



PUBLIC POLICY ADVISOR

Michigan's Future: The Need for Public Investment

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This paper examines public investment spending. Focusing primarily on physical infrastructure—including transportation and environmental facilities—the discussion also touches on two related issues: human capital, including programs that increase the skills and knowledge that people bring to their jobs, and intangible capital, such as research and development (R&D). Physical infrastructure includes highways, mass transit, railways, airports and airways, ports and harbors, water resources, and water supply and wastewater treatment plants. In 1987 these public facilities were valued at \$1.2 trillion compared with private nonresidential capital of \$4.1 trillion. Human capital programs include education, job training and employment services, social services such as Head Start, vocational and rehabilitation services, and food and nutrition assistance programs. R&D programs develop new products and processes—for example, new drugs or technology.

NATIONAL INVESTMENT TRENDS

Experts agree that investment is one of the principal sources of economic growth. Financed by the savings of households, businesses, governments, and foreigners, investment expands the stock of capital available for use in producing goods and services. With more capital generating more production, both income and the standard of living rise.

The productivity of private capital can be enhanced by public capital. For example, the usefulness of privately owned motor vehicles depends on networks of public roads and bridges, while private aircraft use public airports and air traffic control systems. Private ships and barges rely on the public locks and dams of the inland waterway system and on public port and harbor facilities, and agriculture and industry depend heavily on public facilities for water and treatment of waste by-products.

In another area, cost-benefit analysis of aviation spending suggests that increased public outlays to expand airport capacity yield substantial returns. The Federal Aviation Administration points to the need for such outlay, estimating that the cost of delays for passengers and carriers now approach \$5 billion annually. Furthermore, the U.S. House

Public Works and Transportation Committee has identified the following infrastructure shortcomings:

- Forty percent of the nation's bridges are substandard, and 28 million Americans are served by inadequate sewage-treatment plants.
- By the year 2000, 58 airports will be seriously congested, causing delays for 74 percent of passengers.
- By the year 2005, traffic delays because of inadequate roads may cost the nation \$50 billion annually in wasted fuel and lost wages.

Public capital also can reduce the amount of private input needed for a given level of output. More efficiently designed and better maintained roads reduce wear and tear on motor vehicles, reducing the cost of traveling on these roads. In addition, by cutting travel time, better roads lower the amount of labor required for shipping. Shorter and more certain shipping times allow companies to reduce inventory, resulting in lower carrying costs.

The economic benefits of investments in physical infrastructure are often oversold, however.



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While some recent studies have suggested that every dollar spent on public infrastructure yields a higher rate of return than does the same amount of private-sector investment in plant and equipment, a Congressional Budget Office (CBO) study indicates that there is little evidence that substantial, across-the-board increases in public infrastructure investment would be more productive on average than private investment. Carefully targeted investments, such as highways and aviation projects, however, can yield economic rates of return higher than the average return on private capital.

Generally, the highest economic benefits result from maintaining existing infrastructure and from expanding capacity in highly congested facilities. Substantial economic benefits also can be achieved by using existing assets more efficiently, such as using price mechanisms to allocate resources¹ (for example, charging a fee for the use of infrastructure, such as toll-road charges or fees for the use of harbor facilities).

¹ Congressional Budget Office, *How Federal Spending for Infrastructure and Other Public Investments Affects the Economy* (Washington, D.C.: Government Printing Office, July 1991), pp. 23-41.

