ADVERSARIAL LEGALISM, TRANSACTION COSTS, AND THE INDUSTRIAL FLIGHT HYPOTHESIS

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1. Introduction and Motivation

There has been considerable debate in regulatory policy circles concerning the industrial flight hypothesis: increases in environmental regulatory compliance costs will, at the margin, drive investment overseas. The literature on environmental regulations and industrial competitiveness, however, provides little solid empirical support for the hypothesis. There are several possible explanations for the weak empirical evidence. First, the available data are limited. Second, the costs of stricter environmental regulation may be trivial compared to other cost considerations facing the firms, or may be nonbinding because the regulations are not enforced. Third, the costs of regulation may be offset by productivity and innovation benefits which accrue to firms as a result of their compliance efforts: the so-called "green gold" effect. Fourth, the predicted effect of the hypothesis, i.e., that competitiveness will fall as the cost of regulation rises, may hold for some firms and some industries, while other firms and other industries may be unaffected or experience the opposite effect. Thus aggregate level analysis of the effects of increased environmental regulation have revealed insignificant results; perhaps the industrial flight and the green gold effects negate each other; or perhaps firms for which the hypothesis holds are overwhelmed by unaffected firms.

Each of these explanations may have some merit. In this paper, however, we explore a fifth possibility arising from the exclusion of regulatory process costs from total compliance costs. Most empirical work has looked for capital movement in response to differential abatement costs, predicting that investment would flow from environmentally stringent regimes to those with laxer environmental regulations, for example, from the U.S. to some developing countries. But if, at the margin, it is regulatory process costs and liability risks that constitute the primary compliance cost differential, then capital flow would be predicted to move in different ways. Unfortunately, what constitutes the total costs of compliance, or their impact, has not been settled in the empirical literature. Jaffe *et. al.* (1995) provide a taxonomy of the costs of environmental regulation, beginning with the regulators' administrative costs and the firms' compliance costs. They also list legal and other transaction costs, and acknowledge the extra expense generated by the legislative and adversarial approach to regulation in the U.S. Because these latter costs are particularly difficult to measure, however, they are often dropped from models and ignored in empirical work. It is this bias, we argue, that leads to incorrect hypotheses about the effect of regulations on firm's investment, production, and location decisions. Our goal in this paper is to explore the implications of these transaction and process costs and reveal empirical relationships that establish their relevance by examining the data from a new perspective.

Section 2 begins with a review of the empirical literature on industrial flight, followed in Section 3 with a discussion of factors affecting capital or trade flows. Section 4 presents some preliminary empirical results and analysis, and some comments on directions for future research. We conclude in Section 5 with a summary of our results.

2. Brief Review of the Empirical Literature[1]

The empirical literature on industrial flight has, in one form or another, attempted to measure how the cost of environmental regulation affects international competitiveness.[2] One can group studies of the industrial flight hypothesis either by the independent variables — regulatory compliance costs — or by the dependent variable — changes in international competitiveness. "International competitiveness," however, has proven to be a difficult notion to directly identify and capture. Researchers have thus relied on various proxies for international competitiveness: productivity measures, trade measures, direct foreign investment and plant location choices. The proxies employed provide one convenient means to categorize the literature.

On the other side of the equation, we might group studies according to the types of environmental regulatory costs considered. Most studies include some measure of direct compliance costs, or abatement costs.[3] Many studies also consider the direct cost to the government of enacting and enforcing environmental regulatory policies. The indirect compliance or process costs of environmental regulation have, however, received sparse attention in the literature, probably because of the uncertainty and difficulty in identifying and measuring them. This constraint implies that total compliance costs have been systematically under-estimated. When included, there is little uniformity in the indirect cost measures employed. Therefore, we have chosen to group the studies by the proxies of international competitiveness they employed.

2.1 Studies Using Productivity Measures

The evaluation of environmental regulatory costs begins with the premise that compliance increases production costs. Opponents of greater environmental regulation argue that resulting increases in production costs will make domestic firms less productive, forcing them out of the market or inducing them to relocate or redirect investment to a venue with a less stringent regulatory stance. Supporters of greater regulation claim that the associated increases in production costs are not large enough to adversely affect international competitiveness, or they may increase competitiveness by inducing technical

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[1]This literature review was provided by Richard A. Brooks.

[2]Jaffe, *et. al.* (1995) claimed to have identified (with competitiveness defined broadly) over one hundred studies that potentially fall within the purview of this literature.

[3]Direct compliance costs consists of plant and equipment investment to meet regulatory requirements and associated increases in operating costs to industry.

innovations.[4] or leading 10 unanticipated productivity gains by improving the quality of inputs like water, or the health of the labor force. The empirical studies described below attempt to measure the significance of the regulatory burden on industry through productivity changes.

Many U.S. industries experienced a productivity decline during the 1970s. Barbera and McConnell (1990) evaluated the effects of environmental regulation from 1970 to 1980 in five U.S. industries: chemicals, iron and steel, paper, non-ferrous metals, and stone, clay and glass. They estimated the share of the productivity decline attributable to increased environmental regulation was between 10% and 30%. Other researchers have attempted to measure the share of the 1970s productivity decline that is attributable to increased environmental regulations. Norsworthy, Harper and Kunze (1979) looked at manufacturing industries and found that increased regula;ory costs were responsible for 12% of the productivity decline; Haverman and Christainsen (1981) and Gray (1987) obtained results similar to Norsworthy, *et. al.;* Dension (1979) found that environmental regulation was responsible for 16% of the productivity decline in the business sector; and Gallop and Roberts (1983), focusing on electric utilities, estimated that increased regulatory costs accounted for 44% of the decline in productivity.

Robinson (1995) looked at the impact of environmental and occupational health regulation on productivity in over 400 U.S. manufacturing industries according to their four digit Standard Industrial Classification (SIC). He measured productivity levels and growth rates from 1974 to 1986 using a basic ratio of outputs to inputs and an econmetrically estimated production function. Robinson found the marginal impact of regulatory compliance on productivity to be significantly negative. He found no support for the technology-forcing hypothesis.

The costs of environmental regulation presumably do not fall solely upon the regulated industries. Jorgenson and Wilcoxen (1990), using data on thirty-five U.S. industries from 1973 to 1985, created a model that estimated the general effect of increased environmental regulation on Gross National Product (GNP). Removing the costs associated with environmental regulation, their model predicted a 1985 GNP about 1.7% higher than was actually recorded.

Assuming environmental regulation adversely affects U.S. productivity, if the costs of compliance are roughly the same among the U.S.'s trading partners, then the reduction in productivity should not affect the competitiveness of American firms. This issue has been given little empirical consideration as most studies are based solely on the U.S. However, two cross-national studies in 1985, the Congressional Budget Office (CBO) (1985) and the Organization for Economic Cooperation and Development (OECD) (1985), found the compliance costs of environment regulation had a disproportionate impact on U.S. productivity compared to some of its main trading partners. The CBO (1985) study estimated that Canada's and Japan's productivity was less adversely affected by those country's compliance costs.

2.2 Studies Using Trade Measures

If industries in one country face rising production costs relative to industries abroad, then the former are likely to become less competitive. Nations with less competitive industries will presumably have falling net exports relative to their more competitive counterparts. Assuming that regulation increases production

[4]See for example, Porter (1991). Robinson (1995) has aptly referred to this argument as the "technology-forcing" interpretation.

costs, one might expect highly regulated domestic industries to become less competitive than their competitors in nations with less regulation, and all else being equal, have declining net exports.

Kalt (1988) attempted to test this hypothesis by analyzing changes in net exports over a decade beginning in 1967 for 78 U.S. industries. Kalt found that higher environmental regulatory compliance cost was associated with lower net exports for the manufacturing industries in his sample, but not for the whole sample. Still, Kalt's findings provided some empirical support for the industrial flight hypothesis.

Grossman and Krueger (1993) and Tobcy (1990), however, found the proposed negative relationship between compliance costs and net exports to be statistically insignificant even in manufacturing. Grossman and Krueger looked at U.S.-Mexico trade in the manufacturing sector for 1987. They found that higher U.S. pollution abatement coses were not associated with higher imports from Mexico, where compliance costs are generally thought to be lower than in the U.S. Tobey (1990) used a subjective scale designed to represent the stringency of environmental policies in 23 countries from the late 1960s to the early 1970s. He found that stringency of environmental policy had no significant affect on net exports in mining, paper, chemicals, steel and metals industries.

Of course, since some industries are only marginally touched by environmental regulation their international trade should be essentially unaffected. The opposite should hold for industries that are greatly affected by environmental regulation. Low and Yeats (1992) looked at the distribution of U.S. industries that had high pollution abatement costs from 1965 to 1988. They found that over the years the proportion of these "dirty" industries fell in developed countries (particularly in North America) and rose in developing countries (particularly in Southeast Asia.) They found that developing countries were quickly gaining a comparative advantage in these industries. There are many qualifications and alternative explanations for these results — some of which are discussed by Low and Yeats.[5] However, there is a clear implication that generally strict national environmental regulatory policies adversely affect competitiveness in certain high-pollution industries. Robison (1988) reached, the same implication using U.S.-world and U.S.-Canadian trade patterns from 1973-1982. Looking at 78 industry categories, he identified changes in U.S.-world trading patterns as U.S. environmental regulation became more stringent relative to the rest of the world. He did not find such changes in U.S.-Canadian trade patterns, where national environmental regulatory policies are well aligned. There have been other empirical studies which similarly point toward changing trade patterns as a result of increased environmental regulation: Congressional Budget Office (1985), D'Arge (1974), Environmental Protection Agency (1992) and Organization for Economic Cooperation and Development (1985). Nonetheless, it is not clear that the noted changes in U.S. trade patterns were properly attributed to increased regulation. And finally, even if the effects of environmental regulation were properly identified, the changes in trade were not particularly large in any of the studies above.

2,3 Studies Using Direct Foreign Investment and Location Decisions

Despite popular commentary to the contrary, there is very little empirical support for the claim that increased environmental regulation will induce firms to relocate existing facilities. There remains, however, the question of how tougher regulation affects firms' decisions on expanding existing plants and locating new ones. Since foreign direct investment reflects firms' willingness to invest in facilities

[5] Also see Jaffe *et. al.* (1995).

abroad, some authors have compared a country's capital inflows with their environmental regulatory stringency to test the industrial flight hypothesis.

Leonard (1988) analyzed changes in direct foreign investment in two highly regulated U.S. industries: chemicals and mineral processing. He found a significant increase in foreign direct investments for capital expenditures (i.e., new plants and equipment) by U.S. firms in Brazil, Ireland, Mexico and Spain from 1970 to 1980. Overall, however, he found the changes in foreign direct investment were small. Some of the strongest empirical results to date come from Xing and Kolstad (1995), who also focus on the U.S. chemical industry. Using reported sulpher emissions as a measure for environmental stringency across countries, they find that lax environmental regulations are a significant determinant of U.S. foreign direct investment.

Unfortunately, limited international comparative data has contributed to a limited number of cross-country location studies. Lucas. Wheeler and Hettige (1992) used toxic release data across industrial sectors to measure changes in toxic intensity of various countries from 1960 to 1988. They found a significant increase in toxic intensity in developing countries which could be explained by pollution-intensive industries migrating to nations with less stringent environmental policies.[6] Alternatively, it has been noted that the increased pollution may only be a by-product of the industrialization experienced by many developing nations during the period of the study.

Because cross-country measures of regulatory stringency are limited, several authors have focussed on differences among U.S. states. Bartik (1988) looked at U.S. plant location decisions among manufacturing plants of Fortune 500 companies from 1972-1978. He found that the average compliance costs for environmental regulations had no significant effect on plant location decisions.[7] Bartik also found no significant correlation between plant location and several other measures of a state's regulatory stringency.[8] Friedman, Gerlowski, and Silberman (1992), looking at foreign multi-national corporations' plant location decisions in the U.S. from 1977 to 1988, also found effects of environmental regulatory stringency to be an insignificant factor.[9] McConnell and Schwab (1990), looked at correlations between regional differences in regulatory stringency and automobile branch plant locations. Using several measures of stringency, they also found no evidence that the stringency of environmental regulation affected plant location. Levinson (1992), looking at the U.S. manufacturing sector from 1982 to 1987, found no significant relationship between most new plant locations and differences among states' regulatory stringency. Levison found, however, that differences in environmental regulatory stringency had a significant impact on some plant location choices for multi-plant companies in pollution-intensive industries. This finding, taken with Leonard's (1988) results, supports the claim that increased environmental regulation may significantly affect highly-regulated pollution-intensive firms and industries,

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[6]This hypothesis presumes, of course, that developing countries are less likely to enact and enforce environmental regulations.

[7]However, in a second study, Bartik (1989) found that state environmental policies had a significant negative impact on small burgeoning companies.

[8]For example, state government expenditures on air and water pollution control.

[9]As a measure of regulatory stringency, they used the ratio of pollution abatement expenditure and gross product derived from manufacturing in the state.

while producing a insignificant effect at :he aggregate level.

U.S.-based location studies tend to show that differences among states' regulatory policies are not a significant factor in location decisions. It may be that the differences simply are not large enough to capture the attention of industry decision-makers. Differences in domestic regulatory policies are tempered by federal legislation and other direct and indirect coordination mechanisms, and regulatory disparities are not likely to be as great among states as they are among nations.

3. Theoretical Framework

At its simplest, the theory behind the industrial flight hypothesis is that a relative increase in the cost of doing business in one location will induce firms to substitute into alternative locations. As always, ceteris paribus conditions including revenue opportunities and labor and other costs must be examined. The divisibility and fixed costs of industrial activity must also be considered since firms cannot costlessly expand and contract production in response to changes in relative costs. Small changes in relative costs may not justify the costs associated with adjusting production or changing locations. The cost of relocating or redirecting investment is affected by the type of industry, the company's output, the size of its fixed and sunk costs and the company's level of experience or prior presence in the "target" country.

