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# GLOBAL ELECTRONICS

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## JOB PROJECTIONS

One of the most telling influences of data processing upon public policy has been the elevation of economics into the realm of mathematical study. Many economists consider the subject a science, but without the ability to create laboratory conditions, the assumptions from which econometricians calculate their findings are little more than guesses. Thus, no matter how detailed the formulas and extensive the data tables, long-term job projections are at best educated guesses.

However, since they are "the only game in town," some of those analyses are worth reviewing. For example, the Congressional Research Service has summarized and interpreted the findings of Faye Duchin and Nobel-prized winner Wassily Leontief, which appeared in their study, "The Impacts of Automation on Employment, 1963-2000." ("The Computer Revolution and the U.S. Labor Force," a study prepared by the Congressional Research Service for the Use of the Subcommittee on Oversight and Investigations of the Committee on Energy and Commerce, U.S. House of Representatives," March, 1985)

The study is based upon the dynamic Input/Output model created by Leontief, Duchin, and Daniel Szyld, which is used to measure and calculate employment, output, and investment in 89 individual industries, over nearly 40 years, involving 53 different occupations.

Breaking the U.S. workforce into nine general categories, the CRS estimates that the fastest growing occupational group will be professionals, rising by 123.7% over the period from 1978 to 2000 and jumping from 15.6% of the U.S. workforce to 19.8%. Clerical work will grow only 12.6% over the same period, with clerical employees declining from 17.8% of the labor force to 11.4%.

Overall, the CRS finds that the capital costs of significant blue-collar automation are enormous. Largely for that reason, the study suggests that new technologies are unlikely to cause massive unemployment by the year 2000.

The Leontief-Duchin model does not provide the data necessary to test directly the hypothesis that the U.S. workforce is polarizing. However, by dividing studied occupations into three tiers, the CRS found that the shares of the U.S. workforce in upper and lower echelon occupations are likely to increase relative to the middle. The change, however, will not be dramatic.

### Share of U.S. Workforce

	1978	2000
Professionals, managers, proprietors, officials	25.1%	27.0%
Sales, clerical, & craft workers	37.7%	32.9%
Operatives, laborers, farm & service workers	36.2%	40.1%

While such a projection is somewhat useful, it is based upon static job classifications. Some of the most significant changes wrought by workforce technology have altered the wages and skill requirements within occupational categories. In fact, employers often mask changes in the structure of production by retaining old job titles.

The CRS study is a useful introduction to the input/output methodology, and its findings are by no means a cover-up. It concludes, "The bottom line of the Leontief-Duchin study seems to be an indication that the U.S. could have the required time to make adjustments found necessary in its human resource policies that affect the American labor force."

### A.E.A.

The Palo Alto-based American Electronics Association, with 2,800 member companies, is one of the leading voices for high-tech industry in the U.S. Under new leadership, the AEA is moving to strengthen its political influence. Dick Iverson, who recently left Gould to replace the retiring Ed Ferrey as head of the association, is based in Washington, D.C., although the organizational headquarters remains in Silicon Valley.

In addition, the AEA will establish a computer network to rapidly alert top executives at high-tech companies when they are needed to contact a member of Congress. (*San Jose Business Journal*, November 25, 1985)

Ironically, the AEA's success in fighting organized labor may be its biggest weakness in Washington. Other industries, such as textile and apparel manufacturing, rely upon the political clout of unions such as ACTWU and the ILGWU to win support from Democratic members of Congress for protectionist trade legislation. High-tech employers, on the other hand, have few natural allies on that side of the aisle.

## PAY COMPARISON

A driving force behind the international division of labor in high-tech production is the differential in wage rates among different countries. While averages do not tell the whole story, they do indicate the relative cost of carrying out labor-intensive production at various sites. From several sources, *Electronic News* (September 23, 1985) generated a chart comparing the average hourly compensation of production workers in numerous countries. It is interesting to note that these figures parallel, but are not always the same as, the comparison of seven countries published in the October, 1985 issue of *Global Electronics*, based upon data collected from the Bureau of Labor Statistics by the Communications Workers of America.

The following table shows the hourly compensation – wages plus benefits – in 21 countries. *Electronic News* points out that averages can be misleading: "There can be wide variations within a country. For instance, in Japan, women receive less than half the pay of men." *Electronic News* does not specify whether the figures are for all manufacturing or for electronics alone.

