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ENVIRONMENT, NAFTA, AND NEW YORK

Testimony, New York State Senate Hearing

The Impact of the U.S.-Mexican Free Trade Agreement on Labor, the Environment, and Economic Development in New York State

New York City, June 4, 1992

by

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In preparing this discussion, I have made use of earlier work on this subject which was analyzed with a national focus. Therefore, it is difficult to draw precise conclusions about New York and Mexican competition. What is feasible, however, is to examine two industries important to New York which are affected by free trade, and draw general conclusions from this information. The two industries, which are very different in size, are silverware and automobiles.

1. SILVERWARE

I want to start with silverware because it is produced by a simple process, and the role of environmental protection costs in the demise of the New York industry is relatively easy to see. Then, I want to turn to automobile manufacture and trade, and look at this industry for indications about the impact of environmental protection cost and NAFTA on its future in New York.

Twenty years ago New York was a major U.S. manufacturer of silverware, using U.S. copper. In the middle 1980s, there was still New York production. Today, there is no longer any wholly domestic operations. Peter Dorman reports that employment fell by 50% in metal plating in the State.

The loss of production and employment, in my judgement, is directly related to the avoidance of environmental protection and worker safety costs in foreign production for U.S. markets. A silverware plant uses steel, copper, nickel, chrome, lead, gold, silver, aluminum, and powerful industrial chemicals used in metal finishing. Because of the unusual hazards arising from contact with these materials, their use is strictly regulated in the U.S.

The general production method is to cut a blank from metal coil, stamp the blank, grind the form, perhaps plate the stock, and polish and clean. The shop noise, if uncontrolled, is at a level comparable to a room full of chain saws and power motors.

With equipment lacking safety features, productivity is enhanced by worker direct contact with moving machinery. But this is at a cost of smashed or cut hands and arms.

U.S. standards require air filtration to remove the toxic metal particles, solvents, and cleaners from the workplace without worker contact.

U.S. standards require treatment of these wastes so that the effluent water approaches drinking water standards, and storage or burial of the sediment at certified locations.

In a U.S. plant, the average production worker retired after 20 years or more in production work, without experiencing occupational illness or injury.

In an uncontrolled developing country plant, the average production worker manages 6 - 8 month's work. This suggests potentially crippling exposure to machinery, fumes, and chemicals.

Table 1 outlines my estimate of the cost impact of the difference in protection technologies. Note that air and water pollution control and OSHA regulations constitute about 25% of the U.S. cost. I also assumed that U.S. materials (copper, acids, etc.) are more costly, reflecting in part the same differences in workplace and environmental standards.

Labor costs per unit product may not differ greatly. I assumed that seven minutes of U.S. labor are paid $30 per hour in wages and social insurance, or $3.60 per set. I assumed that 96 minutes of developing country labor were paid $1.50 per hour or $2.40 per set. I assumed a transportation cost of an additional $3.60 per set to bring the developing country product to the U.S.

Table 1 shows a developing country advantage of $18 per set for environmental and OSHA protection in the silverware manufacture and in the purchase of metals and chemicals, themselves produced without comparable standards.

Notwithstanding the labor cost and other differences, it appears that the cost advantage for imported silverware is equivalent to the avoidance of modern control technologies. We may assume that the external social cost is borne by the Korean workers, and by the general population exposed to highly toxic metal and chemicals in their air, water and fish.

We may ask if the ultimate depository of uncontrolled toxic metal plating waste dumping would not be oceans and fisheries. The U.S. Council on Environmental Quality and the EPA had previously identified these heavy metal wastes as toxic priority pollutants. Threshold levels for aquatic life impact are measured in billionths of a gram of metal per gram of water.

There is irony in the realization that older U.S. equipment not meeting modern standards was purchased and taken to Asia. There, it was used to undercut and eliminate New York production. It is my understanding that there is no longer any New York or U.S. production of mass-market silverware. I believe that environmental protection costs had a major role in the disappearance of this activity from New York.