Moreover, as noted earlier, some critics of the industrial flight hypothesis argue that tougher environmental regulations may actually reduce a firm's costs by increasing the productivity of their inputs and promoting technological and other innovations that are marketable in the long run. Some Japanese companies and MITI are said to believe that the development technologies that meet more demanding environmental regulations in Japan will defuse potential political opposition abroad to Japanese exports and direct foreign investment. In a national survey of firms, Florida (1996) finds evidence that research and development intensive firms pursuing manufacturing and organizational innovations have a greater incentive and capacity for environmental innovations. Landy and Cass (1996), however, question how frequently regulations provoke profit-maximizing businesses to suddenly recognize previously overlooked productivity increasing innovations. They note Robinson's observation that technology-forcing regulations divert "economic resources and managerial attention away from productivity-enhancing innovation." (Robinson, p.389).

We do not directly assess this so-called "green gold" hypothesis, considering it only as a potential "drag" on the industrial flight hypothesis. Rather, we briefly outline what we believe to be some of the most important determinants of industrial location. Our focus is foreign direct investment (FDI), since this seems to best represent a firm's incremental production choices among locations. The alternative is to study outputs or trade, rather than investment, which we look at in the empirical section but do not deal with here. We begin with a general discussion of the determinants of FDI, followed by a comparison of how these variables are expected to differ among groups of countries.

3.1 Determinants of FDI

A firm's decision on where to spend its next dollar of investment will depend on differences in the expected rate of return on that dollar among locations.[10] The expected rate of return in any location depends on expectations about revenue and a variety of production and transaction costs.[11] Revenue will depend on local sales, hence on the size and income of the domestic market, and on exports and exchange rates. The more important export revenue is to the firm, the more important the host country's location is because of shipping and transportation costs. Other production costs frequently cited as affecting foreign direct investment decisions are wages for skilled and unskilled labor and costs related to the host country's infrastructure.

Every state has political, legal, and possibly bureaucratic rules that impose obligations and correctively delineate, assign, and enforce *de jure* rights.[12] National rales can redistribute wealth and affect the terms of trade, as well as impose compliance costs, trade impediments, and regulations. They also give rise to a variety of transaction costs. Transaction costs here refer to expenditures that arise when individuals or organizations try to secure their property rights and/or limit their obligations under regulations through, for example, bribes, private security systems, and litigation.

Political or legal instability, uncertainty, and corruption increase transaction costs by increasing the amount individuals and organizations must spend (relative to state efforts) delineating their legal obligations and enforcing their rights. For foreign investors, political instability increases exchange rate risk and the cost of insuring against capital destruction or expropriation.[13] In a review of recent empirical work, Levine and Renelt (199.2) found that an index of revolutions and coups was negatively correlated with a country's investment share of gross domestic product.

Empirical explorations of the industrial flight hypothesis have primarily focused on differences in the substance of environmental regulation — that is, the direct costs of installing the control or abatement technologies mandated by the country's d*ejure* regulations and laws. Total compliance costs to the firm, however, will also depend on costs associated with the implementation process of environmental regulations, i.e., regulatory process costs. Process costs include the opportunity costs of regulatory delays and bureaucratic red tape; the litigation, lawyer, insurance, and certification costs of proving compliance; and other costs arising from regulatory dispute-resolution mechanisms and legal unpredictability. Some research indicates that these legal process costs are very salient to companies, at least in the U.S., and may amount to a significant proportion of total compliance costs.[14]

The lower the government's willingness or ability to enforce compliance with its environmental policies

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[10]There is a large literature on the determinants of FDI. We are mentioning only the most common variables here. For a more complete discussion, see Kudrle (1995) or Xing and Kolstad (1995).

[11]A useful distinction between these two costs is that "Transaction costs are the cost of negotiating a contract ex ante, and enacting, monitoring and enforcing the transfer of rights in the contract ex poste, as opposed to production costs, which are the costs of executing a contract." (Matthews, 1986).

[12]Because of transaction costs the state can never fully delineate and enforce rights, *dejure* rights will differ from *de facto* rights.

[13]See. for example, Barro (1991).

[14]See Kagan and Axelrad (1996), Vogel (1986).

- which may be determined by budgetary constraints, political feasibility, or both -- the lower the *de facto* compliance cost. Firms will continue to spend additional dollars on compliance until the marginal cost of compliance equals the expected marginal benefits from avoiding sanctions and any anticipated benefits, such as increased productivhy. That is, each firm will determine its optimal degree of compliance by comparing the cost of compliance[15] to noncompliance, considering the probability that noncornpliance will be detected and sanctioned. In a 1990 survey of American businesses approximately 75% of respondents had been penalized for noncompliance.'[16] Sanctions include not only legal penalties but also adverse publicity and reputational effects (the extent of which is difficult to predict). Hence some firms, particularly high-visibility multinationals, may invest to achieve full compliance.

3,2 Ranking of Costs Across Economies

With some exceptions, differences in these production and transaction costs can be crudely ranked for the U.S.. other OECD and developed market economies (other developed), and developing economies (developing).[17]

Table 1
Cost ranking by Country Group

COST	*Highest*	*Medium*	*Lowest*
Securing property rights	Developing	Other developed	U.S.
Taxes and regulations	Other developed	U.S.	Developing
Enviro compliance costs	U.S.	Other developed	Developing
Bureaucracy and delay	Developing	U.S.	Other developed
Dispute Resolution costs	U.S.	Other developed	Developing
Skilled labor wages	Developing	Other developed	U.S.
Unskiiled labor wages	Other developed	U.S.	Developing

[15]Which, among other costs, includes the costs of responding to the government's enforcement efforts.

[16]Deloitte and Touche and Stanford University (1990).

[17]This grouping is based on the three categories provide by United Nations Conference on Trade and Development (UNCTAD) (1992).

Infrastructure costs	Developing	Other developed	U.S.

Security of property rights refers to private expenditures firms incur to protect their investment. For U.S. investors, property rights are arguably least secure in developing countries (and therefore the most expensive to protect) and most secure in the U.S.[18] Taxes on profits, income, property and sales are expected, on average, to be highest in other developed countries and lowest in the developing countries[19]

Direct compliance costs or abatement costs are the capital and operating costs of complying with the substance of an environmental regulation, net of the transaction costs (enforcement and monitoring) of the regulator. Although compliance costs are the most common variable argued to lead to industrial flight, it is the *de facto,* not the *de jure* stringency of environmental regulations that matter to the firm. Compliance costs are expected to be highest in the U.S. and other developed economies both because of more stringent *de jure* regulations and because of greater monitoring and enforcement efforts.

The observed movement of foreign direct investment from the U.S. to other developed economies with presumed similar compliance costs implies that standard industrial flight studies may be systematically omitting certain compliance costs considerations. We propose that one missing variable is the cost of the regulatory process. Perhaps the most troublesome regulatory process costs are those that arise in systems whose bureaucracy and legal institutions are pervaded by corruption and legal unpredictability, which we assume to be highest in developing countries.[20]

Relative to the legal systems of other developed countries, however, the U.S.'s system is often said to entail particularly high process costs, arising from American "adversarial legalism" (Kagan, 1991). These costs are often more salient to firms than are cross-national differences in substantive compliance costs.[21]

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[18]The ranking of the U.S. as lowest in cost of securing property rights could be questioned on grounds that while American law in principle provides strong protection of physical and intellectual property, the implementation of those rights in disputed cases often is very costly, due to the complexity, expense, and uncertainty of litigation in the American legal system. Nevertheless, business people tend to rank the U.S. highly in terms of property protection.

[19]Tax differentials are perhaps less important for multinational companies that can transfer price and move profits around within their organization. Our intent is to capture some meaningful cost differences rather than encompass all of the costs encountered in FDI.

[21]Discovering and negotiating the appropriate bribe can be more costly and take more time than an inefficient incorrupt bureaucracy (Mauro, 1995). Obviously this is not the case in ail developing countries, but according to most international business surveys it occurs more on average in this group.

[21]See Kagan and Axelrad (1996). We are talking about expense to the firm, not necessarily efficiency or effectiveness. For example, Harrison (1995), comparing the Canadian and U.S. pulp and paper industry, found lower rates of compliance in the Canadian cooperative regulatory approach, though other studies have found contradictory results.

Regulatory process costs include expense, diversion of managerial time, and delays associated with permit applications, preparation of environments] analyses, assessing and proving compliance (e.g., monitoring, third-party certifications, legal consultations), dispute resolution, litigation and legal uncertainty. Process costs vary substantially across countries (as well as across regulatory programs within countries). A wealth of anecdotal information from multinational corporations[22] as well as comparative studies of regulatory and legal enforcement styles[23] indicate that as a result of a more adversarial and legalistic style, process costs tend to be substantially higher in the U.S. than in Japan, Great Britain, Canada and other OECD countries, which tend to employ a much less legalistic and punitive regulatory style and in which the threat of costly litigation is far lower. American adversarial legalism also adds to direct or "substantive" compliance costs because U.S. regulators are reported to be less willing to make case-by-case adjustment to regulatory rules based on environmental and cost factors specific to particular production sites and technologies.[24]

The final three rows list other production cost differentials hypothesized to be important to the firm's investment decision. Firms requiring a high proportion of skilled labor are expected to face higher costs in developing countries because of less supply. Local wages for skilled labor would be relatively higher, or the firm would be forced to bring in foreign labor and pay relatively higher wages as compensation for working abroad. Wages for unskilled labor are typically lowest in developing countries, followed by the U.S. Minimum wage laws and benefits are argued to make unskilled labor most expensive in other developing economies. Communication and transportation costs arising from a weak infrastructure are expected to be highest in developing countries and lowest in the U.S. since among the developed countries the U.S. has the lowest fuel taxes and a relatively deregulated truck, train, airline, and communications industry.

4. Empirical Support

The low quality or nonexistence of cross-country data on environmental compliance costs, direct and process, limits our empirical expectations. We have tried to innovate by using some new data and exploring it in new ways, though we have restricted ourselves to simple statistics. Our results should be considered exploratory; our objective is to find new evidence in the data indicating the role of regulatory process as well as substance in investment decisions.

The first question is whether pollution intensive industries have systematically moved into other locations. The second question is whether this movement can be attributed to differences in direct environmental compliance costs or to regulatory process costs (adversarial legalism).

We offer two different strategies for uncovering evidence of industrial flight. The first approach examines international trade in pollution intensive goods; the second examines flows of capital into pollution intensive industries. These correspond to earlier models that looked for the effect of pollution

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[22]See Kagan and Axelrad (1996).

[23]See Kagan (1991), and the table of studies cited in Kagan and Axelrad (1996).

[24]Braithwaite (1985); Bardach and Kagan (1982); Kelman (1981); and Vogel (1986).

control measures either through changes in the balance of trade[25] or in the location of industry.[26]

4.1 Trade Flows

We begin by looking for patterns in linked Nations Conference on Trade and Development (UNCTAD) export data since 1967. Of interest are changes in the origin of pollution-intensive exports, where pollution-intensity is measured by the industries producing the product.

Pollution intensity by industry can be ranked by several measures. The most common are the Bureau of the U.S. Census' pollution abatement operating costs (PAOC) and pollution abatement capital expenditures, (PACE). A second measure is the U.S. Environmental Protection Agency's (EPA's) toxic release inventory (TRI) that records emissions of 320 different toxic substances.[27] Combining this output data with measures of toxicity and carcinogenic potency, a weighted measure of the human risk factor can be calculated.

We hypothesize that environmental regulations will be most stringent in response to local air, water, and land pollutants, rather than global pollutants like CO_2, each country bears the full costs of abatement for global pollutants, but does not capture the full value of the benefits.[28] Additionally, emissions of more visible, more measurable, and more toxic pollutants are likely to be regulated more stringently. PACE expenditures will reflect this to the extent that the more harmful the pollutant, the more stringent the likely emissions controls.[29]

We rely mostly on the pollution abatement costs and expenditures (PACE) numbers to classify pollution-intensive industries, due to PACE'S greater industry coverage. TRI measures are used for comparative purposes, though we have less confidence translating them into standard industrial classifications (SIC).[30] For the human risk factor weighted TRI, we use 1987 values from Lucas, Wheeler, and Hettige (1992).

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[25]For example, D'arge, (1974), Robison (1986), Tobey (1990), OECD (1992).

[26]For example, Walter (1985), Pearson (1985) and (1987), Leonard (1988). Jaffe *et. al.* (1995) distinguish changes in world market share in production and foreign direct investment flows in the industry location measure.

[27]For a discussion of different measures of pollution intensity see Lucas, Wheeler, and Hettige (1992).

[28]This may be a reason that CO_2 regulation has only recently been added to the political agenda.

[29]Note, however, that toxicity and abatement costs are not perfectly correlated, and depend on the relative price of substitutes for the offending process and pollutant. That is, it may be less costly to reduce emissions of one toxic pollutant by 90% than to reduce emissions of a less toxic one by 60%.

[30]Our 47 TRI and PAOC measures have a correlation of .44, which is not significant. Lucas, Wheeler, and Hettige (1992, p.81) report a correlation of .64 between PACE expenditures and the weighted TRI index for their sample of 19 industries, .74 if printing and publishing is excluded.

Table 2 lists 72 industries by two or three digit standard international trade classification (SITC) for which we have a PACE or TRI measure. PACE measures are based on industries and processes (SIC), whereas UNCTAD trade data is by commodity (SITC). We have tried to match industry to commodity, but the match is imperfect, and it is difficult to know the direction of the resulting biases.[31] In column two, the commodities are listed in order of pollution abatement operating costs (PAOC) per unit of output. Columns three and four compare the PAOC and the risk factor-weighted TRI rankings. The final column rates each commodity by the labor skill embodied in its production, according to UNCTAD calculations of the share of production workers in total employment.[32] For example, based on the list of the 15 most pollution-intensive industries by PAOC, lime and cement, ferrous, non-ferrous, mineral manufactures, and textile products require (or use) the least skilled labor. All else equal, these are the industries expected to move to developing economies.

