental policy issues, it is impossible to determine whether the narrow focus of Leonard's inquiry is representative of a broader trend. It is unknown whether defenders of environmental regulation are retreating from direct debate of the merits of environmental policy. Such a trend would have great significance.

Nevertheless, Leonard's topic does consider whether the debate on environmental policy should discard the broadly accepted industrial flight theory results in the formulation of

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3. The macro economic perspective compares collective costs to society caused by pollution with collective costs to society of required pollution control measures. This is in contrast to the micro economic perspective which compares the costs to a firm resulting from its pollution with the costs to that firm of controlling its pollution.

policy choices. The author and CF deem it important to verify or dispel the accuracy of this prediction.

### C. *Analysis by Hypotheticals*

The methodology of the CF study is to set forth as postulates the expected consequences of certain hypothetical conditions. To test whether the hypothetical conditions actually exist, Leonard looks to see whether the expected accompanying consequences exist. When he finds that these consequences do not exist, he concludes that the hypothetical conditions do not exist. The problem with this methodology is that the correlation between the conditions and consequences is unproven. Additionally, Leonard has not shown that it would be erroneous to reject his correlations. It simply may be that Leonard's expectations were erroneous.

Specifically, Leonard hypothesizes that if environmental regulations are causing U.S. industry to relocate overseas, then it follows that direct foreign investment in countries with lax environmental requirements should be greater for high pollution U.S. industries than for other U.S. industries. Since foreign investment for high pollution industries does not differ from investment by other industries, Leonard concludes that relocations of U.S. industry are not attributable to U.S. environmental regulations. While it appears reasonable to expect a correlation between foreign investment and environmental regulation, Leonard fails to demonstrate the significance of the absence of such a correlation.<sup>4</sup> For this reason, it is disappointing that Leonard did not directly examine the number of and reasons for any recent relocations of U.S. firms. Had he done so, his conclusions could not so easily be ignored by those opposing his views. As it is, Leonard may be correct in his conclusions, but he does not prove them.

Part of the problem with Leonard's methodology is that

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4. The thesis remains unproven so long as no consideration is given to the reasons why particular firms elect to invest or not invest in foreign enterprises. The impact of environmental regulations on investment decisions has not been determined. Furthermore, it is completely unexplored whether factors other than environmental regulation influence investment.

he chooses to investigate what is likely to happen in the future rather than investigate what has already happened. For this reason, Leonard relies on data which he hopes to be an indicator of future relocations. He does not reveal concern over relocations which have occurred to date. Additionally, he does not attempt to conclusively determine whether environmental regulation causes relocations. Instead, Leonard is content to base his conclusions on a method which demonstrates, at best, only that his expected correlation between environmental regulations and relocations has not yet materialized.

His speculative approach is disappointing because it fails to definitively dispose of the issue. Further debate is invited on the necessity for assuming the correlations suggested by Leonard. This is especially disappointing since an important purpose of the CF study was to criticize reliance on untested theories and examine the accuracy of unproven predictions. Leonard's success is in illustrating that the industrial flight theory is unproven. Leonard's failure is his inability to determine whether U.S. industry is relocating overseas as a result of environmental regulations.

#### D. *Future Projections*

Leonard presents no direct information on the actual impact of environmental regulations on relocation decisions. He uses direct foreign investment and annual capital expenditures as substitutes for assessing the magnitude of projected relocations overseas by U.S. industry. Leonard considers this information more demonstrative of future trends than data concerning overseas relocations of U.S. industry which have occurred since the late 1970's.<sup>5</sup>

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5.

Widespread industrial flight abroad by U.S. high-pollution industries would measure first in large increases in annual overseas capital expenditures (for building new industrial plants) and only gradually over time would cumulate to affect the total value of U.S. foreign direct investments. Thus, since annual spending overseas has been expanding more slowly for the three high pollution industries than it has for manufacturing industries overall, there is no reason to believe that large jumps in the shares of total foreign direct investment held by these industries are in the offing through the mid 1980's.

But Leonard fails to perform a multiple regression analysis to determine the extent to which foreign investment and capital expenditures by industries with large environmental costs can be explained by the presence of those same costs. This analysis would assess the importance of various factors affecting relocation decisions. Instead, Leonard elects to examine whether increased foreign investment (his substitute for projected relocations) correlates with domestic environmental costs. Leonard's conclusions are based on the failure of this correlation to materialize. A regression analysis becomes complicated to perform when many variables are present. Nevertheless, it would be useful to perform in order to quantify the impact of environmental regulations on relocation decisions. Leonard's methodology never compares the importance of various factors on relocation decisions. Instead, he attempts to determine, in a vacuum, whether environmental regulation can be said to be the leading cause of relocations.