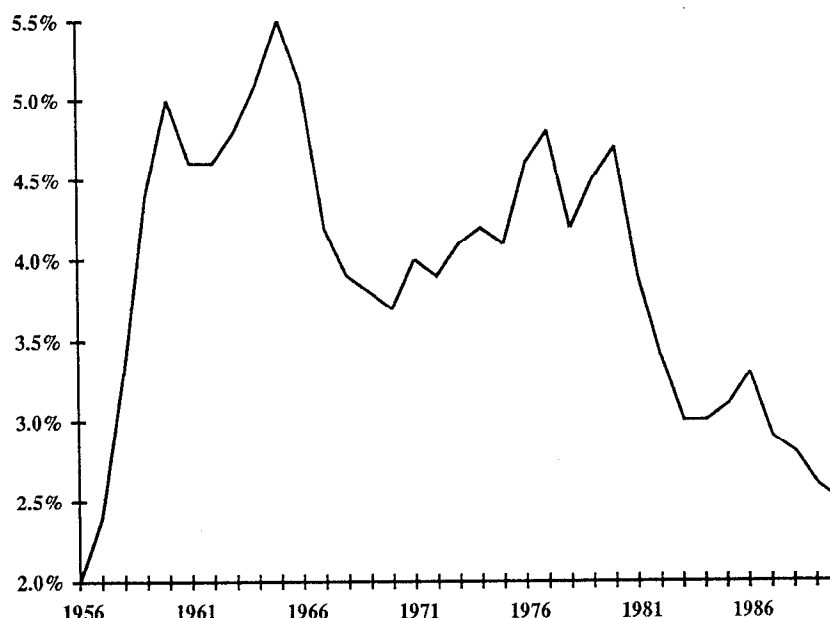
Federal investment policy has varied over the past 40 years. Adjusted for inflation, federal outlays for physical infrastructure rose rapidly from 1956 to 1965, rose again between 1970 and 1980, and fluctuated around a slight downward trend since 1980. Between 1956 and 1970, and again during the 1980s, fluctuation in federal highway outlays accounted for most of the changes in total federal investments (see Appendix). During the 1970s, the growth in investment was driven largely by support for mass transit and the construction of municipal wastewater treatment plants.

In 1990 federal infrastructure investments totaled \$26.2 billion, of which \$14 billion was for highways. Infrastructure investment peaked at 5.5 percent of total federal outlays in 1965. After falling to 3.7 percent in 1970, investment rose to 4.8 percent of total outlays in 1977, dipped slightly in 1978 and 1979, and then rose to 4.7 percent in 1980. Since that time infrastructure investment has declined steadily, reaching a 33-year low of 2.5 percent of federal outlays in 1990 (see Exhibit 1).

Federal investments in human capital (education, training, and employment and social services) rose from about \$3 billion in 1960 to \$24 billion in

EXHIBIT 1

Infrastructure Investment as a Percentage of All Federal Outlays



SOURCE: Data taken from Congressional Budget Office, *How Federal Spending for Infrastructure and Other Public Investments Affects the Economy*, July 1991.

1968 and peaked at \$52 billion in 1979 (adjusted for inflation); spending has fallen to \$38 billion in 1990.

Federal spending for R&D (adjusted for inflation) quadrupled between 1953 and 1967 then fell for the next eight years. Since 1976 R&D spending has increased at an annual rate of 3.6 percent. Much of the fluctuation in spending on this form of capital is explained by changes in outlays for defense-related R&D, which increased significantly during the 1960s and 1980s. Federal R&D spending in non-defense areas has grown steadily over the past ten years. In 1990 federal spending for R&D totaled \$67 billion—about 46 percent of all R&D spending in the United States. More than 60 percent of federal outlays for R&D go to defense-related activities.

MICHIGAN'S INFRASTRUCTURE NEEDS

The negative economic effects of a deteriorating infrastructure are real. Michigan communities are having problems providing basic utility services, such as clean drinking water and sewage disposal. A 1990 American Public Works Association, Michigan Chapter, survey of cities, villages, townships, county road associations, county departments of public works, and the Michigan Department of Transportation (MDOT) identifies the following problems that had developed in the previous five years:

- One of five communities' ability to provide/obtain adequate water service had been adversely affected.
- One in seven communities had a ban on new sewer construction, resulting in a temporary halt on new development and expansion of existing businesses.
- One of six communities' ability to provide/obtain adequate wastewater service had been adversely affected.
- Nearly two of five communities had to slow or halt development because of inadequate streets and roads.
- Nearly one of four communities feel that inadequate facilities had negatively affected its economic potential.

Overall, public works officials give the state's infrastructure low marks. Exhibit 2 shows a "report

card" that records the grade for each infrastructure category. Of those participating in the survey, 69 percent estimated the cost of making Michigan's infrastructure adequate. That cost totals \$15.9 billion, with transportation funding comprising 81 percent of that amount. The actual needs are much greater, however, since the survey respondents represent only 22 percent of the state's infrastructure population (i.e., those entities responsible for building infrastructure—cities, counties, road commissions, and so forth).