(Table 2 here)

Revealed comparative advantage (RCA) ratios for two country groups by three-digit SITC code were calculated for several different time periods. Our RCA ratio measures the commodity's share of each country groups' total trade relative to the commodity's share of total world trade. The denominator takes account of changes in the overall trade of the commodity. Following Balassa (1979), we calculate $RCA_{ij} = (x_{ij}/X_{it})/(x_{jw}/X_{tw})$, where i represents developed market economies and developing countries and territories (see Appendix 1), w represents the world, j represents specific two or three-digit (SITC) exports, and t represents totals.[33]

In Table 3 we calculated RCAs for developed and for developing economies over six different time periods: 1967, 1970, 1975, 1980/81 (referred to as 1981), 1984/85 (referred to as 1985) and 1990/91 (referred to as 1991). A ratio greater than one means that the share of the export for the country group's total exceeds the share of the export in world trade --- i.e., that country has a comparative advantage in that product.[34]

The industrial flight hypothesis would predict a larger increase in the RCA of pollution-intensive exports in developing countries, on the assumption that those industries face higher compliance costs in the developed countries. That is, countries with consistently low compliance costs should see their production and exportation of goods made in pollution-intensive industries increase at a faster rate than countries with higher domestic environmental regulatory compliance costs.

[31]Low (1992) calls this "the difficulty of concording production and trade data", p.110.

[32]The exceptions are pulp and waste paper SITC 251, and petroleum products SITC 332, which were not mentioned in the UNCTAD report. To estimate the skill level for these two commodities we used the ratio of production workers to employees from the U.S. Department of Commerce (USDOC) Census of Manufacturing.

[33]Low and Yeats (1992) calculate a revised ratio to analyze 109 countries' RCAs within a specific industry: the country's share of total commodity exports relative to the country's share of total exports.

[34]Since our commodity and economy groups are not exhaustive, it is possible for both groups to have RCA's greater than or less than one for the same commodity.

(Table 3 here or as Appendix 2)

In 1967. the data shows developing economies had a comparative advantage in a limited number of industries: dyeing and raining extracts, synthetic tanning material (SITC 532), veneers, plywood, improved or reconstituted wood (SITC 634), woven cotton fabrics (SITC 652), pearl, precious and semi-precious stones, unworked or worked (SIC 667), and primary and secondary nonferrous metals (SITC 68 and 69). By 1991. this list had expanded to include leather tanning and finishing (SITC 61), wood manufactures (SITC 635). several more groups of textile products (SITC 65), household audio and visual equipment (SITC 76V several categories of electrical machinery (SITC 77), cycles, motorized and non-motorized (SITC 785). trailers and other non-motorized vehicles (SITC 786), ships and boats (SITC 793). most categories of textile finishing (SITC 84), footwear (SITC 851), watches and clocks (SITC 885). toys and sporting goods (SITC 894) and gold, silverware and jewelry (SITC 897).

Table 4 specifies the movement in relative comparative advantage in terms of percent change.[35] We have calculated percent change over three different time periods because the SITC classification is different in the 1991 tables and may lead to some grouping errors.[36] The first period is 1967 through 1991. which includes the change in SITC classifications. The second period is 1967 through 1985, a period for which our data was consistently classified. The third period is 1981 to 1991, for which the 1981 data was reclassified according to the 1991 groupings. The last two time periods, therefore, are the most reliable.

(Table 4 here)

From 1981 to 1991 the developed economies' RCA fell in every category. This does not mean that developed economies no longer have a RCA. As Table 3 indicated, many ratios remain above one in 1991. It does indicate, however, that the developed economies have less of a RCA in 1991 than a decade earlier. This can be due to a composition effect — a decline in that commodity's share of developed economy exports — expressed as a decline in the numerator of the RCA ratio. It is impossible however, for the share of every commodity to fall. It can also reflect a scale effect through a rise in that commodity's percentage of the world's exports — an increase in the denominator.[37] These numbers only indicate comparative statics, they cannot support hypotheses about flows between the two groups.

It is clear, however, that in general RCA is increasing in the developing economies relative to the developed group. This is to be expected given their starting points and the trend does not necessarily reflect differences in environmental regulatory compliance costs. Some of the change may simply be due to the process of development, structural adjustment and lower trade barriers, declining transportation costs, changes in labor costs, and the strength of certain economies in the developing group like Hong Kong. Singapore, and Korea, etc. Thus our interest is to discern any any pattern in the percent change numbers that correspond more closely to environmental compliance and process costs.

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[35]Some subcategories have been removed.

[36]There appear to be some data oddities in 1984/85, though this was not a year in which the categories changed. Low and Yeats (1992) and others have averaged data over three years to remove single year anomalies.

[37]Grossman and Krueger (1993) discuss scale and composition effects from economic growth.

Table 5 shows differences in means for the percent change in RCA grouped into high and low labor skill industries and high and low PAOC groups. The difference in means statistic compares averages between two groups within a sample. For example, the first three rows in the first column of Table 5 present the means for the sample of low. medium. and high-skilled labor for RCA ratios in developed countries from 1967 through 1991. An asterisk indicates groups where the mean difference was significantly different than zero, and can be inferred to hold for the population with 90% confidence. An example is the mean difference for the percent change in RCA between low and medium skill industries for developed economies from 1981 through 1991.

RCA declined in the developed economies in both the high and low skill commodities, with the greatest decline after 1980. RCA also declined in the last decade in the medium skill group, consisting of commodities such as wood and paper products and machinery. The developing economies increased their RCA most in the high skill commodities, where the developed economies suffered the greatest loss. The developing economies initial RCA was lowest in these areas, so any growth becomes a relatively large percent change.

Table 5
RCA Differences in Means for Labor Skill Level and Pollution Abatement Operating Costs

% ∆ RCA	D67_91	D67_85	D81_91	G67_91	G67_85	G81_91
LOW SKL	-18.32 (27)	-5.70 (28)	-21.90 (31)*	331.35 (27)	365.05 (27)	76.20 (30)*
MED SKL	4.91 (19)	11.78 (19)	-17.46 (26)*	489.81 (19)	429.37 (19)	91.40 (26)*
HIGH SKL	-17.08 (13)	-3.17 (14)	-20.07 (15)	522.69 (13)	372.16 (14)	145.43 (15)*
PAOC>=1.5	-16.06 (8)	-.13 (8)	-20.84 (8)	143.02 (8)*	87.34 (8)*	69.62 (8)
PAOC<1.5	-9.87 (50)	.26 (52)	-19.89 (63)	474.82 (50)*	440.27 (51)*	99.02 (62)
PAOC>=.75	-13.47 (15)	-1.14 (16)	-20.76 (15)	291.49 (15)	276.28 (16)	96.14 (15)
PAOC<.75	-9.77 (43)	.697 (44)	-19.78 (56)	477.04 (43)	435.63 (43)	95.53 (55)
PAOC>=.45	-3.03 (28)	8.76 (29)*	-20.33 (30)	331.58 (28)*	304.05 (29)	92.66 (29)
PAOC<.45	-17.90 (30)	-7.79 (31)*	-19.74 (41)	520.02 (30)*	477.83 (30)	97.78 (41)

(Number of cases)
* two-tailed significance of 90% or higher

Only the percent change in RCA from 1931 to 1991 was significant for both groups. The mean increase in RCA for commodities that embody a high level of labor skill was approximately 145% over ten years, significantly higher than the increase in RCA of 76% for low labor skill industries. This result may reflect some of the highly industrialized economies in UNCTAD's developing economy group, such as Singapore and Hong Kong, that can lure industry with a highly skilled labor force, and favorable wages, tax and regulatory regimes.

To look for patterns in direct compliance costs, we chose three arbitrary cutoff points for PAOC groups: pollution abatement operating costs equal to 1.75, .75, and .45 of output value. At points above 1.75 the sample size became too small, and below .45 differences became insignificant. Our results provide little support for the industrial flight hypothesis: they show no significant difference in the average percent change in RCA lost between high and low PAOC commodities in developed economies. In fact, RCA declined in the cleaner industries (PAOC < .45) from 1967 to 1985 and improved in the dirty industries (PAOC > = .45). Though any conclusions are very tentative from such a small sample that relies on U.S. PAOC measures, this contradicts the industrial flight hypothesis for this period.[38]

Table 6 pushes the analysis further, however. It presents a simple linear correlation of percent change in RCA for each time period with the skill level embodied in the commodity and PAOC per dollar of output in 38 to 72 industrial groups (and TRI). Note that this bivariate correlation does not adjust for the influence of other variables. The only strongly significant result for labor skill is the positive correlation between skill level and RCA for developing countries from 1981-91, implying the percent increase in RCA corresponded to an increasing skill level. For PAOC, negative correlations on pollution cost variables for developed countries in 1967-91 and 1981-91 indicate that the higher the pollution abatement operating costs in an industry, the more RCA fell, though the coefficients are small and not significant. The opposite is implied by the positive sign from 1967-85. These results parallel Table 5, and support an assertion of industrial flight only after 1981, perhaps after 1985. The results for the toxicity measure for developed countries, though also not very significant, echo the results for the PAOC measure. They suggest that toxicity did not negatively affect RCA in developed economies prior to 1981, but from 1981-91, the higher the toxic risk, the higher the percent increase in RCA in developing economies.

Table 6
Correlation of RCA, Skill Level, PAOC and TRI

% Δ RCA	D67_91	D67_85	D81_91	G67_91	G67_85	G81_91
Labor Skill: 1=low, 2=med, 3=high.	.0623 p=.639 (59)	.0643 p=.623 (61)	.1429 p=.231 (72)	.1849 p=.161 (59)	.0183 p=.889 (60)	.2740 p=.021 (71)

[38]Our results are based on a small sample, control for no other variables, and use U.S. PAOC measures which may not accurately represent compliance costs in other countries. Lucas, Wheeler, and Hettige (1992). however. suggest for some OECD countries that, "industries needing substantial abatement controls in one country also require expensive controls in another..." p. 83.

Pollution Abatement Operating Costs PAOC	-.0093 p=.945 (58)	.0383 p=.771 (60)	-.0442 p=.714 (71)	-.2496 p=.059 (58)	-.2430 p=.064 (59)	-.1042 p=.391 (70)
Risk weighted Toxic Release Inventory TRI	-.1822 p=.274 (38)	.0297 p=.856 (40)	-.1161 p=.448 (45)	-.3182 p=.052 (38)	-.2774 p=.087 (39)	.1081 p=.485 (44)

(Number of cases)
D=developed economy
G=developing economy
p=two-tailed significance level

The strongest and most significant results are with the developing countries. Particularity in the last decade from 1981-91, as the labor skill required for the industry rises, so does the percent change in RCA. And as pollution abatement costs and toxicity for the industry rise, RCA falls. Both of these results challenge the simple notion that developing countries, at least those in our sample, are increasingly becoming havens for cheap labor and dirty industries.

Next we ran a partial correlation of PAOC and RCA, adjusting for labor skill differences across industries. Controlling for labor skill differences did not fundamentally change the results, though it did increase most significance levels. The results in Table 7 indicate that rising PAOC is significantly correlated with the percent change in RCA from 1967-1991 and 1967-85 for developing countries. For the developed countries, the positive but not significant value of .0386 for 1967 through 1985 again suggests that much of the lost RCA in the pollution intensive industries came after 1985.

Table 7
Partial Correlation of RCA and PAOC -- Labor Skill Held Constant

%RCA	D67_91	D67_85	D81_91	G67_91	G67_85	G81_91
PAOC	-.0086 p=.950	.0386 p=.778	-.0907 p=.506	-.2732 p=.042	-.2556 p=.057	-.0732 p=.592

n=54 cases for each time period
D=developed economy
G=developing economy
p=two-tailed significance

4,1.1 Separating out the U.S. trade flows

The aggregate trade data and analytic procedures described thus far give us some insight into the first question: has there been any movement in dirty industries? Evidence suggests a small but significant correlation between pollution abatement operating costs and a declining developed country RCA after 1981, adjusting for labor skill level. This lends support to the hypothesis that higher compliance costs in the U.S. and OECD are driving some production to developing countries. However, alternative hypotheses for developing economies improved RCAs, such as the importance of proximity to growing markets and labor cost differentials, cannot be discounted.

The analytic steps, however, do not provide much insight into the second question: why has this movement occurred? We require more specific data for the U.S. to test for movement in response to its more adversarial and legalistic regulatory process. Data from the trade flow studies provide us with two anecdotal views.

A study by Low and Yeats (1992. p.94) — after separating out changes in North American and U.S. exports — reports that in 1965 environmentally dirty products accounted for 18.9% of world trade, with industrial countries accounting for 77.7 % of these products.[39] By 1988 total world trade in dirty products had declined to 16%. with the industrial country share falling to 74.3%. The North American share fell twice as much as the overall industrial country share over this period. The largest decline occurred between 1965 and 1975. which coincides with some major pieces of federal environmental legislation, including the 1970 Clean Air Act (CAA) Amendments and the 1972 Water Pollution Control Act (WPCA) Amendments. This drop is paralleled in the data on the share of environmentally dirty goods in all exports from the region, suggesting that the effect is not simply due to an economic decline. Nonetheless, the role of alternative factors, such as the oil embargo's effect on energy intensive, dirty industries cannot be determined by this data.

Second, using the results from another study by Low (1992), we can compare changes in pollution intensive exports from Mexico to the U.S. and from Mexico to the rest of the world. If pollution intensive industries are leaving the U.S. in particular in response to regulatory compliance process costs, then imports of those products should be increasing more in the U.S. relative to other countries and relative to other commodities. This latter distinction is important as there are obvious proximity advantages between these two countries that encourage overall trade.

Table 8 shows the compound growth rate in Mexico's exports of pollution intensive products to the U.S. relative to the rest of the world. The growth rate of Mexican exports to the U.S. of the two dirtiest commodity groups (according to U.S. PAOC measures), for example, is 35% for lime, cement, and building products (S1TC 661) and 48% tor pulp and waste paper (SITC 251), both well above the 9% average for all dirty industries. The dirty industry average of 9% is three times the average of 3% for all exports to the U.S. This relative growth in dirty industry exports to the U.S. suggests there may be some particular factor such as U.S. abatement or process costs that encourages production outside of the country.