United States	US\$ 12.59
Canada	11.51
W. Germany	9.57
Belgium	8.87
Netherlands	8.60
France	7.43
Japan	6.35
United Kingdom	5.87
Ireland	5.46
Spain	4.68
Israel	4.22
Singapore	2.43
Mexico	1.70
Taiwan	1.70
Hong Kong	1.60
S. Korea	1.36
Brazil	1.23
Thailand	.88
India	.70-1.00
Malaysia	.50-1.00
Philippines (min. rate)	.39

## PUERTO RICO

Puerto Rico's Economic Development Administration has issued an updated report on "The Electrical and Electronics Industry in Puerto Rico" (October, 1985). The island has 136 electronics plants, with 11 more being established. Though the number of establishments has fallen slightly from 144 in 1980, employment rose from 18,024 in that year to 22,859 in 1984.

Most of Puerto Rico's electronics output is exported, and 90% of that goes to the United States. A variety of electronic components make up a majority of shipments, and consumer electronics equipment accounts for about one seventh of the total.

Puerto Rican wages in electronics production are lower than U.S. averages, but are subject to the U.S.

minimum wage standard, currently \$3.35 per hour. They rank well above rates in Third World "export platform" nations. For example, in Puerto Rico, electronics assemblers are paid from \$4.24 to \$5.55 per hour. Average hourly earnings - including skilled production work - in the industry are \$5.39 per hour plus an additional \$.85 in fringe benefits.

## FOOTLOOSE

Verbatim, a Silicon Valley-based manufacturer of diskettes for microcomputers, announced in October that it plans to shift most of its floppy disk production from Sunnyvale to its plants in Charlotte (North Carolina), Ireland, and Mexico. The company, which was purchased by Eastman Kodak earlier this year, is laying off 400 workers in the Valley. It plans no new hiring at its other three sites, but if expansion is called for, it will take place in Mexico. Like other Valley manufacturers, Verbatim is keeping its newer product lines – in this case, optical disks – back home. (San Jose Mercury News, October 26, 1985)

Texas Instruments, the largest U.S. firm in El Salvador, has finally decided to call it quits there. TI, which employed 900 workers in San Salvador, blamed the shutdown on the semiconductor industry slump, not political conditions.

In both cases, the business cycle acted to mask shifts in production. It is rare for a company to close a factory during a boom. It just establishes new capacity elsewhere. Then, when a market slowdown leads to surplus capacity, it shuts the plant in the less profitable or less stable location.

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## SRI LANKA & CARIBBEAN

The CPA firm of Coopers & Lybrand, apparently under contract to promote offshore assembly, has issued studies of production costs in both Sri Lanka and the English-speaking Caribbean, two areas which have had difficulty attracting investment from U.S.-based electronics firms. In Sri Lanka, hourly direct labor costs in electronics assembly average \$.519, based on wages of \$.191 per hour. Other costs of labor include training, vacations and holidays, and fringe benefits. Total costs of production, including management salaries, overhead, equipment depreciation, shipping, and the financial costs of carrying inventory, average \$6.273 per hour.

Based on a sample product requiring Sri Lankan labor of 45 minutes per piece, Coopers & Lybrand says that a Sri Lankan plant would save 71% on labor and overhead and 35% overall (calculating in \$17.50 of material per piece).

A similar analysis of a typical plant on the Caribbean island of St. Kitts reports average production wages of \$.5527 per hour, with direct labor costs totalling \$1.1629 per hour. However, with shipping costs and support for an expatriate managing director lower than for the Sri Lankan example, total production costs average \$4.4818 per hour.

Based upon a sample product requiring 5.06 minutes labor per piece, the St. Kitts plant would save 75% on labor and overhead, and 51% overall for a product containing \$.667 in materials per piece.

While these studies appear to be based upon relatively reliable cost data, the mix of employees, product costs, etc., are hypothetical. It is likely that the firm chose examples that would highlight cost savings for potential investors. ("Cost Profile of a Typical Electronics Assembly Plant in Sri Lanka" and "Cost Profile of a Typical Electronics/Electro-Mechanical Assembly Plant in the Caribbean")

## SUBCONTRACTORS

Not only are the countries of East Asia the major foreign centers of contract assembly for the U.S. electronics industry, but immigrants from Asia are taking a leading role in the domestic subcontracting sector. In Silicon Valley, several local job shops, including Solec-tron, Raytec, Altatron, and Lytek are run by executives from Taiwan and Hong Kong. In many contract plants, a large share of the workers are immigrants as well. For example, roughly three quarters of the 150 employees at Raytec are from Vietnam. (Peninsula Times Tribune, November 25, 1985).