By almost any measure, Michigan ranks low in infrastructure investment. As shown in Exhibit 3, Michigan per capita expenditures in 1990 were only \$453, 31 percent below the national average, and 14th among the 15 major industrial states. This exhibit also shows that Michigan ranks 14th when infrastructure expenditures are measured as a percentage of personal income. Even more disturbing is that Michigan is falling further and further behind other states: As shown in Exhibit 4, Michigan per capita expenditures on infrastructure increased only 23.8 percent from 1980 to 1990, last among the 15 largest industrial states and far below the national increase of 83.8 percent. During the same period, in Michigan infrastructure expenditures as a percentage of total state-local expenditures declined from 17 percent to 15.3 percent. Michigan's expenditures for the past decade are shown in Exhibit 5. Note that Michigan infrastructure investment as a share of national spending is down from FY 1979–80, but has remained stable in recent years.

In addition, Michigan infrastructure expenditures fell from 4.2 percent of personal income in 1980 to 2.6 percent in 1990, the second lowest among the 15 industrial states. This drop is a major change from the 1970–80 period when Michigan per capita infrastructure expenditures increased 293.7 percent compared with a national increase of 244.8 percent (only four states did better) and rose from 2.3 percent to 4.1 percent of personal income. (The 1970–80 increase may be somewhat exaggerated for all states because of changes in the way data are reported; however, this does not change Michigan's relative performance.) It is clear that Michigan's neglect of infrastructure investment in the 1980s was due mainly to the state's budget problems and the national emphasis on consumption rather than investment.

EXHIBIT 2

Report Card on Michigan's Infrastructure

Subject	Grade	Successes/Recent Changes	Problems/Future Weakness
Water supply	B-	1986 Amendments to the Federal Safe Drinking Water Act (SDWA) and subsequent changes in state law and regulation are bringing changes to drinking water practices in the '90s. Supply has been adequate despite problems throughout the nation.	Implementation of SDWA amendments impact both small and large systems and could be expensive. Water distribution systems are in need of repair for many communities.
Wastewater	C+	State Revolving Loan (SRL) fund started in 1990 to help compensate for limited local resources and depleting federal funds. Concentrated efforts to treat and properly dispose of wastewater have been possible through large amounts of federal and state assistance.	Combined sewer overflows (CSO) continue to be a problem with a high dollar need. SRL cannot fulfill entire CSO and wastewater needs throughout the state.
Storm drainage	C-	Increased emphasis on water quality in addition to reducing peak discharge and runoff volume of a watershed. Recent USEPA storm water regulations will change, storm water management practices in the '90s.	Lateral storm drainage, ditches, and retention are in need of major improvements. Federal storm water permits will be burdensome to large communities and communities with industrial activities.
Transportation	C-	Transportation Economic Development Fund (TEDF) implemented in 1988. National Transportation Act under review; it appears that additional federal will be released.	Many roadways and bridges are aging and require major work. Primary road systems are failing faster than they can be repaired. Needs of most systems exceed available resources. National Transportation Act funding may increase local community match.
Solid waste	B-	Funding provided for recycling/composting and landfill closure through Proposal D, 1990.	No funding available for operating landfills or constructing new landfills. Recycling and composting can be more expensive than landfilling; communities must find money to maintain program.
Public buildings	C+	Headlee amendment required public vote to increase millage, a primary source of funding for public buildings.	Reliance on state funds as secondary source of funding. Nearly 1/4 of public works officials feel inadequate facilities negatively impact development. Difficult to obtain funding on regular basis for maintenance.
Public services	C+	Perceived increase in Michigan's public services during last seven years despite lack of funding.	Transportation, an area with considerable problems, is not viewed as improving in recent years.
State funding assistance	D	SRL and TEDF started in 1988, Recreation Bond Implementation Act & Proposal D passed in 1990.	Current levels are not adequate. Proposed cutbacks are sure to affect all areas of the infrastructure. Property tax freeze reduces revenues.

SOURCE: American Public Works Association, Michigan Chapter, 1991 *Infrastructure Survey*.