[Table 8 here.]

Any conclusions from the data in this section, however, must be tentative. Even if the percent change in RCA ratios clearly displayed a movement of more pollution-intensive industry to developing countries, as with Low and Yeats (1992), it cannot be attributed solely to differences in environmental compliance costs, for as noted earlier, it may also be due to changes in trade barriers and regimes, reductions in international shipping costs, or just a stage of development.

[39] 2% from the EEC. 20.5% from Canada and the U.S. combined, 3.4% from SE Asia and 2.1% from West Asia.

4.2 Capital Flows from the U.S.

Since we are interested in separating out the effect of the direct costs of compliance from the costs of the adversarial process, our second approach is to focus on capital movement from the U.S. For this we use a time series of U.S. direct investment abroad (net capital outflows) by manufacturing group.

As we argued in Section 5. a firm's investment decision will depend on *de facto* abatement costs and regulatory process costs, adjusting for other production and transaction costs and revenue opportunities. Production cost differentials may dominate, as they do in most empirical work looking for industrial flight from the U.S. to developing countries, but we are looking for firms at the margin, for whom environmental costs will make a difference. If production and environmental compliance costs are quite similar between the U.S. and other OECD countries, for example, then investment flows to the OECD are hypothesized to result from process cost differences arising from the U.S.'s adversarial legalism.

Figure 1 shows the share of total U.S. net capital outflows in millions of dollars from 1977 through 1994 for six manufacturing categories: food and kindred products (SIC 20), chemicals and allied products (SIC 28), primary metal industries (SIC 33), machinery except electrical (SIC 35), electric and electronic equipment (SIC 36). and transportation equipment (SIC 37).[40] These figures are each manufacturing category's share of total capital outflow in manufacturing for the year. Using a share figure removes some of the effect of exchange and interest rate fluctuations that affect all capital movements and allow us to better focus on industry differentials.

(Figure 1 here)

The industrial flight hypothesis would predict a relatively greater outflow of capital in those industries with the highest reported pollution abatement operating costs, all else equal. Overall, the chemical and primary metal industries are the dirtiest, as measured by PAOC's and the risk factor weighted toxic release intensity measure, followed by food and kindred products, transportation equipment, electric equipment, and non-electric machinery. Without considering any other factors, Figure 1 supports the industrial flight hypothesis with the two dirtiest industries, chemicals and allied products and primary metals, having the largest capital outflows from 1977 onward. Perhaps most interesting is how closely the capital outflow shares of these two industries move together. The third dirtiest industry, food and kindred products, also moves more closely with chemicals and primary metal industries than do the other three. To the extent that pollution abatement operating costs are the common denominator, this provides some evidence for the industrial flight hypothesis.

The periods of greatest outflow were 1981, 1986, and 1988. It is extremely difficult to attribute capital movements to particular policies. Depending on the flexibility of the industry, the policy or regulation, and the policy process, firms may make investment or production decisions in advance of expected legislation, at the same time, or with some delay if time is required to react. Each policy has its own timetable, pathway, and participants for deliberations, implementation, and. enforcement.

[40] Net capital outflows are "Funds that U.S. parent companies provide to their foreign affiliates (gross outflows) net of funds that affiliates provide to their parents (gross inflows) during a given period. USDOC, BEA 1995, p.M-3. Entries suppressed by the USDOC to ensure confidentiality of the reporting companies appear in our database as missing observations.

Figure 2 suggests that the bulk of this outflow was not to the group called the rest of the world (ROW), consisting of the total group minus the European countries and Canada,[41] but rather to the developed countries. Although most of the capital to the rest of the world was from the dirtiest industries, the difference in shares between the three dirtiest and three cleanest industries is less than for all countries in total.[42]

(Figure 2 here)

The predominant capital movement of the three dirtiest industries has been to Europe, shown in Figure 3, where direct environmental compliance costs are also relatively high. The biggest cost difference between the U.S. and these countries, we propose, arises from the regulatory process and adversarial legalism in the U.S. Taxation and other production costs are a less likely factor, since taxes and labor costs are at least as high in Europe as the U.S., and skilled labor is available in both. Additionally, these three industries represent three different labor skill levels: chemicals are high skill, food is medium skill, and primary metal industries are low skill. Although proximity to markets, domestic economic conditions, and a desire to secure a position with the new European Union (rather than efforts to reduce regulatory process costs'), may have contributed, this does not explain the particular unison of capital outflows in the dirtiest industries.

(Figure 3 here)

4.2.1 PAOC by medium

One variation on most empirical work to date is to look at PAOC by media: air, water, solid or contained waste. Our hope is to exploit differences in the potential for adversarial legalism according to the primary medium polluted by an industry, Landy and Cass (1996, p.22) point out that the 1990 Clean Air Act Amendments contain "...a citizen suit provision that, in coordination with the permit program, provides fertile ground for adversarial legalism." Previously, they argue, most citizen suit activity had arisen from the publicly accessible National Pollutant Discharge Monitoring Reports of the Clean Water Act.

Table 9 presents correlation coefficients between PAOC by medium and U.S. capital outflow for each industry from 1977 through 1994. Variables in the first column represent the pollution abatement operating costs by medium for that industry. These are gross annual costs that include payments to government, and unlike the earlier PAOC figures these are not divided by the value of the industry's output. The top row indicates the destination of net U.S. capital outflows.

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[41]The variable ROW was constructed to represent developing economies, as the raw data did not provide such a grouping. This means that some developed economies such as Japan and Australia are also in this group. An obvious extension is to remove these countries from the ROW total to have cleaner categories according to stringency of domestic regulations.

[42]Transportation equipment industries had to be removed because the U.S. capital outflow was so large in 1989 and 1990 that the required scale made movement in the other industries indiscernible.

Table 9
Correlation of U.S. Capital Outflows Shares and PAOC by Medium:
Food and Kindred Products. Chemical and Allied Products and Primary Metal Industries

	Total	Canada	Europe	ROW
Air-food	.1775 p=.495	-.1525 p=.559	-.3003 p=.241	.2891 p=.260
Wtr-food	.2475 p=.338	-.0782 p=.766	-.2783 p=.279	.3464 p=.173
SW-food	.2093 p=.420	-.1268 p=.628	-.2426 p=.348	.3356 p=.188
Air-chem	-.1698 p=.515	-.1513 p=.562	-.1230 p=.638	.0291 p=.912
Wtr-chem	-.1521 p=.560	-.1152 p=.660	-.1414 p=.588	.1005 p=.701
SW-chem	-.1050 p=.688	-.1161 p=.657	-.1741 p=.504	.1373 p=.599
Air-pmetal	.1461 p=.576	-.0106 p=.968	-.1415 p=.588	-.1246 p=.634
Wtr-pmetal	.0522 p=.842	.0665 p=.800	-.0680 p=.795	-.0971 p=.711
SW-pmetal	.0017 p=.995	.1193 p=.648	-.0217 p=.934	-.0394 p=.881

ROW = All countries minus Canada and Europe
n = 17 observations for each cell

There are two striking results in Table 9, The first, for the "dirty" food and chemical industries, are the negative correlations between PAOC and capital outflow to Canada and Europe, and the positive correlations between PAOC and the rest of the world. Though significance levels are low, this does not refute the hypothesis that firms are making investment decisions in response to compliance costs, and that capital flowing out of the U.S. is directed to countries with less stringent regulatory regimes. The positive correlation for Canada and negative correlation for Europe and the rest of the world for primary metal industries may be a function of resource location, transportation costs and the mobility of the industry.

A second important result follows from this observation. If, over the past 18 years, U.S. capital outflows to Canada and Europe have been negatively correlated to the costs of compliance, then the large net capital flows of the dirtiest industries to Europe indicated in Figure 3 must be driven by something else. If this capital movement is not correlated with PAOC, there must be some other (common) factor(s). One related factor is the higher costs, threats and uncertainty associated with the regulatory process for these dirty industries, arising from adversarial legalism in the U.S.

As further evidence, we found that the same patterns do not appear for the three cleaner industries in Table 10. There has been a positive, though weak, correlation between abatement costs and capital outflow, and a greater ratio of clean industry to dirty industry investment in the non-European countries.

Table 10
Correlation of U.S. Capital Outflows Shares and PAOC by Medium:
Non-electrical machinery, Electrical and Electronic Equipment, Transportation Equipment

	Total	Canada	Europe	ROW
Air-mach	-.1967 p=.449	-.4121 p=.100	.1975 p=.447	-.1367 p=.601
Wtr-mach	-.5188 p=.033	-.5144 p=.035	.0075 p=.977	-.1325 p=.612
SW-mach	-.5335 p=.027	-.5965 p=.011	-.0114 p=.965	-.1615 p=.536
Air-elect	.0975 p=.710	-.4265 p=.088	.0853 p=.745	.1455 p=.577
Wtr-elect	-.0172 p=.948	-.0440 p=.867	.1337 p=.609	.1087 p=.678
SW-elect	-.1034 p=.693	.0795 p=.762	.0929 p=.723	.0592 p=.821
Air-trans	.3741 p=.138	.1370 p=.626	.2247 p=.386	-.0383 p=.892
Wtr-trans	.3585 p=.158	.1302 p=.644	.2652 p=.304	-.0253 p=.929
SW-trans	.3131 p=.221	.0235 p=.934	.2162 p=.405	-.1111 p=.693

If firms are making investment decisions based on the relative costs and legal uncertainties of the regulatory process, and if Landy and Cass (1996) are correct about the focus of citizen suits, then we should see a greater capital outflow after the mid 1970s in those industries which are differentially high water polluters, holding constant compliance costs. Likewise, there should be an increase in the capital outflow of industries who primarily discharge into the air following the 1990 Clean Air Act Amendments.

To separate out capital movement in response to process costs rather than compliance costs requires an industry in which PAOC's differ significantly by medium. Table 11 lists and ranks PAOC by media for each group from 1977 through 1994."[43] Changes in abatement costs over that time will reflect regulatory changes, technological changes, and output changes.

Chemicals and allied products have the highest air and water abatement costs, with air abatement costs just under 60% of water in 1994. Primary metal industries have the second and third highest air and water abatement costs, with water about 70% of air. These numbers suggest a relatively greater outflow in chemicals and allied products after 1072 in response to the Clean Water Act. Food and kindred products, with the second highest water and fourth highest air PAOC may provide the best contrast. For that industry, in 1994 PAOC for air were only 18% of water costs. Hence we should see a relatively greater capital outflow after 1972 in food and kindred products, and less response in 1990 to the CAA Amendments.

*** We need a meaningful policy date for the CWA (when citizen suits began).

4.2.2 Property rights and Adversarial Legalism

We argued in Section 3 that insecure property rights could negatively affect investment. There are various databases with political and institutional variables that are commonly used to proxy property rights.[44] We follow Mauro (1995) who uses Business International (BI) indices on country risk factors from 1980-83 which allows us to include variables on bureaucratic efficiency as well as political stability.[45]

Following Section 3's discussion, we estimate a model positing that a country share of U.S. foreign investment in industry j (K.-SHARE) will be a function of that country's political stability (POLSTAB), the efficiency of their judiciary (EFFJUD), the efficiency of their bureaucracy (RED TAPE), and the level of corruption (CORRUPT). Political stability is intended to proxy the security of property rights, while the remaining three variables proxy regulatory process costs.[45] Income on investment in the country earned in the previous year by the industry (INCj), the adult illiteracy rate (ILLIT), the number telephone mainlines per 1000 persons (TELECOM), population (POP), and an index of the linguistic

[43]Capital outflows are combined for primary metal industries and fabricated metal products are combined, but separate as PAOC measures. Rather than trying to determine an accurate weighting of abatement costs for the category, we simply used primary metal industry numbers and refer to the category as such.

[44]See Perotti and Alesina (1993) for a review of these data sources.

[45] Business international is a private company with in-country analysts providing their perspective on investors' assessments of risk and efficiency conditions. Mauro discusses the index's reliability and the advantages and disadvantages of its construction.

[46] Definitions for the BI indices from Mauro (1995, p.684) are:
EFFJUD - "Efficiency and integrity of the legal environment as it affects business, particularly foreign firms;" REDTAPE - "The regulatory environment foreign firms must face when seeking approvals and permits. The degree to which it represents an obstacle to business;" CORRUPT - "The degree to which business transactions involve corruption or questionable payments."

heterogeneity (ETHLING were other country variables included.(fn The model was also run with per capita income included to reflect the domestic market, but it was insignificant throughout.) Lagged income reflects many influences including, we hope, the tax and general regulatory burden, the illiteracy rate is intended to proxy :he availability of skilled labor, telephone lines reflect the country's infrastructure. POP reflects domestic market size, and the linguistic index is another measure of stability on the assumption (Mauro 1995) that homogeneity decreases the possibility of ethnic conflict and corruption from bureaucrats favoring "members of their own group" (Mauro 1995, p. 693).[47]

We expect the relationship between capital shares, political stability, and the process costs to be positive, as the higher the number assigned to a country, the better their performance (for example, 9 out of 10 on corruption indicates that corruption is perceived to be low). We expect political stability to be more important for industries with higher fixed costs. It is difficult how the BI results will vary by industry. Perhaps a more inefficient bureaucracy is a greater deterrent to the cleaner industries. The higher the ethnolinguistic index, the more fragmented the country, so we expect capital shares and ETHNLIKG to be negatively related.

We estimated the model for each of our six industries — food and kindred products, chemical and allied products, primary metal industries, non-electrical machinery, electrical machinery, and transportation equipment — using ordinary least squares (OLS), with 1984 country shares of U.S. capital as the dependent variable. We expect 1983 hogged industry income to be highly correlated with the other independent variables measured in 1983. including population and the BI indices.[48] The multicollinearity resulting from our specification does no; bias our estimates or seriously change the overall fit of the equation, but leads to high standard errors in the estimates and hence low t-statistics.