Table 1: Silverware Set Cost Illustration

	New York		Korea	
Retail Price, U.S.		$60		$40
Profit	0%	$0	18%	$7.20
Taxes	10%	$6.00	10%	$4.00
Interest	3%	$1.80	3%	$1.20
Admin.;misc	14%	$8.40	14%	$5.60
Advertising	4%	$2.40	0%	$0
Distribution	2%	$1.20	12%	$4.80
Selling	14%	$8.40	14%	$5.60
Packaging	6%	$3.60	6%	$2.40
Labor	6%	$3.60	6%	$2.40
Material, metals, chem.	16%	$9.60	17%	$6.80
Environment, OSHA	25%	$15.00	0%	$0
	100%	$60.00	100%	$40.00

2. AUTOMOBILES

New York employment in vehicle manufacturing stood at 28,000 in 1988, the latest year reported by the industry. (This figure does not include stamping or aluminum smelting, so the total employment must be considerably higher.) These 28,000 employees were paid $35,000 annually.

However, this employment of 28,000 is 50% lower than in the early 1970s. My best judgement is that the U.S. automobile industry will continue to relocate in Mexico.

Without some change in national or international policy, I expect that all large scale manufacturing of products for U.S. markets may be located outside of the U.S. I mean, specifically, those industries using metals, chemicals, and energy where pollution control is a significant cost item.

A typical domestic passenger vehicle consists of 3200 pounds of material. Table 2 indicates the raw materials which must be processed to produce an automobile. Japan and East Asia are almost wholly lacking in the mineral and fuel resources needed to produce those automobiles. Table 3 shows Japan's resource dependency in basic resources; it is essentially 100%. This dependency is matched by South Korea and the other newly industrialized countries in East Asia. It seems, then, that Japan's contribution to global pollution is connected to both the supply of raw materials from resource-exporting, developing countries and to U.S. product demands. In other words, a U.S. buyer of a Japanese vehicle is purchasing a commodity linked to environmental protection or worker safety problems in the countries of origin for the embodied resources.

Table 4 summarizes five types of cost differences between Japan and the U.S. for automobile manufacturing. The most important difference is the estimated cost savings from avoided environmental protection cost. These costs are estimated from input-output data summarized in Table 5. The 1982 data for eighty-one commodities were aggregated into the eighteen categories in Table 5. The manufactured commodities (generally industries 16-79) have a total direct and indirect requirements coefficient of 2.18. Since $15,000

TABLE 2

Composition and Weight
of Average Passenger Car

1987

Material	Weight in Pounds
Steels	1775
Iron	460
Plastics, Composites	222
Fluids, Lubricants	183
Rubber	136
Aluminum	146
Glass	86
Copper	25
Lead	24
Zinc	18
Others	103
Total	3178

TABLE 3

Japan's Resource Dependency for Selected Minerals and Fuels

1985, units of contained mineral

Mineral or Fuel	Mine Production or Field Output	Consumption of Refined Primary Metal or Fuel	Measure of Resource Dependency
Aluminum (10^3 mt)	0	2814	100.0%
Coal (10^{12} Btu)	530	3540	85.0%
Copper (10^3 mt)	43	1172	96.3%
Iron, Steel (10^3 mt)	212	179,419	99.9%
Petroleum (10^3 barrels)	3929	1,517,676	99.7%
Uranium (10^3 kg)	7	650	98.9%

TABLE 4

Potential Profit Advantage (+) or
Handicap (-) for a Japanese Manufacturer

per $15,000 car

Pricing	- $1500
Transport	- $450
Labor Cost	+ $1150

Environmental Costs(+ $2100)	
10% on mining	+ $100
10% on chemicals, energy, metals	+ $750
5% on other manufactured goods	+ $1250
Net Before-Tax Capital Income Advantage	+ $1300

TABLE 5

Total Requirements for $15,000 Car

Commodities	Amounts
Agriculture and Lumber	$70
Mining and Minerals	$1004
Construction	$249
Transportation	$733
Trade, Communications, Television	$1327
Finance	$578
Services	$1445
Other	$276
Manufactured Commodities	
Textiles	$716
Chemicals, Plastics	$957
Energy, Utilities	$1657
Rubber	$871
Glass	$193
Metal Products	$4982
Engines	$166
Machinery	$1015
Computers, Electrical	$797
Motor Vehicles	$20,467
Total Manufactured Commodities	$32,646
All Other	$824
Total	$38,328

is the current average price of both domestic and imported cars, it is used as the basis for application of the I-O coefficients. It is assumed that smaller environmental costs for developing country suppliers reduce the costs of Japanese mining, chemicals, energy, and metals by 10 percent. It is further assumed that the same factor is 5 percent for other manufactured commodities.