EXHIBIT 3

Infrastructure Investment in 15 States, 1990

State	Highways	Airports	Water Transportation	Sewers	Utilities	Transit Subsidies	Total	Population (thousands)	Personal Income	Per Capita Expenditures	Expenditures as Percentage of Personal Income
New York	\$4,796,385	\$716,850	\$241,467	\$1,465,481	\$9,669,421	\$97,105	\$16,986,709	17,990	\$378,273	\$944	4.5%
California	5,033,022	583,687	484,759	2,780,368	12,456,738	64,778	21,403,352	29,760	579,189	719	3.7
Minnesota	1,642,659	133,409	18,725	352,417	920,602	2,638	3,070,450	4,375	76,861	702	4.0
Florida	2,760,651	894,194	185,060	718,364	4,365,111	369	8,923,749	12,938	223,609	690	4.0
North Carolina	1,510,903	131,063	30,819	378,141	2,333,661	508	4,385,095	6,629	99,863	662	4.4
Texas	4,234,630	411,442	135,062	1,207,877	5,230,922	655	11,220,588	16,987	266,794	661	4.2
Massachusetts	986,728	146,903	68,843	620,883	2,122,402	0	3,945,759	6,016	131,118	656	3.0
Georgia	1,443,189	138,585	65,931	346,729	2,200,188	0	4,194,622	6,478	103,313	648	4.1
New Jersey	1,995,664	10,062	11,941	935,782	1,420,132	1,656	4,375,237	7,730	183,943	566	2.4
Illinois	3,019,645	393,350	10,891	845,513	1,952,148	10,575	6,232,122	11,431	219,448	545	2.8
Wisconsin	1,357,760	83,194	5,360	540,923	575,428	0	2,562,665	4,892	80,052	524	3.2
Pennsylvania	2,747,811	235,595	13,220	824,376	2,177,183	154	5,998,339	11,882	207,916	505	2.9
Indiana	1,048,422	81,059	6,321	367,401	992,684	19,403	2,515,290	5,544	88,251	454	2.9
Michigan	1,860,072	140,272	1,828	703,726	1,471,263	36,026	4,213,187	9,295	161,764	453	2.6
Ohio	2,138,420	102,804	4,691	868,876	1,654,327	0	4,769,118	10,847	178,583	440	2.7
United States	\$61,057,330	\$6,483,626	\$1,968,378	\$18,308,853	\$74,874,709	\$369,687	\$163,062,583	248,710	\$4,368,129	\$656	3.7%

SOURCE: U.S. Department of Commerce, Bureau of the Census, *Governmental Finances*, 1989-90. Calculations by Public Sector Consultants, Inc.

EXHIBIT 4

Public Infrastructure Investment, Michigan and Selected States,
FYs 1970, 1980, and 1990

State	Per Capita Expenditure			Percentage of Change		Percentage of Total Expenditures			Percentage of Personal Income		
	FY 1970	FY 1980	FY 1990	1980-90	1970-80	FY 1970	FY 1980	FY 1990	FY 1970	FY 1980	FY 1990
New Jersey	\$102	\$203	\$566	179.0%	99.5%	16.8%	10.7%	12.9%	2.4%	2.1%	2.4%
Massachusetts	86	245	656	167.6	184.7	12.7	11.1	10.8	2.2	2.6	3.0
New York	93	374	944	152.6	303.6	10.1	14.4	15.9	2.1	4.1	4.5
North Carolina	77	267	662	147.7	245.4	16.7	17.7	19.7	2.6	3.8	4.4
Pennsylvania	102	242	505	108.6	138.2	17.0	13.7	14.4	2.8	2.9	2.9
Florida	81	332	690	107.9	311.7	15.3	22.1	19.2	2.4	4.3	4.0
California	121	351	719	105.0	189.3	14.4	16.0	16.0	2.9	3.6	3.7
Indiana	82	251	454	80.8	207.5	15.8	17.8	15.0	2.2	3.0	2.9
Minnesota	135	402	702	74.6	197.6	18.6	18.9	15.9	3.8	4.6	4.0
Ohio	98	253	440	73.6	157.7	18.4	14.5	12.4	2.6	2.9	2.7
Texas	105	395	661	67.3	274.9	20.9	24.8	20.4	3.2	4.8	4.2
Illinois	83	334	545	63.4	303.9	13.7	18.2	15.9	1.9	3.5	2.8
Georgia	75	403	648	60.8	435.7	13.7	24.8	18.4	2.4	5.6	4.1
Wisconsin	114	329	524	59.0	189.4	16.4	16.6	14.1	3.3	3.9	3.2
MICHIGAN	93	366	453	23.8	293.7	13.5	17.0	15.3	2.3	4.1	2.6
United States	\$103	\$357	\$656	83.8%	244.8%	16.0%	18.7%	16.8%	2.8%	4.2%	3.7%

SOURCE: U.S. Department of Commerce, bureau of the Census, *Governmental Finances* selected issues. Calculations by Public Sector Consultants, Inc.