Leonard's decision to evaluate projected relocations leaves him open to criticism that these substitutes are poor indicators. Another consequence of Leonard's failure to quantify the significance of various factors affecting relocation decisions is his inability to quantify the reliability of his conclusions. Without such a quantification, Leonard implies that one should have 100 percent confidence in his conclusions.<sup>6</sup> Such confidence is not merited.

Leonard concentrates on projected relocations and not actual relocations. This is consistent with the scope of his study which is concerned with evaluating whether existing environmental regulations are leading to prospective relocations overseas by U.S. industry.<sup>7</sup> Leonard uses historical data as of 1980-83 as a substitute for measuring projected relocations.

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*See*, H.J. Leonard, *Are Environmental Regulations Driving U.S. Industry Overseas?* 25.

6. The statistical method known as analysis of variance provides a quantification of confidence intervals and degrees of freedom accompanying correlation of variables and coefficients. Covariance analysis provides similar analysis when more variables are present.

7. Leonard does not clearly specify what time frame he is concerned with, but the language quoted in note 6 implies that he is concerned with the mid-1980's.



There is another problem with Leonard's methodology. While he purports to study the impact of regulations on decisionmaking, he never examines how decisions are made. Although he studies indicators of relocation, he never makes use of data concerning general decisionmaking practice.<sup>8</sup> This is another consequence of Leonard's decision to study projected relocations rather than assess why actual relocations were made.

### E. *Industrial Examples*

Leonard identifies manufacturing and other industries with the largest plant and equipment expenditures for pollution control (i.e., the mineral-processing, chemical, pulp and paper, and petroleum industries).<sup>9</sup> He then compares these industries to the overall average pollution control expenditures for U.S. manufacturing industries. Leonard notes that except for these four industries which greatly exceed the overall average, no other industries are even close to the overall average. The sample group is composed of the same industries noted in a 1970's study, by industrial flight theorists, as having the greatest environmental conflicts.<sup>10</sup>

Leonard postulates that certain correlations should follow if higher direct foreign investment is caused by avoidance of U.S. environmental costs. Under such circumstances, Leonard expects that investment in low environmental cost countries should be greater for U.S. firms with large environmental control expenses than for average U.S. manufacturing firms. Accordingly, imports of raw and manufactured products from less developed countries (LDC's)<sup>11</sup> should be expanding faster for high pollution industries than for other manufacturing in-

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8. In the event that such data is unavailable, the scope of the CF study should have included its assembly.

9. The petroleum industry is defined by Leonard to include downstream petrochemicals. The definition deletes basic petroleum producers.

10. See, H.J. Leonard, Are Environmental Regulations Driving U.S. Industry Overseas? 17.

11. Leonard described LDC's as having undeveloped economies, poverty, and relatively weak environmental regulations.

dustries.<sup>12</sup> Leonard's review of available data<sup>13</sup> discloses that, contrary to predicted expectations, growth in foreign investment for high pollution industries is consistent with overall growth in foreign investments. Leonard concludes that this evidence contradicts the conclusion that growth in foreign investments is caused by U.S. environmental regulations. This conclusion is based on Leonard's observation that investment growth in industries without large environmental costs is comparable to the growth exhibited by industries with high environmental costs. Unfortunately, this may only signify that Leonard's expectations were ill founded.

Leonard excludes the petroleum industry from his analysis of high pollution industries because he considers it "impractical to factor out all the extraordinary international circumstances that have affected oil refiners during the past decade."<sup>14</sup> It is hard to dispute that important factors independent of environmental regulations had an impact on the petroleum industry during the 1970's. There his exclusion of the petroleum industry may be totally justified.

The chemical industry, Leonard reports, has smaller than average imports of raw materials from LDC's. He also reports that a few specific chemicals increasingly are being produced in LDC's. Leonard concedes that environmental hazards result in some pesticides and dyes increasingly being produced overseas in the short term, pending replacement of these products by safer substitutes. Leonard concludes that environmental regulations have resulted in changes and innovations by the chemical industry but have not resulted in any wholesale overseas exodus.

Leonard also reports that the pulp and paper industry was required to install capital equipment that now satisfies environmental requirements. Because he finds that recent expenditures for environmental control measures by this indus-

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12. Leonard reasons that manufacturing industries incur greater environmental control costs than other industries.