Table 12 presents our results. ILLIT, TELECOM, and POLSTAB are not reported; they were not significant in the estimation for any of the six industries.

Table 12: OLS estimates

	Food	Chemical	Metal	Nonelectric	Electrical	Transport
EFFJUD	.0050 (.95)	.0068 (1.06)	-.0038 (-.35)	-.0032 (-.41)	.0074 (2.40)*	.0266 (1.98)*
REDTAPE	.0036 (.69)	.0017 (.27)	-.0046 (-.46)	-.0035 (-.43)	.0017 (.55)	.0011 (.09)
CORRUPT	-.0031 (-.54)	-.0056 (-.83)	.0060 (.57)	.0010 (.11)	-.0042 (-1.26)	-.0243 (-1.76)*

47 Mauro (1995) uses the ethnolinguistic fractionalization index as an instrument to deal with endogenity bias in his estimation of the effect of corruption on investment.

48 We considered taking first differences of these variables, but because of missing observations in different years the sample became too small. Another alternative, using 1983 capital shares and 1982 income was less desirable because of extraordinary recession conditions in 1982.

ETHNLING	-.0002 (-.89)	-7.7E-05 (-.26)	-8.2E-04 (-1.68)	6.0E-04 (1.84)*	-4.4E-05 (-.33)	2.7E-05 (.04)
INC	-.0006 (4.40)*	4.9E-04 (4.65)*	.0028 (7.44)*	6.6E-04 (5.23)*	8.5E-04 (7.16)*	.0017 (19.34)*
POP	7.7E-07 (2.76)*	1.7E-07 (.46)	-5.7E-07 (-1.08)	-9.4E-07 (-2.00)*	6.2E-07 (3.86)*	2.3E-06 (3.37)*
Adj R^2	.437	.473	.613	.598	.757	.945

*significant at the 10% level for a two-sided test

The BI indice results were mixed. In the primary and fabricated metal and nonelectrical machinery industries the sign on EFFJUD and REDTAPE was negative, opposite that predicted, though not significant. For electrical and transportation equipment, our results indicate that an increase in judicial efficiency is associated with an increase in a country's share of investment. The amount of REDTAPE was not a significant predictor of capital share for any industry. CORRUPT's sign was opposite that predicted for all industries but primary and fabricated metal and non-electrical machinery, and significantly negative for transportation equipment. This means the more corrupt the regime, the greater the share of U.S. capital investment in that industry.

Unlike other studies, our proxy for political stability was not significantly related to investment share.[49] The results are once again odd. though, for non-electrical machinery and primary and fabricated metals. The degree of linguistic fractionalization was positive and significant (marginally so for the metal industry) implying that investment was positively correlated with fractionalization.

Cross-sectional data, a small sample, and large standard errors may have weakened our estimates. Only the industry's income in the previous year is a consistently good predictor of investment shares in the following year. To try and get a better sense of the regulatory process proxies that are of primary interest, following Mauro (1995) we collapsed the three BI indices into a single measure of bureaucratic efficiency. Mauro (1995) defends this procedure based on the collinearity of the three indices, and because of potential measurement error argues that the composite average index may be a more precise measure.'"[50]

Table 13 presents the results of a partial correlation of the composite bureaucratic efficiency index (BUREFF) with a country's share of U.S. capital, controlling for the previous year's income from capital invested in that industry.

Table 13: Partial Correlation of BUREFF and K-SHARE

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[49] Barro (1991). Levine and Renalt (1992).

[50]Our BI indices are also highly correlated. Correlation coefficients are: CORRUPT and EFFJUD = .7979; CORRUPT and REDTAPE = .8599; REDTAPE and EFFJUD = .7560.

food products	chemical products	primary metal	non-electric machinery	electrical equipment	transport equipment
.0058 (37) p=.972	-.1074 (33) p=.539	-.3168 (32) p=.068	.1294 (32) p=.466	.2173 (32) p=.217	-.0406 (27) p=.834

(number of cases)

These results suggest that bureaucratic efficiency is correlated with a higher investment share in the food, non-electrical machinery, and electrical machinery industries, and a lower investment share in the other three industries, though only the result for the primary metal and electrical equipment industry are reasonably strong.

4,3 Future research directions

The major hindrance to empirical work in trade and the environment is a lack of quality data. Three areas in particular are weak: environnmental data (the output of industries and country-wide conditions); regulatory substance data (the stringency of environmental and other regulations); regulatory process data (the costs imposed by bureaucratic red tape, uncertainty, liability and litigation, and so on). There are some reasonable proxies available for the U.S., such as the pollution abatement operating costs, but even these are limited or unavailable. Some existing data are simply made difficult to access, such as environmental liability insurance costs, which we hoped to use as one proxy for regulatory process. For comparative work, however, and to test hypotheses about trade and capital movement, some international measures are required.

Nonetheless, there are some additional avenues we can pursue with the available data. The first is to regress a time series of country and industry characteristics affecting foreign direct investment on the country's share of total U.S. capital outlaw by industry. This requires using various proxies for the international variables. To get a sense of the real stringency of pollution laws worldwide, we want to proxy *de facto* compliance costs by the amount of pollution per unit of output from the manufacturing source. This approach has been used with some interesting results by Xing and Kolstad (1995).[51] We continue to hope to measure process costs, which reflect the costs of potential liability and dispute resolution, by a U.S. insurance industry ranking of environmental liability by industry. This ranking could then be assumed to hold across countries.

It is also important to consider the relative costs of the form of regulation used in each jurisdiction and industry, for example, best available or conventional technology (BAT or BCT) versus a market based incentive. With a few exceptions such as air pollution taxes in Japan, tradeable permits in the U.S., and water pollution in the Netherlands and Germany, however, market based incentives have not been implemented to any significant degree. Additionally, some of costs from the choice of regulatory instrument are social rather than private, hence it seems less likely to influence a firm's decision making.

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[51]Any difference between a subjective index of the strictness of the regulatory regime (Tobey, 1990) and the reality of effluent and emissions can be inferred as a measure of the regulatory transactions costs (enforcement and monitoring) for each country.

5. Summary

Our paper centered on two hypotheses. The first was the standard industrial flight question: do the direct abatement costs of the U.S. discourage investment or production in certain industries? The second hypothesis, thus far ignored in the empirical literature, was does the regulatory process and adversarial legalism of the U.S. discourage investment or production in certain industries?

Evidence of industrial flight due to abatement costs was much stronger in the capital flow data compared to the trade data. This may be due to the UN grouping of developed and developing economies, which includes several high income economies in the latter group and excludes the central and Eastern European economies. .Also, capital outflows are arguably the most mobile and hence sensitive to cost differentials, and unlike the trade data they are U.S. specific. Perhaps the biggest drawback is that it is impossible to distinguish capital movement in response to domestic market growth rather than for export markets.

The greatest evidence of a shift in the production of pollution intensive industries in the trade data occurs after 1985. Over the time period 1965-91. and particularity 1981-91, there is evidence that the developed economies lost more comparative advantage in the dirtier industries. For the sample ending in 1985 these results do not hold, and in some cases are reversed. In most cases, revealed comparative advantage also increased more in the developing countries in the cleaner industries, with one exception from 1981-91. This suggests an overall decline in the production of the dirtiest industries and/or a movement to economies not included in our sample.

Another explanation is suggested by our results using the capital flow data. The ratio of U.S. capital outflow in our sample's three dirtiest industries relative to the three cleanest industries was greater to Europe than to our group of non-European countries (excluding Canada). In other words, Europe may-have been gaining some comparative advantage in dirty industries. At the same time, there is a negative correlation from 1977 to 1994 between abatement costs and capital outflow to Europe. If firms are decreasing capital flows to Europe in response to changes in abatement compliance costs in the dirtiest industries, but nonetheless investing relatively more in Europe in these same dirty industries compared to non-European countries, this suggests there is some factor common only to these dirty industries, other than abatement costs, that makes investment in Europe more attractive than investment in other countries. We are suggesting that this common factor is the indirect compliance costs arising from the regulatory process and adversarial legalism in the U.S.

Although our results are limited at this stage, they nonetheless provide some valuable new insights Into the importance of considering the costs of the legal and regulatory regime as part of total compliance costs. Any policy debate over harmonizing the substance of regulations across countries or jurisdiction through standardized abatement costs, is incomplete without considering the differential costs of complying to these regulations.

Appendix 1: UNCTAD (1993) economic groupings, p.vi.

Developed market-economy countries:

Australia, Austria, Belgium-Luxembourg. Canada, Denmark, Faeroe Islands, Finland, France, Germany, Greece. Iceland, Ireland. Israel. Italy, Japan, Netherlands, New Zealand, Norway, Portugal, South Africa. Spain, Sweden. Switzerland. United Kingdom and United States.

Developing countries and territories:

AMERICA: Antigua and Barbuda. Argentina, Bahamas, Barbados, Belize, Bermuda, Bolivia, Brazil, British Virgin Islands. Cayman Islands. Chile, Colombia, Costa Rica, Cuba, Dominica, Dominican Republic. Ecuador. El Salvador. Falkland Islands, French Guiana, Greenland, Grenada, Guadeloupe, Guatemala. Guyana. Haiti. Honduras. Jamaica, Martinique, Mexico, Montserrat, Netherlands Antilles, Nicaragua. Panama. Paraguay. Peru. Saint Kitts and Nevis, Saint Lucia, St. Pierre and Miquelon, Saint Vincent and the Grenadines. Suriname. Trinidad and Tobago, Turks and Caicos Islands, Uruguay, and Venezuela.

NORTH AFRICA: Algeria. Egypt. Libyan Arab Jamahlriya, Morocco, Sudan and Tunisia

OTHER AFRICA: Angola. Benin. Botswana, Burkina Faso, Burundi, Cameroon, Cape Verde, Central African Republic, Chad. Comoros. Congo. Cote d'Ivoire, Dijbouti, Equatorial Guinea, Ethipoia, Gabon, Gambia, Ghana, Guinea. Guinea-Bissau, Kenya, Lesotho, Liberia, Madagascar, Malawi, Mali, Mauritania, Mauritius. Mozambique. Namibia, Niger, Nigeria, Reunion, Rwanda, Saint Helena. Sao Tome and Principe, Senegal. Seychelles. Sierra Leone, Somalia, Swaziland, Togo, Uganda, United Republic of Tanzania. Zaire. Zambia and Zimbabwe.

WEST ASIA: Bahrain. Cyprus. Iran. Islamic Republic of Iraq, Jordon, Kuwait, Lebanon, Oman, Qatar, Saudia Arabia, Syrian Arab Republic. Turkey, United Arab Emirates and Yemen.

SOUTH AND SOUTH-EAST ASIA: Afghanistan, Bangladesh, Bhutan, Brunei Darussalam, Cambodia, Hong Kong. India, Indonesia. Lao People's Democratic Republic, Macau, Malaysia, Maldives, Myanmar, Nepal. Pakistan, Philippines, Republic of Korea, Singapore, Sri Lanka, Taiwan Province of China, and Thailand.

EUROPE: Malta and former Yugoslavia.

OCEANIA: American Samoa. Christinas island, Cook Islands, Fiji, French Polynesia, Guam, Kiribati, Nauru, New Caledonia. Niue, Pacific Islands, Papua New Guinea, Samoa, Soloman Islands, Tokelau, Tonga, Tuvalu, Vanuatu. Wake Island and Wallis and Futuna Islands.

Appendix 2: Definition of Variables and Data Sources

Commodity Trade Flows
United Nations Conference on Trade and Development (UNCTAD) Handbook of Trade and Development Statistics. Table 4.3. 3-digit export structure for world. developed market economies and developing country and territory economies. 1976. 1979, 1988, 1991 and 1993.

Capital Outflows and Income Earned By U.S. Parents
U.S. Department of Commerce. Bureau of Economic Analysis. U.S. Direct Investment Abroad: Balance of Payments and Direct Investment Position Estimates, 1982-88

Population, GDP per Capita and Manufacturing as a Proportion of GDP
World Bank, World Tables, various years and the World Bank, World Development Report 1995, Oxford University Press

Skill Level
United Nations Conference on Trade and Development Report, 1995. pp.136-140.

Production Workers as a % of total employees, Capital Expenditures
U.S. Department of Commerce. Bureau of the Census, 1987 Census of Manufactures, Subject Series, General Summary.

Pollution Abatement Operating Costs
U.S. Department of Commerce. Bureau of the Census, Current Industrial Reports. Pollution Abatement Costs and Expenditures, various years.

Risk Factor Weighted TRI
United States Environmental Protection Agency Toxic Release Inventory and Lucas, Wheeler and Hettige (1992)

Assassinations, strikes, guerilla warfare, riots, revolutions and antigovernment demonstrations, 1989
** Arthur Banks data set, get full cite

Efficiency of the Judiciary System, and Red Tape
1980-83 Business International Index of Corruption and Institutional Efficiency in Paolo Mauro (1995).

Ethnolinguistic Fractionalization Index
Based on 1960 data (Taylor and Hudson (1972)

Telephone Lines Per Capita
World Bank Development Report 1995, Workers in an Integrating World, World Bank, Washington, D.C.

Index of Environmental Stringency
James A. Tobey, The Effects of Domestic Environmental Policies on Patterns of World Trade: An Empirical Test, Kyklos, Vol. 43, Fasc. 2, 191-209.