EXHIBIT 5

Michigan Public Infrastructure Expenditures,
FY 1979-80 to FY 1989-90 (dollars in millions)

Fiscal Year	Highways	Air Transportation	Water Transportation	Transit Subsidies	Sewerage	Utilities	Total	Percentage of Total U.S. Infrastructure Expenditures
1979-80	\$1,263.4	\$77.4	na	na	\$644.6	\$759.4	\$2,744.8	3.5%
1980-81	1,165.4	60.7	na	na	466.9	840.2	2,533.2	2.9
1981-82	1,079.4	67.6	na	na	556.0	905.3	2,608.3	2.8
1982-83	1,095.8	67.8	na	na	429.0	1,027.5	2,620.1	2.6
1983-84	1,284.6	51.7	na	na	495.9	1,408.4	3,240.6	3.0
1984-85	1,417.0	73.1	\$5.6	\$14.8	476.9	1,096.6	3,084.0	2.6
1985-86	1,581.4	85.0	5.9	17.9	579.8	1,206.3	3,476.3	2.6
1986-87	1,628.2	122.0	8.9	12.9	545.8	1,219.8	3,537.6	2.5
1987-88	1,725.3	131.6	11.2	24.9	568.6	1,297.9	3,759.5	2.6
1988-89	1,787.2	132.6	1.3	22.9	606.4	1,389.9	3,940.3	2.6
1989-90	1,860.1	140.3	1.8	36.0	703.7	1,471.3	4,213.2	2.6

SOURCE: U.S. Department of Commerce, *Governmental Finances*, selected issues.

na = not available

This lack of investment is of great concern because there appears to be a high correlation between certain kinds of infrastructure investment and economic growth. The House Fiscal Agency developed indices of relative infrastructure investment and relative economic welfare for 11 industrial states (based on 1978-89 data). See Exhibit 6.

Michigan ranked low in infrastructure investment and in economic performance. In contrast, New Jersey, which established one of the nation's first infrastructure banks, ranked high in both investment and in economic performance. An exception to the rule was Massachusetts, which ranked low in investment and high in economic growth. This lack of

EXHIBIT 6

Index of Infrastructure Investment Compared with Index of Economic Strength
Among 11 Industrial States

State	Infrastructure Rank	Economic Rank
New Jersey	High	High
New York	High	Moderate
Pennsylvania	Moderate	Moderate
Illinois	Moderate	Low
Indiana	Moderate	Low
Minnesota	Low	Moderate
Massachusetts	Low	High
California	Low	Moderate
Ohio	Low	Low
Michigan	Low	Low

SOURCE: House Fiscal Agency calculations from the U.S. Bureau of Census, *Governmental Finances*, 1991; and Wharton Econometrics, regional forecast tables, spring 1991.

investment may have finally caught up with Massachusetts, however; in the last four years its economic growth has been among the slowest in the nation.

Unless this policy of slighting investment is reversed, the national economy and the Michigan economy, in particular, are doomed to a number of years of continued slow economic growth. Fortunately, President Clinton appears to recognize this problem and has pledged to increase investment and reduce the federal deficit, which will free up savings that can be used for public and private investment. We also must reverse policy in Michigan and divert more resources into public investments, even if it means higher taxes.

THE NEED FOR PUBLIC INVESTMENT

Successful Investments

According to U.S. Secretary of Labor Robert Reich,

there is . . . a growing connection between the amount and kind of investments that the public sector undertakes and the capacity of the nation to attract worldwide capital. Herein lies the new logic of economic nationalism: The skills of a nation's work force and the quality of its infrastructure are what makes [*sic*] it unique, and uniquely attractive, in the world economy.²

In support of his ideas, Reich could easily point to Berea, Kentucky. Having failed to interest foreign investors in a tract of barren farmland intended for an industrial park, the city borrowed funds to lay sewer and water lines and extend natural gas and electricity to the site. They also induced the state to make road improvements. Within a year, two Japanese and several domestic firms bought sites on the property.

A similar experience occurred in Greenwood, South Carolina: A year after spending \$7 million on infrastructure improvements, notably water and sewer lines, the city successfully recruited the Fuji Company, whose investment at the site totaled some

\$65 million. Infrastructure investment appears to be a critical factor in these individual success stories.