Summing up the entries in Table 4, the Japanese manufacturer has an advantage of about $1300 per vehicle. (About $1550 is before-tax capital income for the U.S. manufacturer, and the figure may be about $2850 for the Japanese manufacturer.) The overall context, then, is that an estimate of $2100 in avoided environmental protection costs is essential to providing for the profitability and price advantage for the sale of Japanese cars in the United States.

3. NEW YORK'S FUTURE: MOVING TO MEXICO

The magnitude of avoided environmental protection costs is obviously sizeable. In addition, Dorman argues that Mexican auto plants have 80% of the productivity at 10% of the wages. In other words, the unit labor cost must be about 15% in Mexican auto manufacturing compared to New York localizations.

The wage and environmental cost advantages are substantial. With NAFTA, my best judgement is that we would see an acceleration of the movement of manufacturing to Mexico. This would apply to Japanese owned U.S. production as well as production from U.S. companies. I expect that this will be most important for pollution-intensive processes using chemicals, metals, and energy. The kinds of products which require these processes are such items as batteries, appliances, automobiles, electronics, and, in agriculture, fresh fruits and vegetables.

4. POLICIES

The net result is a painful dilemma: reduce New York environmental standards and wage levels, or accept the continued movement of New York manufacturing to Mexican and other foreign locations.

One response would be to organize a state commission to fully investigate and publicize this problem in New York.

Another, and perhaps related action would be to pursue the Congressional initiatives developed by Senator Boren (his "International Pollution Deterrence Act", S. 984), and by Representatives Gephardt, Waxman, and Sikorski (House Concurrent Resolution 246).

Finally, I would recommend that approval of NAFTA be linked with some method of U.S. - E.P.A. certification of Mexican plants.

Accepting NAFTA as it is means adding to continued exponential growth in major world pollutants. Exchanging products freely without mutual environmental standards means that what we gain in lower product prices for pollution-intensive products is exceeded by our loss in environmental degradation.

APPENDIX A: WHY DOES MACROECONOMICS UNDERESTIMATE THE MAGNITUDE OF ENVIRONMENTAL PROTECTION COSTS?

The general belief among macroeconomists is that industrial country pollution control and workplace safety are unimportant economic factors in influencing productivity, the location of manufacturing, or levels of global pollution. For example, Edward Denison finds that U.S. productivity declined at a 0.22 percent rate from 1973 to 1981. He attributes this primarily to a reduction in managerial and technical knowledge and efficiency. He finds environmental factors to be unimportant with respect to productivity. The OECD Environment and Economics Conference, Ingo Walter, Smith and Ulph, Pasurka, and Leonard agree.

How can the conclusions of these studies be reconciled to my work? I can use the copper industry to show six factors that lead to different conclusions (See Table A). All of these studies have used Federal survey data. One important factor is that many labor-intensive activities that are part of a production process may not be reported. For example, the labor, fuel, and equipment costs of dust control in a pit mine by use of watering trucks may not be reported. Similarly, collateral protection devices that are a secondary part of production equipment may not be reported. Relevant examples here would be the capital and labor costs of a dust hood on an ore conveyor, or fans and hoods on a grinder.

Second, monitoring and planning activity may be excluded. For example, four excluded kinds of environmental protection expense would be: (1) professional time spent with visitors inspecting protection systems; (b) meteorological monitoring of ambient air quality; (c) environmental planning; (d) time and expense in report preparation and meetings with State and Federal regulatory personnel.

A third omission from survey data is the cost of protection of workers from environmental hazards. All of the items in Table A2 are excluded.

A fourth excluded item is productivity loss. When production stops or is slowed because of environmental problems, this is not counted as an environmental expense.