13. This data is relied upon here and has not been independently verified.

14. See, H.J. Leonard, Are Environmental Regulations Driving U.S. Industry Overseas? 19.

try are dramatically diminished, Leonard concludes that regulations requiring a once-only capital expenditure are less burdensome than regulations requiring recurring expenses. He also concludes that there is no evidence of any widespread locational problems in this industry.

Leonard concedes that data concerning the mineral processing industry does not contradict the correlation between foreign investment and environmental regulations. Accordingly, for this one industry, he deems it necessary to review more closely the causes of the investment. His review discloses that in the mineral processing industry, both direct foreign investment and imports from LDC's are growing faster than average.<sup>15</sup> Leonard proceeds to investigate what reasons, other than the presence of environmental regulations, might explain why this industry has greater than average foreign investment.

Leonard enumerates other factors besides U.S. environmental regulations which may be contributing to a decline in U.S. production of nonfuel mineral commodities. These include: government subsidy of mineral processing in the countries where they are mined, advantageous loans and technical assistance for processing in mining nations by international development agencies, higher transportation costs (making it more economical to import processed minerals than raw materials), U.S. tax laws and other nonenvironmental regulations which encourage foreign investment or reduce its risks, and nonregulatory economic factors (such as high inflation and recession) which slowed capital formation in the U.S. during the late 1970's.

A problem with this methodology is that the mere recital of these additional factors does not demonstrate that U.S. environmental regulations are not causing a decline in the domestic mineral processing industry.<sup>16</sup> Leonard is unsuccessful

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15. To study this industry, Leonard compares imports and exports of copper, slab zinc, primary refined lead, arsenic trioxide, asbestos, and cement and clinker.

16. In this area, as with others, Leonard does not seek to demonstrate a positive correlation. Nor does he directly attempt to identify the cause of this industry's decline. Instead, he tries to disprove any correlation between the decline and U.S. environmental regulations.

in his attempt to explain away any correlation between problems facing the mineral processing industry and environmental regulations.

His difficulties illustrate the inadequacy of his overall methodology. For various industries, including the mineral processing industry, numerous factors may influence their growth or decline. Leonard has not quantified the importance of any particular factor. Accordingly, his recital of various possible factors contributing to the decline does not establish whether any particular factor is important or insignificant. The limitations of Leonard's methodology makes it impossible to determine the cause of the mineral processing industry's decline.

Leonard's study also describes a correlation between the decline of the nonfuel mineral commodity industry and its required compliance with expensive environmental regulations.<sup>17</sup> Using the same flawed methodology, Leonard once again explains factors, besides the presence of U.S. environmental regulations, which may have influenced the decline of a domestic industry.

He begins by dividing the industry into two main groups. These are the metal processing group, and the nonmetallic mineral processing group. For both of these groups Leonard tries to disprove any correlation between group problems and environmental regulations by citing other possible contributing factors.

The metal processors (both primary and secondary) have three main products: steel, iron, and aluminum. Producers of each of these products have had difficulties in the past decade. In each instance, Leonard is able to describe factors, apart from environmental regulations, responsible for these difficulties. For example, the complex and continuing problems of the steel industry are famous and long standing. The steel industry has had to contend with firms owned or supported by foreign governments, high domestic labor prices, and obsolete equipment.

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17. For his review of the mineral processing industry, Leonard reviews levels of import of foreign goods and reduced U.S. production.

With regard to other metallic processors, Leonard again concedes that U.S. environmental regulations are a factor in industry difficulties.<sup>18</sup> However, he is able to enumerate other significant factors contributing to the problems of this industry. He hopes, in vain, that this enumeration of factors shows that industry difficulties are not attributable to U.S. environmental regulations.

Leonard states that the metallic processing industry's economic difficulties are based on many factors other than environmental regulations. These factors include: steeply rising production costs, workplace health and safety requirements, location of raw materials, energy and transportation costs, and decreased capital investment.<sup>19</sup>

Particularly depressed among metallic processors is the copper industry. It faces improved processing capabilities in mining countries, coupled with technological improvements. Similar factors are cited for the lead and zinc industries.

Asbestos clearly fits the profile suggested by Ingo Walter, of a nonmetallic mineral product hazardous to produce, whose production is being transferred to LDC's. Also, cement producers using obsolete technology are likely to be adversely influenced by environmental regulation. He reports that U.S. cement manufacturers using obsolete equipment are likely to lose market share both to U.S. and foreign cement producers using modern technology despite compliance with environmental regulations. Leonard concludes that technology and not environmental regulation is the determinative factor.