Michigan's efforts to win the Mazda assembly plant in Flat Rock show how private growth results from public capital investment. State and federal funds totaling \$10.6 million were augmented by \$4 million from the Grand Trunk Western Railroad and another \$1 million from the Mazda Corporation. Together, they provided road and rail improvements and increased sewer capacity to the plant site. Today, approximately 3,500 people work there.

Dangers of a Remedial Focus

The Mazda cooperative venture was part of a larger effort, begun in 1983 by Gov. James Blanchard. The governor's program, "Rebuild Michigan," began with input from 60 representatives of private associations who worked with designees from departments of state government to catalog state infrastructure projects, develop a study identifying investment needs, and assign priorities to those needs as a guide for future spending. Among the initial priorities identified were highway repair, environmental cleanup, and prison construction and repair.

In 1986 nearly half of the infrastructure dollars of the Michigan Department of Natural Resources were designated for hazardous waste cleanup and remedial action at contaminated sites across the state. The cost of environmental contamination was even more dramatic in the Department of Agriculture: More than half of all department funds designated as infrastructure investment were used to remove PCB-contaminated silos in Michigan.

The largest state infrastructure program by far was in transportation, to which 40 percent of all state infrastructure resources were allocated between 1984 and 1986. Although the governor's report asserted that "Michigan has repaired more roads than have deteriorated into substandard condition" during those three years, recent data suggest that even this level of effort was inadequate.

According to a 1992 report by the Citizens Research Council of Michigan, the Federal Highway Administration considers 61 percent of the state's paved roads "deficient." The MDOT itself rated one-third of the state's bridges functionally obsolete

2 Robert B. Reich, *The Work of Nations* (New York: Alfred A. Knopf, 1991), p. 264.

or structurally deficient. The council reports that Michigan ranks 46th in per capita spending for highways and receives only 80 cents in federal funds for every dollar paid into the Federal Highway Trust Fund.³ In FY 1989-90 Michigan per capita state-local highway expenditures were \$200, about 19 percent below the national average of \$246 per capita.

One can argue, of course, that these remedial actions were necessary to correct the neglect of the past and to ready Michigan to face the future. But in focusing on the problems of the past, the infrastructure program of the 1980s did little to address Michigan's current economic problems. Since 1982, Michigan's per capita income has ranked below the national average, even as our unemploy-

ment rate consistently exceeds national levels (see exhibits 7 and 8). Poverty, especially among children, has risen dramatically since 1979 and now touches nearly one in four residents.

Michigan's previous investments brought little economic improvement, mainly because in many cases the wrong choices were made. Spending money on tax abatements and prison construction did little to increase productivity and stimulate long-term economic growth. Using these funds for education and job training likely would have produced better long-term results.

Tax abatements defer revenue gains, usually in the form of property taxes, in the hope that increased employment will generate additional economic activity in the form of consumer spending. Tax abatements, however, are also business-specific (that is, they apply to the one company that accepts the offer) and, as the problems of the General Motors Willow Run facility demonstrated, they do not guarantee that