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TABLE 2

SIC	SITC #	Industrial Group	PAOC $/output	PAOC Rank	TRI Rank	Labor Skill
286	661	lime,cement,bldg prods	3.17	1	18	low
261	251	pulp and waste paper	2.42	2	11	med
281	68	primary non-ferr	2.35	3	9	low
265	52	industrial inorganic chemicals	2.21	4	1	high
283	51	industrial organic chemicals	2.13	5	2	high
284	641	paper and paperboard	2.08	6	13	med
287	562	fertilizers,manufactured	1.94	7	2	high
291	334	petroleum products refined	1.62	8	14	med*
289	67 exc 67	blast furnace & basic steel pr	1.39	9	4	low
282	663	nonmetal mineral manufactures n	1.28	10	18	low
311	635	wood manufactures nes	1.17	11	10	med
306	69	secondary non-ferr	1.07	12	9	low
301	699	base metal mfrs nes	1.03	13	7	low
243	572	explosives,pyrotech prod	0.95	14	16	high
249	58	plastics materials & synthetic	0.94	15	3	high
263	694	stl,coppr nails,nuts,etc	0.79	16	7	med
264	842.3.4	textile finishing,except wool	0.68	17	17	low
228	785	cycles,etc motrzd or not	0.64	18	27	low
221	667	pearl,prec-,semi-p stones	0.63	19		low*
222	61	leather tanning & finishing	0.62	20	5	low
225	665	glassware	0.62	21	19	low
299	335	residual petroleum products ne	0.61	22	24	high
229	871	optical instruments and appara	0.6	23	32	high
227	692	metal tanks,boxes,etc	0.58	24	7	med
324	662	clay,refractory bldg prd	0.58	25	18	low
325	664	glass	0.57	26	19	low
329	695+696	cutlery,handtools & hardware	0.57	27	7	med
321	541	medicinal, pharm products	0.5	28	20	high
322	791	railway vehicles	0.45	29	27	low
326	621	materials of rubber	0.45	30	28	low
328	881+882	photographic equipment & suppl	0.45	31	25	high*
331	776	transistors,valves,etc	0.45	32	25	med
346	652	cotton fabrics,woven	0.45	33	8	low
333	793	ships and boats etc	0.44	34	31	low
334	533	pigments,paints,etc	0.4	35	1	high
244	657	special txtl fabrc,prods	0.4	36	17	low
241	666	pottery	0.4	37	26	low
344	895	office supplies nes	0.4	38	37	med*
345	764	telecom eqpt,pts,acc nec	0.39	39	25	high
342	812	plumbg,heatng,lghtng equ	0.35	40	23	med
339	642	paper,etc,precut,arts of	0.35	41	13	med
351	884	optical goods nes	0.35	42	32	high
352	625	rubber tyres,tubes etc	0.35	43	28	low
353	72 w/exc	general industrial machinery	0.34	44	22	med
356	772+773	electric distribution equipmen	0.33	45	23	med
354	693	wire products non electr	0.33	46	7	med
358	691	structures and parts nes	0.33	47	7	med
359	792	aircraft etc	0.33	48	27	high
357	679	iron,steel castings unwok	0.31	49	7	low
365	634	veneers,plywood,etc	0.3	50	10	med
366	771	electric power machy nes	0.3	51	23	med
362	775	household type equip nes	0.29	52	22	med
361	71 exc 71	engines & turbines	0.28	53	33	med
363	741	heating,cooling equipmnt	0.27	54	23	med
367	553+554	soaps,cleaners,& toilet goods	0.26	55	16	high
371	78 exc 5.	motor vehicles & equipment	0.25	56	33	low
375	821	furniture,parts thereof	0.25	57	15	low*
374	894	toys,sporting goods, etc	0.24	58		med*
372	653+654	brdwovn fabric mills,manmade f	0.24	59	8	low
373	736+737	metal working machinery	0.23	60	22	med
343	721	agric machy,exc tractors	0.2	61	22	med
251	831	travel goods,handbags	0.2	62	30	low
316	655	knitted,etc fabrics	0.19	63	8	low
226	899	other manufactured goods	0.18	64		med
314	723	civil engneerg equip etc	0.17	65	32	med
383	742+743	industrial machinery nec	0.17	66	22	med
364	872	medical instruments nes	0.14	67	32	high
386	885	watches and clocks	0.14	68		high
385	651	textile yarn and thread	0.14	69	17	low
387	659	floor coverings,etc	0.13	70	18	low
271	851	footwear	0.11	71	34	low
394	892	printed matter	0.1	72	12	high
395	76 exc 76	household audio & video equipm	0.08	73	23	med
391	897	gold, silver ware,jewelry	0.07	74	7	low
399	75	computer & office equipment	0.04	75	37	high

REVEALED COMPARATIVE ADVANTAGE

SITC #	Industrial Group	1967 Dev'ed	1970 Dev'ed	1975 Dev'ed	1980/81 Dev'ed	1984/85 Dev'ed	1990/91 Dev'ed	1967 Dev'ing	1970 Dev'ing	1975 Dev'ing	1980/81 Dev'ing	1984/85 Dev'ing	1990/91 Dev'ing
51	industrial organic chemicals	1.354	1.741	1.422	1.481	1.361	1.160	0.188	0.094	0.201	0.179	0.401	0.507
511	hydrocarbons nes,derivs	1.000	1.000	0.500	1.489	0.833	1.152	1.000	1.200	2.000	0.149	1.833	0.543
512	alcohols,phenols etc				1.400		1.000				0.400		0.875
513	carboxylic acids etc				1.478		1.125				0.174		0.719
514	nitrogen-fnctn compounds				1.500		1.226				0.143		0.321
515	org-inorg compounds etc				1.519		1.162				0.111		0.405
516	other organic chemicals	1.367	1.769	1.473	1.471	1.395	1.238	0.158	0.052	0.103	0.176	0.311	0.333
52	industrial inorganic chemicals	1.366	1.625	1.289	1.403	1.347	1.025	0.225	0.300	0.542	0.338	0.463	0.633
522	inorg elemnts,oxides,etc	1.325	1.542	1.200	1.270	1.250	0.973	0.325	0.438	0.800	0.514	0.771	0.865
523	othr inorg chemicals etc	1.407	1.720	1.375	1.478	1.333	1.083	0.111	0.120	0.208	0.261	0.292	0.500
524	radioactive etc material	1.500	1.857	1.556	1.588	1.565	1.056	0.000	0.000	0.000	0.059	0.000	0.333
531	synt dye,nat indgo,lakes	1.320	1.720	1.400	1.467	1.375	1.174	0.000	0.000	0.050	0.133	0.125	0.435
532	dyes nes,tanning prods	1.000	1.000	1.000		1.000		2.000	1.000	1.000		1.000	
533	pigments,paints,etc	1.360	1.667	1.429	1.417	1.400	1.229	0.160	0.125	0.143	0.208	0.240	0.343
541	medicinal, pharm products	1.280	1.562	1.364	1.411	1.361	1.224	0.220	0.213	0.221	0.233	0.277	0.293
551	essentl oils,perfume,etc	1.231	1.545	1.375	1.375	1.375	1.182	0.769	0.455	0.750	0.500	0.625	0.545
553+554	soaps, cleaners and toilet goo	1.310	1.607	1.370	1.419	1.364	1.192	0.276	0.214	0.333	0.323	0.364	0.519
553	perfumery,cosmetics,etc	1.364	1.636	1.333	1.400	1.333	1.194	0.364	0.273	0.417	0.267	0.389	0.484
554	soap,cleansing etc preps	1.278	1.588	1.400	1.438	1.400	1.190	0.222	0.176	0.267	0.375	0.333	0.571
562	fertilizers,manufactured	1.298	1.450	1.295	1.244	1.106	0.814	0.351	0.200	0.328	0.533	0.596	0.791
572	explosives,pyrotech prod	1.333	1.600	1.200		1.000		0.167	0.200	0.200		1.600	
58	plastic materials and synthetic	1.413	1.779	1.504	1.512	1.409	1.182	0.037	0.025	0.059	0.017	0.279	0.099
581	plastic materials, etc.	1.413	1.779	1.504		1.409		0.037	0.025	0.059		0.279	
582	prod of condensation etc				1.543		1.250				0.057		0.396
583	polymerization etc prods				1.500		1.160				0.000		0.000
591	pesticides,disinfectants				1.455		1.182				0.182		0.364
592	starch,inulin,gluten,etc				1.444		1.214				0.222		0.357
598	miscel chem products nes				1.521		1.262				0.125		0.292
61	leather tanning & finishing	1.114	1.353	1.185	0.773	1.088	0.590	1.057	0.588	0.852	1.273	1.206	2.026
621	materials of rubber	1.300	1.700	1.400	1.500	1.333	1.250	0.100	0.100	0.100	0.250	0.222	0.417
625	rubber tyres,tubes etc				1.390		1.128				0.415		0.702
628	rubber articles nes	1.326	1.667	1.407	1.400	1.288	1.133	0.196	0.104	0.185	0.300	0.577	0.533
634	veneers,plywood,etc	1.065	1.258	1.080	0.917	0.880	0.679	1.194	0.710	0.960	1.500	1.840	2.286
635	wood manufactures nes	1.333	1.692	1.308	1.111	1.000	0.960	0.267	0.231	0.538	0.833	1.118	1.040
641	paper and paperboard	1.401	1.759	1.477	1.495	1.431	1.273	0.054	0.029	0.054	0.112	0.147	0.240
642	paper,etc,precut,arts of	1.269	1.654	1.462	1.407	1.333	1.200	0.269	0.115	0.231	0.333	0.433	0.500
651	textile yarn and thread	1.277	1.614	1.314	1.221	1.104	0.871	0.543	0.317	0.614	0.809	1.164	1.457
652	cotton fabrics,woven	0.970	1.128	1.000	1.029	0.919	0.733	1.333	0.851	1.184	1.176	1.486	1.469
653+654	brdwovn fabric mills,manmde f	1.146	1.483	1.270	1.194	1.031	0.822	1.006	0.463	0.586	0.776	1.268	1.500

		1967 Dev'ed	1970 Dev'ed	1975 Dev'ed	1980/81 Dev'ed	1984/85 Dev'ed	1990/91 Dev'ed	1967 Dev'ing	1970 Dev'ing	1975 Dev'ing	1980/81 Dev'ing	1984/85 Dev'ing	1990/91 Dev'ing
655	knitted,etc fabrics		0.000	0.000	1.417		0.737		0.000	0.000	0.500		2.053
656	lace,ribbons,tulle,etc	1.364	1.750	1.333	1.286	1.167	0.889	0.182	0.125	0.500	0.429	0.833	1.444
657	special txtl fabrc,prods	1.345			1.391	1.292	1.059	0.207			0.522	0.625	1.029
658	textile articles nes				0.947		0.640				1.263		1.640
659	floor coverings,etc				1.083		0.920				1.125		1.160
661	lime,cement,bldg prods	1.250	1.412	1.048	1.182	1.150	0.913	0.625	0.529	0.952	0.818	1.050	0.957
662	clay,refractory bldg prd	1.389	1.737	1.476	1.409	1.333	1.227	0.111	0.053	0.143	0.227	0.278	0.364
663	nonmetal mineral manufctures	1.316	1.650	1.421	1.474	1.381	1.192	0.053	0.050	0.105	0.263	0.286	0.462
664	glass	1.391	1.696	1.375	1.444	1.300	1.214	0.087	0.043	0.125	0.278	0.450	0.393
665	glassware	1.263	1.611	1.313	1.375	1.250	1.048	0.211	0.167	0.313	0.375	0.563	0.714
666	pottery	1.385	1.750	1.400	1.364	1.182	0.923	0.077	0.083	0.100	0.636	0.818	0.692
667	pearl,prec-,semi-p stones	1.105	1.536	1.400	1.395	1.276	1.026	1.256	0.435	0.383	0.395	0.690	1.013
67 ex 79	blast furnace & basic steel pro	1.261	1.591	1.375	1.412	1.283	1.052	0.135	0.079	0.094	0.271	0.528	0.725
679	iron,steel castings unwok	1.286	1.600	1.400		1.200		0.000	0.000	0.100		0.600	
68	primary nonferrous metals	0.947	1.200	1.095	1.227	1.163	0.938	1.663	0.866	0.908	0.669	0.895	0.943
68	secondary nonferrous metals	0.743	0.941	0.927	1.222	1.000	1.000	2.086	1.015	1.561	5.556	1.441	2.000
691	structures and parts nes	1.400	1.778	1.488	1.429	1.242	1.214	0.080	0.074	0.098	0.286	0.697	0.429
692	metal tanks,boxes,etc	1.308	1.667	1.385	1.500	1.333	1.200	0.385	0.250	0.231	0.333	0.417	0.467
693	wire products non electr	1.294	1.667	1.375	1.364	1.182	1.100	0.059	0.067	0.250	0.455	0.727	0.800
694	stl,coppr nails,nuts,etc	1.353	1.778	1.438	1.429	1.267	1.053	0.059	0.056	0.125	0.429	0.667	0.842
695+696	cutlery,handtools & hardware	0.333	1.723	1.390	1.688	1.263	1.324	0.104	0.085	0.220	0.469	0.579	0.784
699	base metal mfrs nes	1.352	1.741	1.426	1.429	1.327	1.139	0.204	0.111	0.167	0.357	0.500	0.667
71 ex 18	engines & turbines				1.541		1.464				0.212		0.443
718	oth power generatg machy	1.130	1.453	1.456	1.556	1.345	1.100	0.036	0.034	0.134	0.000	0.327	0.000
721	agric machy,exc tractors	1.204	1.440	1.192	1.414	1.288	1.231	0.019	0.012	0.048	0.069	0.135	0.154
723	civil engneerg equip etc				1.434		1.222				0.157		0.278
72 w/exc	general industrial machinery	1.296	1.642	1.382	1.419	1.292	1.248	0.031	0.021	0.066	0.097	0.250	0.240
728	oth machy for spcl indus	1.225	1.529	1.251	1.413	1.317	1.209	0.106	0.039	0.076	0.113	0.183	0.278
736+737	metal working machinery	1.179	1.436	1.189	1.418	1.196	1.209	0.021	0.011	0.033	0.127	0.214	0.275
741	heating,cooling equipmnt				1.517		1.239				0.086		0.338
742+743	industrial machinery nec				1.493		1.266				0.123		0.287
75	computer & office equipment	1.333	1.709	1.364	1.479	1.362	1.077	0.074	0.052	0.187	0.205	0.415	0.977
76 ex 64	household audio & video equipment				1.297		0.817				0.648		1.679
764	telecom eqpt,pts,acc nec	1.323	1.673	1.383	1.274	1.168	1.073	0.131	0.100	0.248	0.642	0.946	0.944
771	electric power machy nes				1.389		1.000				0.444		1.121
772+773	electric distribution equipment	1.284	1.664	1.333	1.400	1.264	1.167	0.057	0.050	0.127	0.389	0.626	0.593
772	switchgear etc,parts nes	1.295	1.673	1.336	1.403	1.254	1.202	0.054	0.045	0.126	0.388	0.627	0.505
773	electr distributng equip	1.241	1.633	1.323	1.393	1.310	1.073	0.069	0.067	0.129	0.393	0.621	0.829
774	electro-medcl,xray equip	1.444		0.000	1.571	0.737	1.333	0.000		0.000	0.000	0.053	0.000
775	household type equip nes	1.341	1.705	1.362	1.311	1.170	1.079	0.068	0.045	0.170	0.556	0.936	0.810
776	transistors,valves,etc				1.123		0.903				0.966		1.608