A fifth factor in under-reporting environmental costs in surveys may be vintage: current management may not perceive practices which preceded them as protective; current management may focus on environmental practices introduced during their tenure. Examples here may be respirators, or tall stacks.

Finally, interest expense or opportunity cost for investment in protection equipment is not included in the survey data. This could be significant.

Whether or not these six factors are sufficient to account for the difference between my estimate (20 to 25 percent) and previous economic studies (2 percent) is an open question. Certainly field research on environmental protection, worker safety, and productivity should be encouraged.

(These comments are based upon discussions with personnel in the Bureau of Economic Analysis, the Bureau of the Census, and management personnel at mines and smelters in the U.S., Mexico, Chile, Zaire, Zimbabwe, and South Africa.)

Table A1
Environmental Protection Activities and Equipment in Copper Production

a. air and water pollution control, coal burned for power generation
b. bag house on crusher
c. berms for chemical storage
d. covered conveyor
e. primary convertor hoods
f. fugitive emission hoods
g. gas collection fans, electricity
h. hazardous waste control
i. meteorological data and forecasting for possible pollution emergencies
j. monitors for air and water quality
k. PCB control
l. storm catchment reservoir for ten-year storm
m. tailing reservoir and drain
n. tall stack
o. waste oil control and monitoring
p. water discharge plans and monitoring
q. water recycle zero discharge
r. water spray for dust control
s. wet scrubbers
t. acid plant
u. professional environmental protection personnel
v. Federal and State reports and meetings

Table A2: Work Place Health and Safety Protection Costs

a. personal safety equipment: protective jacket, hard hat, glass, respirator, boots
b. roll cages and cabs on vehicles
c. clean workplaces
d. lights
e. minimum train crews
f. hearing testing, protection, and monitoring
g. plant air testing
h. radiation monitoring
i. respirator testing
j. training programs
k. mine and industrial safety personnel
l. mine and industrial safety reports and meetings

Sources: Personal interviews, visits to mines and smelters.

APPENDIX B: WAGE AND PRODUCTIVITY CALCULATIONS FOR AUTOMOBILES

All figures in Table 4 are rounded to the nearest $25. With higher U.S. taxes and benefits, the after-tax advantage is probably much greater. The $1500 pricing differential for cars of the same quality is assumed to be 10 percent of retail price, and is based on the Cole and Yakushiji discussion of marketing and pricing. The higher Japanese transport cost of $450 is also based on their analysis. The labor cost differential of $1150 per vehicle was based upon three different methods of estimating U.S. labor cost per vehicle, each giving an estimate of approximately $3200 per vehicle.

In the first method, production worker pay is assumed to equal the average for all employees. In other words, the production worker rate of $20.53 per hour is assumed to be the average for all clerical, sales, managerial, and production workers. This is multiplied by 2000 hours per year, and divided by 13 vehicles per employee. The result is an estimate of $3158 per vehicle. In the second method, an average 1985 motor vehicle industry pay of $31,559 was assumed to be the basis for industry-wide benefits of 29.1 percent for all employees, the I-O value for the auto industry. This was increased by 1.7 percent, the reported increase for production workers in total compensation per hour between 1985 and 1987. Dividing again by 13 vehicles per employee, the result is an estimate of $3187 in labor cost per vehicle, $29 higher than the first method. In the third method, the value-added coefficient (0.331) is multiplied by the ratio of wages and benefits to value added (0.685), and by the $15,000 price. The result of this method is a labor cost per vehicle estimate of $3401.

The estimate of 13 vehicles annually per employee is based upon the U.S. production of 10.906 million vehicles in 1987 with 841,508 employees.

Cole and Yakushiji review several studies of Japanese and American productivity, and cite Japanese studies finding a 10 percent differential, or 14.3 vehicles per employee. Total Japanese compensation is 70 percent of the U.S. level for production workers.

Taking the median U.S. estimate of $3187 total labor cost per vehicle, and assuming 10 percent greater Japanese productivity and 30 percent lower wages, the result is an estimate of $2028 labor cost per Japanese vehicle.

The arithmetic difference of an $1159 wage differential is rounded to $1150 in the text.

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