### III. Analysis

The deficiencies in Leonard's presentation are attributable to his choice of topic and methodology. The topic of Leonard's book, and of the CF study, is an examination of the contention that environmental regulations in the U.S. are causing industry to relocate overseas.\*

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18. The decline in production of arsenic trioxide is conceded to be strongly linked to U.S. environmental and health/workplace regulations.

19. It is for this reason that Congress provided in the Clean Air Act that nonferrous smelters be granted an exemption until 1988.

It is Leonard's hope that resolution of this issue will clarify the consequences of competing policy choices. Leonard attempts to demonstrate that reductions in environmental regulations are not necessary to dispel fears of industrial flight, since this fear is unfounded.

Acceptance of Leonard's conclusions depends on acceptance of his assumptions. His most notable assumption is that if U.S. environmental regulations are causing industry to relocate overseas, then it must be that there is greater than average direct foreign investment and annual capital expenditure from industries with relatively high costs for compliance with environmental regulations. Leonard represents the failure of this expectation to materialize as evidence that environmental regulations are not causing U.S. industry to relocate overseas. This theory is totally unjustified. It seems unreasonable to allocate responsibility for foreign investment (which Leonard uses as an indicator of potential relocations) to environmental regulation, when the level of foreign investment for firms with high environmental costs does not differ from levels of investment by firms relatively unaffected by environmental regulation. Although Leonard's argument has intuitive appeal, it is in no way conclusive. Leonard has failed to show that he has done no more than knock down a straw man.

Furthermore, Leonard did not subject his hypothesis to the statistical testing method known as analysis of variance. Use of this method would have quantified the confidence with which his conclusions properly could be asserted. This is not to say that Leonard's conclusions are wrong, rather he has failed to prove that confidence in his conclusions is merited.

The jurisprudential theory of legal realism provides the basis for a more pragmatic criticism of Leonard's presentation.<sup>20</sup> Assuming that Leonard successfully demonstrates all of his contentions, one should ask what impact, if any, will it have on the formulation of environmental policy? Very little. The limitations inherent in Leonard's choice of topic suggest that his book is not relevant to the real issues upon which environmental regulation is formulated. Accordingly, any in-

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20. The theory of legal realism was presented by the Hon. Jerome Frank in his article, *Legal Thinking in Three Dimensions*, 1 *Syracuse L. Rev.* 9 (1949).

terest in Leonard's book is academic. This is true because Leonard has elected to evade discussion of the dispositive issues of environmental policy. Furthermore, the direction of environmental policy may turn more on the respective abilities of advocates and critics of regulation to influence or control decisionmaking than it does on resolution of the question of whether U.S. environmental regulations in fact are causing U.S. industry to relocate overseas.<sup>21</sup>

The question selected by Leonard for study, is not determinative for those whose opinions may be changed based on the strength or weakness of esoteric arguments rather than bottom line results. Even with such an audience, the policy direction pursued in environmental regulation is more likely to be decided, in this reviewer's opinion, based on more fundamental issues than those selected for this study.

These fundamental issues include a balancing of the costs and benefits to be paid for and derived by society and by affected individuals and industries.<sup>22</sup> In the event that decisions concerning environmental policy are not formulated based on the unverified industrial flight theory, refutation of this theory will not result in policy revisions.<sup>23</sup> Accordingly, the contribution of Leonard's book is in challenging the practice of relying on unproven theoretical predictions as a basis for decisionmaking. Leonard is less successful in his attempt to verify or dispute the accuracy of predictions that U.S. environmental regulations are driving industry overseas.

Gary D. Cohen, Esq.\*

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21. The point is not that environmental policies have not changed during the past decade, but rather that the basis for decisionmaking was not the articulated industrial flight theory (more legal realism). The purpose here is not to prove this contention, but merely to raise the issue.

22. See the earlier discussion of micro and macro economic perspectives for clarification of this point.

23. Cynicism here is limited to conjecture about the use of theories by advocates of causes, and is not intended to question the good faith of authors of theories, past, present, or future.

\* Attorney, Office of Regional Counsel, Air Branch, U.S. Environmental Protection Agency, Region II. This article was written by Mr. Cohen in his private capacity. No official EPA support or endorsement is represented or should be inferred. A.B. Temple University 1973, J.D. Temple University School of Law 1976.