		1967 Dev'ed	1970 Dev'ed	1975 Dev'ed	1980/81 Dev'ed	1984/85 Dev'ed	1990/91 Dev'ed	1967 Dev'ing	1970 Dev'ing	1975 Dev'ing	1980/81 Dev'ing	1984/85 Dev'ing	1990/91 Dev'ing
778	electrical machinery nes	1.364	1.686	1.359	1.405	1.261	1.167	0.126	0.120	0.294	0.351	0.692	0.553
78 ex 5,6	motor vehicles & equipment	1.366	1.690	1.438	1.511	1.444	1.276	0.028	0.021	0.069	0.110	0.110	0.177
785	cycles,etc motrzd or not				1.406		0.969				0.313		1.125
786	trailors,nonmotr veh, nes	1.316	1.632	1.375	1.316	1.136	0.952	0.053	0.053	0.167	0.579	0.773	1.238
791	railway vehicles	0.914		0.000	1.176	1.000	1.071	0.029		0.091	0.000	0.500	0.000
792	aircraft etc	1.397	1.729	1.453	1.500	1.407	1.308	0.124	0.031	0.066	0.096	0.152	0.133
793	ships and boats etc	1.261	1.611	1.373	1.291	1.009	1.000	0.065	0.023	0.092	0.465	1.336	1.089
812	plumbg,heatng,lghtng equ	1.273		0.000	1.333	1.211	1.111	0.318		0.278	0.333	0.632	0.741
821	furniture,parts therof	1.051		0.000	1.315	1.241	1.111	0.154		0.000	0.426	0.638	0.644
831	travel goods,handbags	1.100		0.000	0.643	0.563	0.632	0.600		1.444	1.929	2.500	2.105
841	clothing not of fur	1.073		0.000		0.699		0.993		1.280		2.211	
842,3,4	textile finishing,except wool	1.000		0.000	0.747	0.833	0.592	0.333		0.750	1.768	2.000	2.121
845	outerwear knit nonelastc				0.886		0.570				1.523		2.089
846	under garments knitted				0.850		0.615				1.700		2.282
847	textile clthng acces nes				1.125		0.733				1.125		1.400
848	headgear,nontxtl clothng				0.778		0.448				1.667		2.690
851	footwear	1.137		0.000	0.930	0.789	0.667	0.451		0.600	1.228	1.803	1.901
871	optical instruments and appara	1.375		0.000	1.500	1.411	1.167	0.038		0.162	0.167	0.266	0.583
872	medical instruments nes				1.438		1.258				0.125		0.290
874	measuring,controlng instr				1.519		1.279				0.104		0.198
881+882	photographic equipment & sup	1.385		0.000	1.509	1.471	1.217	0.038		0.083	0.170	0.147	0.467
883	developed cinema film	1.250		0.000		1.000		0.750		1.000		1.000	
884	optical goods nes				1.417		1.143				0.333		0.786
885	watches and clocks	1.342		0.000	1.167	1.091	0.905	0.079		0.344	0.972	1.121	1.262
891	sound recorders and parts	1.378		0.000		1.390		0.044		0.220		0.340	
892	printed matter	1.345		0.000	1.450	1.381	1.236	0.291		0.372	0.250	0.333	0.418
893	articles of plastic nes	1.375		0.000	1.350	1.200	1.114	0.250		0.438	0.525	0.844	0.830
894	toys,sporting goods, etc	1.250		0.000	0.977	0.750	0.721	0.725		0.742	1.349	2.104	1.656
895	office supplies nes	1.400		0.000	1.375	1.300	1.154	0.100		0.143	0.375	0.500	0.692
897	gold, silver ware,jewelry	1.316		0.000	1.357	1.222	0.975	0.368		0.625	0.429	0.778	1.325
899	other manufactured goods	1.059		0.000	1.091	1.042	0.879	1.265		0.708	1.136	1.333	1.242

~~PERCENT CHANGE IN REVEALED COMPARATIVE ADVANTAGE~~

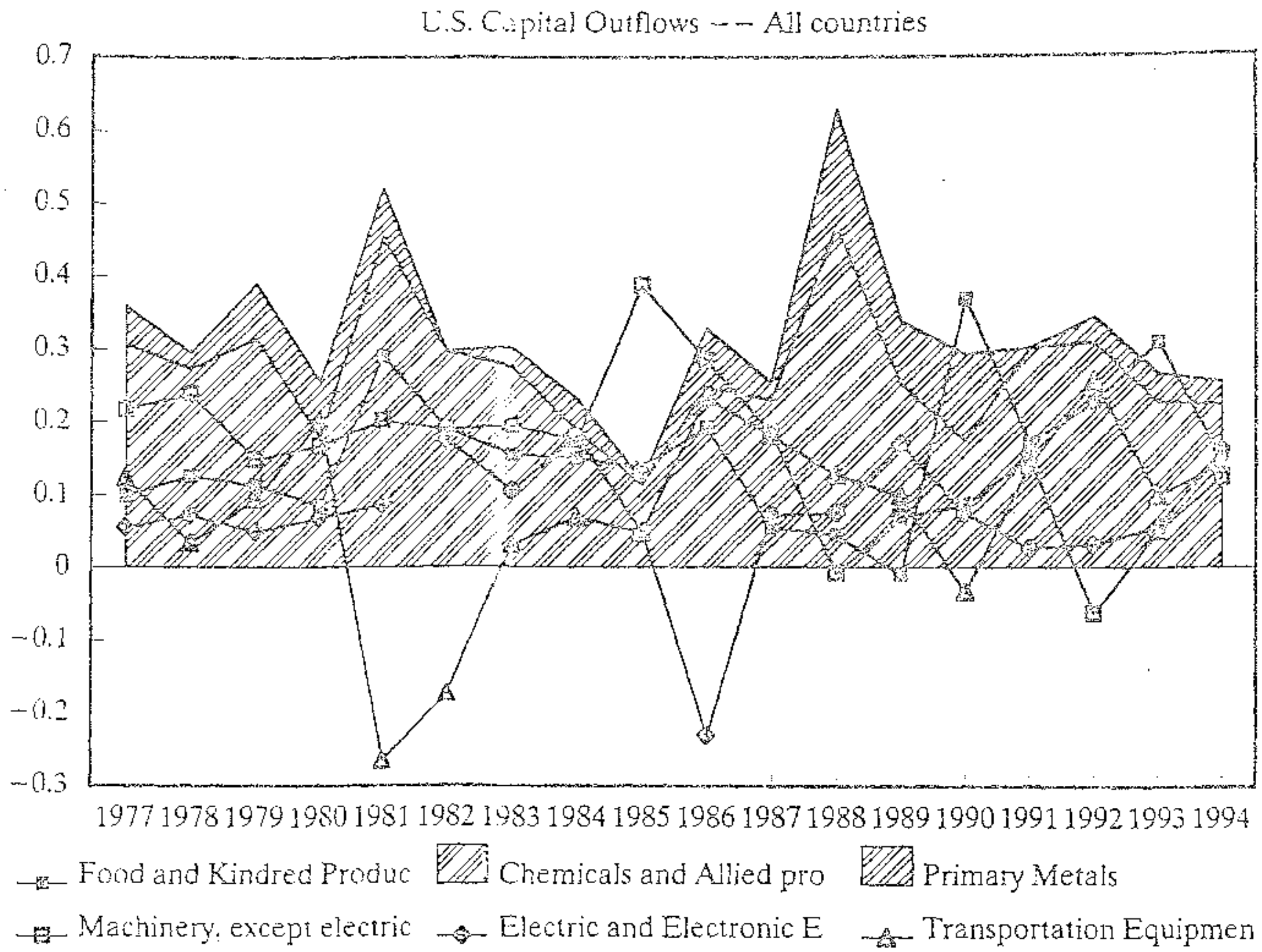
SITC #	Industrial Group	Developed Countries 67-91	67-85	81-91	Developing Countries 67-91	67-85	81-91
51	industrial organic chemicals	-14.37	0.53	-21.73	170.42	113.86	183.24
52	industrial inorganic chemicals	-24.95	-1.38	-26.90	180.85	105.53	87.44
533	pigments,paints,etc	-9.66	2.94	-13.28	114.29	50.00	64.57
541	medicinal, pharm products	-4.40	6.32	-13.24	33.52	26.24	25.86
553+554	soaps,cleaners,& toilet goods	-9.01	4.07	-16.00	88.22	31.82	60.96
562	fertilizers,manufactured	-37.30	-14.78	-34.59	125.35	69.79	48.26
572	explosives,pyrotech prod		-25.00			860.00	
58	plastics materials & synthetics	-16.32	-0.27	-21.83	169.66	660.88	498.70
61	leather tanning & finishing	-47.07	-2.34	-23.68	91.61	14.07	59.16
621	materials of rubber	-3.85	2.56	-16.67	316.67	122.22	66.67
625	rubber tyres,tubes etc			-18.89			69.34
634	veneers,plywood,etc	-36.26	-17.33	-25.97	91.51	54.16	52.38
635	wood manufactures nes	-28.00	-25.00	-13.60	290.00	319.12	24.80
641	paper and paperboard	-9.14	2.12	-14.85	341.00	169.29	114.00
642	paper,etc,precut,arts of	-5.45	5.05	-14.74	85.71	60.95	50.00
651	textile yarn and thread	-31.74	-13.48	-28.61	168.57	114.57	80.16
652	cotton fabrics,woven	-24.38	-5.24	-28.76	11.67	11.49	26.56
653+654	brdwovn fabric mills,manmade fibers,s	-28.27	-10.03	-31.16	49.11	26.04	93.30
655	knitted,etc fabrics			-47.99			310.53
657	special txtl fabrc,prods	-21.27	-3.95	-23.90	397.55	202.08	97.30
659	floor coverings,etc			-15.08			3.11
661	lime,cement,bldg prods	-26.96	-8.00	-22.74	53.04	68.00	16.91
662	clay,refractory bldg prd	-11.64	-4.00	-12.90	227.27	150.00	60.00
663	nonmetal mineral manufctures nes	-9.38	4.95	-19.09	776.92	442.86	75.38
664	glass	-12.72	-6.56	-15.93	351.79	417.50	41.43
665	glassware	-17.06	-1.04	-23.81	239.29	167.19	90.48
666	pottery	-33.33	-14.65	-32.31	800.00	963.64	8.79
667	pearl,prec-,semi-p stones	-7.15	15.50	-26.46	-19.35	-45.08	156.58
67 exc 679	blast furnace & basic steel products	-16.58	1.72	-25.49	436.93	291.04	167.16
679	iron,steel castings unwok		-6.67				

- TABLE 4 -

		Developed Countries			Developing Countries		
		67-91	67-85	81-91	67-91	67-85	81-91
68	primary non-ferr	-0.97	22.89	-23.58	-43.32	-46.17	41.00
69	secondary non-ferr	34.62	34.62	-18.18	-4.11	-30.90	-64.00
691	structures and parts nes	-13.27	-11.26	-15.00	435.71	771.21	50.00
692	metal tanks,boxes,etc	-8.24	1.96	-20.00	21.33	8.33	40.00
693	wire products non electr	-15.00	-8.68	-19.33	1260.00	1136.36	76.00
694	stl,coppr nails,nuts,etc	-22.20	-6.38	-26.32	1331.58	1033.33	96.49
695+696	cutlery,handtools & hardware	297.30	278.95	-21.52	652.43	455.79	67.21
699	base metal mfrs nes	-15.75	-1.84	-20.28	227.27	145.45	86.67
71 exc 718	engines & turbines			-4.97			108.46
721	agric machy,exc tractors	2.23	7.03	-12.95	692.31	593.27	123.08
723	civil engneerg equip etc			-14.75			77.35
72 w/exc	general industrial machinery	-3.69	-0.33	-12.07	685.01	716.67	148.32
736+737	metal working machinery	2.53	1.48	-14.74	1204.95	917.86	117.03
741	heating,cooling equipmnt			-18.31			292.11
742+743	industrial machinery nec			-15.22			132.98
75	computer & office equipment	-19.25	2.13	-27.22	1218.93	459.76	375.46
76 exc 764	household audio & video equipment			-37.01			159.02
764	telecom eqpt,pts,acc nec	-18.87	-11.75	-15.71	621.50	623.37	47.08
771	electric power machy nes			-28.00			152.27
772+773	electric distribution equipment	-9.12	-1.55	-16.67	945.75	1002.91	52.34
775	household type equip nes	-19.50	-12.73	-17.68	1087.30	1273.05	45.71
776	transistors,valves,etc			-19.59			62.99
78 exc 5.6	motor vehicles & equipment	-6.63	5.69	-15.54	533.17	294.35	60.18
785	cycles,etc motrzd or not			-31.11			260.00
791	railway vehicles	17.19	9.38	-8.93	-100.00	1650.00	
792	aircraft etc	-6.35	0.73	-12.80	7.05	22.39	38.83
793	ships and boats etc	-20.69	-19.95	-22.52	1569.20	1949.22	134.05
812	plumbg,heatng,lghtng equ	-12.70	-4.89	-16.67	132.80	98.50	122.22
821	furniture,parts therof	5.69	18.08	-15.49	318.89	314.66	51.30
831	travel goods,handbags	-42.58	-48.86	-1.75	250.88	316.67	9.16
842.3.4	textile finishing,except wool	-40.76	-16.67	-20.74	536.31	500.00	19.94
		-41.38	-30.65	-28.30	321.58	299.76	54.81