## MOSTEK

American conglomerate United Technologies Corp., which shut down its chipmaking subsidiary, Mostek, in October, 1985, has unloaded Mostek's assets at a fire sale price. French electronics giant Thomson-CSF bought Mostek in November for \$71 million, a fraction of the \$345 million United Technologies invested to acquire the firm in 1980. Thomson has agreed to continue to funnel Mostek's technology to UTC's microelectronics research center for five years. For Thomson, the acquisition is a cheap, quick way to establish semiconductor production in the U.S.

Mostek, historically focused in the memory chip business, was losing money - \$325 million in the first nine months of 1985 - in that fiercely competitive segment of the semiconductor market. Thomson plans to halt memory production, while continuing research in that specialty, and it will concentrate instead on microprocessors and customized circuits.

Before the purchase of Mostek, Thomson was the world's 21st largest chip producer. Owned by the French government, Thomson is France's largest electronics enterprise. In November, teamed with GTE, Thomson won the largest Pentagon contract ever based upon non-U.S. technology. Thomson and GTE will build a \$4.3 billion battlefield communications network for the U.S. Army. (See *Fortune*, December 9, 1985)

The Mostek purchase poses a problem for the Austin-based MCC consortium. Mostek researchers are playing an important part in certain MCC research projects, but MCC does not accept foreign-owned companies as members.

## ATLAS SHRINKS

Hong Kong-based Atlas Industries, which grew rapidly as a subcontractor for American high-tech firms, has fallen upon hard times. It has closed five Hong Kong plants, laying off 1,600 workers, and its new, "showcase" disk-drive plant in Penang, Malaysia, is operating well below capacity. Several companies in the Atlas group are now in receivership, and hundreds of idled workers conducted a October 30, 1985 sit-in at the Hong Kong and Shanghai Banking Corporation - a leading creditor - demanding back pay and severance pay.

Like many other high-tech suppliers - Mostek, for example - Atlas was heavily dependent upon orders from IBM. IBM's cancellation of a US\$180 million disk drive contract was the major factor that led to the firm's downfall. (Far Eastern Economic Review, November 14, 1985)

## 32-BIT MICROPROCESSORS ARRIVE

The fourth generation of programmable logic chips, or microprocessors, has finally come of age. Though National Semiconductor introduced its first 32-bit entry two years ago, Intel, the leader of this segment of the integrated circuits market, did not unveil its 32-bit chip until this October. Meanwhile, other chipmakers – Fairchild and Inmos – have announced similar devices, and National has released upgraded versions of its 32-bit processor. (Earlier generations of microprocessors handled data 4, 8, and 16 binary bits at a time.)

The marketing of microprocessors, unlike computer memory chips, depends heavily upon subjective factors, such as the reputation of the manufacturer. For a microprocessor to sell, software writers must design software to run on it. (This includes microcomputer software.) Intel, which developed the chips around which the popular IBM PC and its clones are built, holds a reported 85% of the current \$289 million market for 16-bit microprocessors. (*Business Week*, October 28, 1985). With that record, it is likely to attract a flood of new software.

Equally important, Intel's designed its new 80386 to run software (including IBM PC programs) written for its 16-bit processors. In fact, that requirement is the major reason that it took Intel so long to bring it to market.

## GAS LEAK

Though local, state, and Federal laws have been enacted design to prevent further leakage of toxic liquids from manufacturers' underground storage tanks, little has been done to prevent the accidental discharge of hazardous gases. Unless standards are tightened, high-tech industry may experience its own Bhopal-type incident.

In November, 150 people were evacuated from shops, restaurants and motels near the Stanford Industrial Park, the birthplace of Silicon Valley, following a fire in a laboratory at Varian Associates. The fire released hazardous concentrations of hydrochloric acid vapor within the facility, but the toxic matter had disintegrated by the time the white cloud floated into the adjacent commercial district.

Palo Alto fire chief Robert Wall told the *Peninsula Times Tribune* (November 25, 1985) that acid levels within the lab were twice as high as the acceptable maximum, but that the safety-ventilation system processed the gases.

If the fire had damaged the safety system, however, the leak would have been much more serious.

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