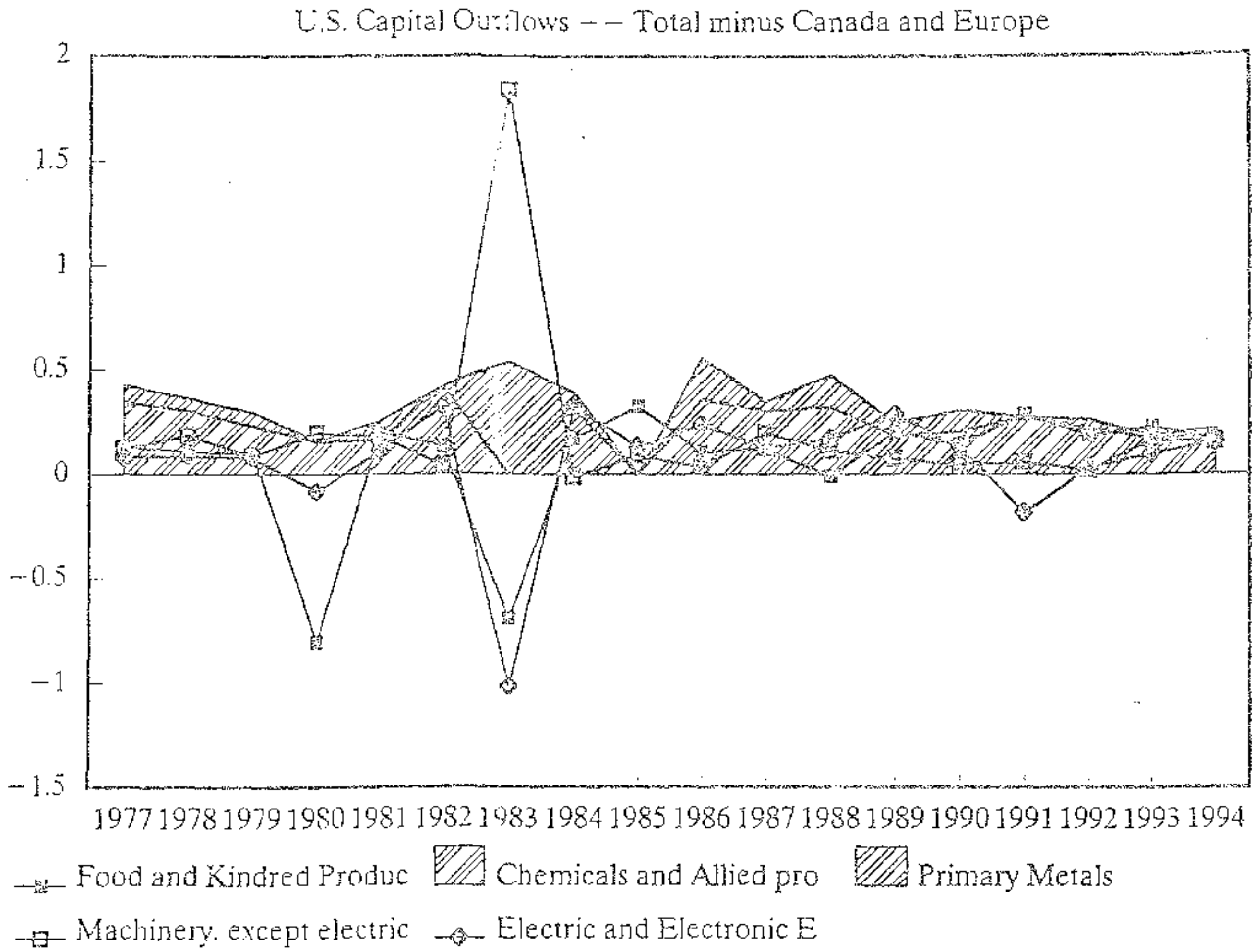
	Developed Countries			Developing Countries		
	67-91	67-85	81-91	67-91	67-85	81-91
871 optical instruments and apparatus	-15.15	2.64	-22.22	1416.67	591.94	250.00
872 medical instruments nes			-12.48			132.26
881+882 photographic equipment & supplies	-12.13	6.21	-19.40	1113.33	282.35	174.81
884 optical goods nes			-19.33			135.71
885 watches and clocks	-32.59	-18.72	-22.45	1498.41	1320.20	29.80
892 printed matter	-8.11	2.64	-14.73	43.75	14.58	67.27
894 toys,sporting goods, etc	-42.30	-40.00	-26.15	128.38	190.23	22.75
895 office supplies nes	-17.58	-7.14	-16.08	592.31	400.00	84.62
897 gold, silver ware,jewelry	-25.90	-7.11	-28.16	259.64	111.11	209.17
899 other manufactured goods	-17.00	-1.62	-19.44	-1.76	5.43	9.33

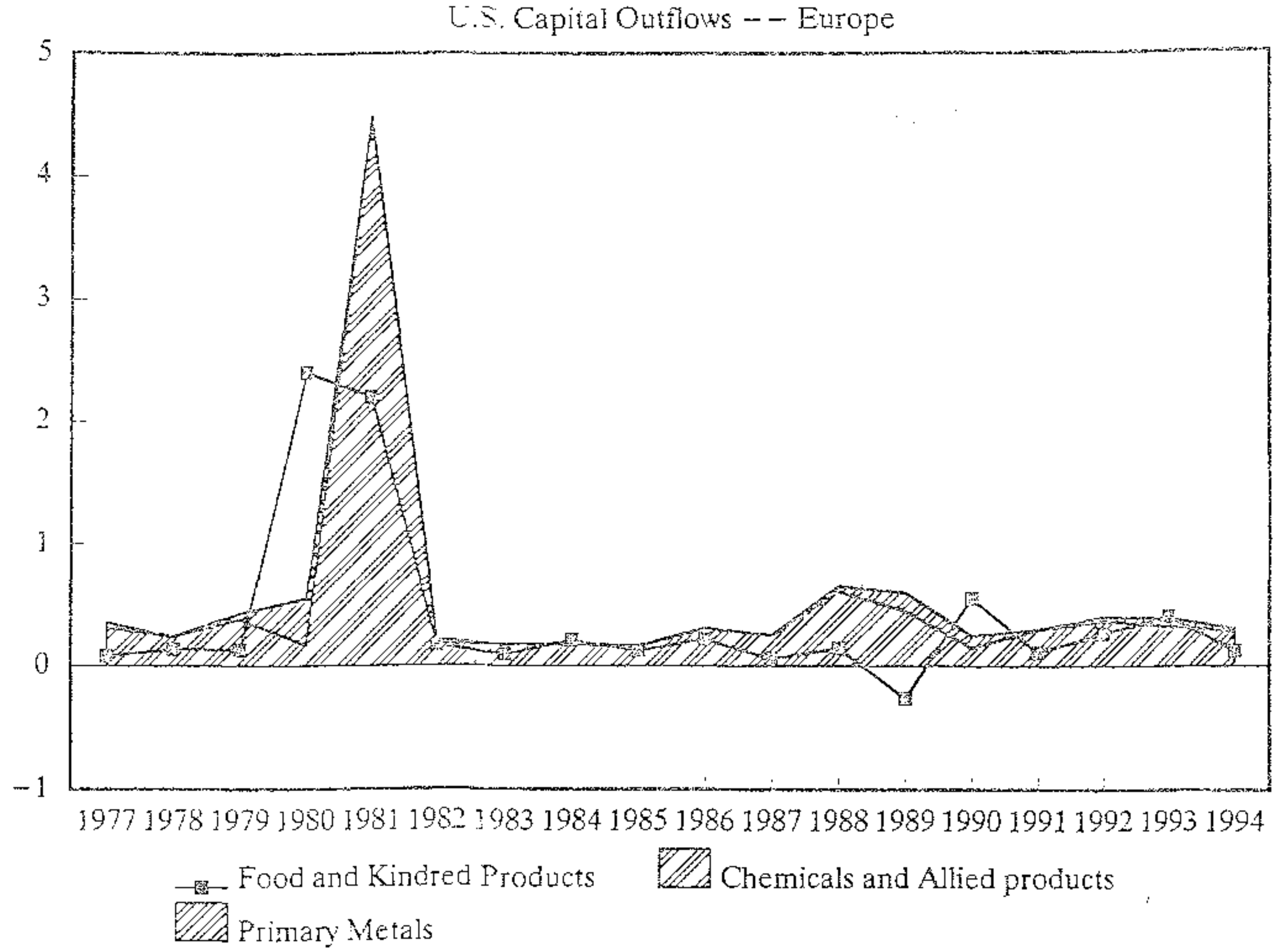
- FIGURE 1 -



U.S. Capital Outflows -- All countries
0.7
0.6
0.5
0.4
0.3
0.2
0.1
0
-0.1
-0.2
-0.3
1977 1978 1979 1980 1981 1982 1983 1984 1985 1986 1987 1988 1989 1990 1991 1992 1993 1994
Food and Kindred Produc
Chemicals and Allied pro
Primary Metals
Machinery, except electric
Electric and Electronic E
Transportation Equipmen

– FIGURE 2 –


U.S. Capital Outflows -- Total minus Canada and Europe
2
1.5
1
0.5
0
-0.5
-1
-1.5
1977 1978 1979 1980 1981 1982 1983 1984 1985 1986 1987 1988 1989 1990 1991 1992 1993 1994
Food and Kindred Produc
Chemicals and Allied pro
Primary Metals
Machinery, except electric
Electric and Electronic E


U.S. Capital Outflows -- Europe
5
4
3
2
1
0
-1
1977 1978 1979 1980 1981 1982 1983 1984 1985 1986 1987 1988 1989 1990 1991 1992 1993 1994
Food and Kindred Products
Chemicals and Allied products
Primary Metals

PAOC

C01 all industries			C04 food and kindr			C05 chemicals & al			C06 primary metal			C07 machinery exc			C08 Electric equip			C09 transportation		
air all	wtr all	ow all	air fd	wtr fd	ow fd	air ch	wtr ch	ow ch	air pm	wtr pm	ow pm	air ma	wtr ma	ow ma	air ee	wtr ee	ow ee	air tr	wtr tr	ow tr
2240.4	2203.4	981.5	56.2	211.6	89.5	335.5	685.2	217.6	721.6	268.3	132.3	33.1	49.8	52.6	28	63.2	37.1	60.6	97.3	76.1
2527.4	2529.9	1218.2	69.4	243.2	99.4	398.8	794.1	280.1	809.6	333	178.9	41	54.4	63.1	30.7	71.7	46.1	77.3	110.2	93
3061.8	3015.6	1322.5	91	297.9	115.3	485.3	895.2	287	981.7	442	163.5	50.1	69	81.1	46.7	82.8	52.8	96.4	126.3	109.1
3297.8	3193.1	1650.6	81.6	314.3	123.6	539.9	942.9	368.8	998.2	463.2	215.3	48	73	85.3	45.2	87.8	71.9	110.7	137.4	153.2
3697.8	3554.3	1855.7	78.3	343.3	157.5	571.7	1069.1	406.9	1111.9	549.2	250.7	47.3	81.6	91.7	51.8	106.2	88.8	117.5	150.7	157.7
3455.9	3488.5	1619.9	77.1	328.1	116.2	556.1	1112.3	438.2	897.2	448.4	167.6	46.6	85.3	75.7	55.1	116.6	88.7	105.6	153.5	137.6
3806.9	3943.2	2175	96.1	402.3	151.3	624.9	1106	467.4	904.3	454.6	256.7	58	105	127.5	77.1	142	136.5	157.5	224.2	178.6
4189.3	4296.4	2402.5	101.3	458.1	155	622	1206.3	517.1	1017.1	450.7	301.7	68.4	115.7	130.1	74.6	150.3	139.1	192.9	280.1	212.6
4330.2	4609.5	2738.3	106.3	525.2	201	672.9	1267.7	599.4	1067	517.4	278.7	76	119.9	147.7	78	174	176.3	194.5	281.9	260.1
4263	4820.2	3176.9	126	559.9	246.1	646.5	1303.8	705.9	968.5	509.4	264.1	81.4	128.3	149.1	86.3	210.9	231.5	195.7	318.5	304.9
4466.5	5275.9	4265.8	157.8	673.3	328.9	706.4	1428.5	940.1	965.8	516.1	327.2	68.4	139.4	221.8	92.2	252.5	314.6	215.7	299.2	459.5
4694.2	5853.4	5078	137.4	663.5	255.3	794	1613.8	1101.4	883.1	574.3	473.7	80.6	170.5	330.8	100.9	308.9	319.3	212.2	318.1	470.1
5010.9	6416.4	5643.4	145.9	692.4	270.4	841.9	1799	1302.5	943.7	565.4	516.4	77.9	159.5	320.3	113.1	370.3	304.4	247.3	373.1	611.6
4955.6	6345	6008.3	149.6	788.5	316.1	879.6	1786.9	1380.5	911.7	564	526.9	70	165.1	338.8	22.1	323.6	409.5	254.7	339.6	544
5395	6576.9	5494.4	162.7	835.7	313.6	1026.9	1946.8	1451.1	933.1	575	485.3	65.4	160.5	237.9	117.9	288.8	259.4	298.5	347	525.2
5574.6	6631.8	5348.6	156.1	857.8	325.4	1013.6	1957	1377.6	944.5	598.2	474.6	71.9	157.2	216	121.8	297.5	243.1	302.4	350.9	541.2
6139.1	7031.5	5601.4	172.4	940.5	334.7	1138.7	1996.7	1431.5	982.1	692.2	537.2	79.1	147.1	218.1	165.4	329.9	276.7	293.7	342.5	480.2
		RANK	4	2	3	1	1	1	2	3	2	6	6	5	5	5	4	3	4	3

TABLE 11