3 Citizens Research Council of Michigan, *Highway Funding in Michigan*, Report #304 (Detroit: The Council, May 1992).

EXHIBIT 7

Michigan Per Capita Income as a Percentage of U.S. Per Capita Income, 1977-92

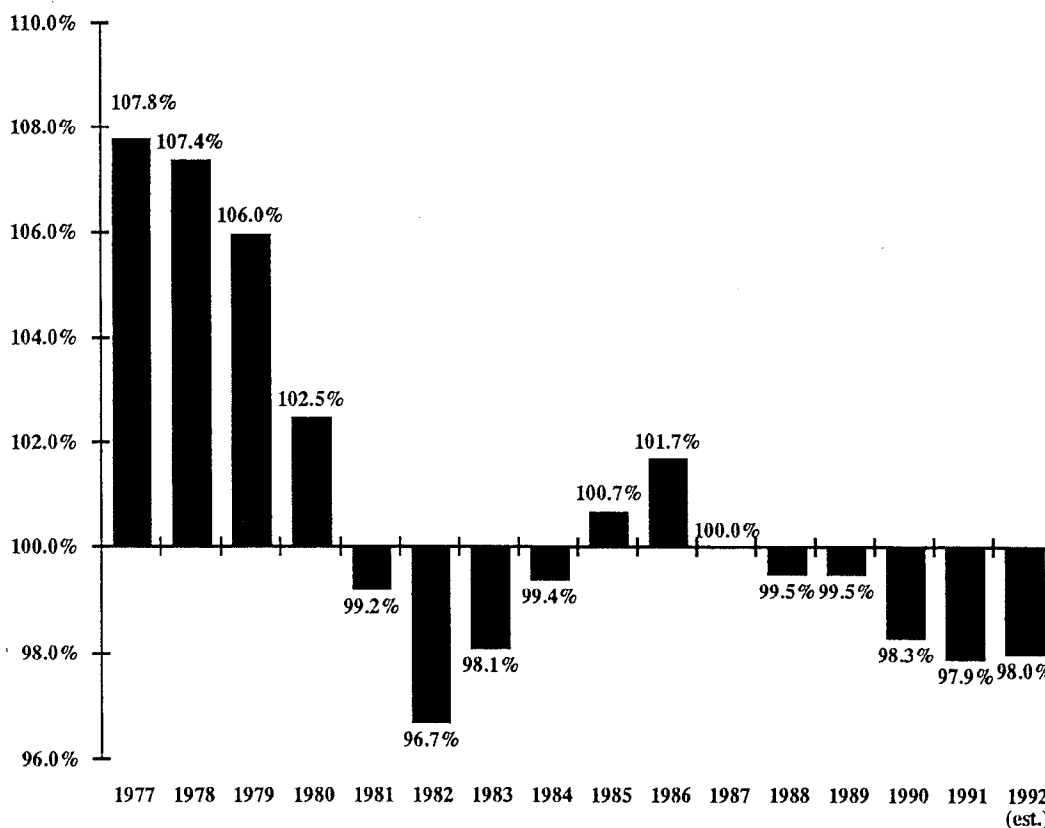
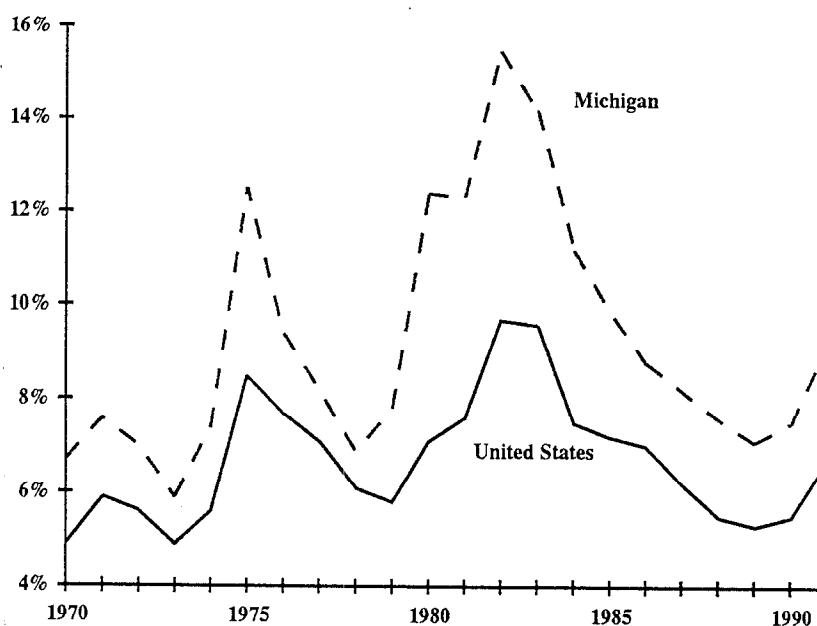


EXHIBIT 8

Michigan and U.S. Unemployment Rates, 1970-91



SOURCES: Michigan Employment Security Commission, special release; U.S. Department of Labor, Bureau of Labor Statistics, *Employment and Earnings*, Washington, D.C.: U.S. Government Printing Office, selected issues.

the company will remain in the community. Nor are tax abatements a sufficient inducement for new ventures: Despite a number of incentives, Michigan lost the bidding war among several states for the Saturn plant.

In contrast, infrastructure development benefits from one to hundreds of companies that may locate in a given area. New roads, harbor facilities, public transportation, and communications networks not only bring many markets within reach of the business site, they also expand the labor market by making transportation feasible for a larger pool of workers.

In effect, infrastructure development can improve the economy of several communities at the same time and, once in place, improvements serve as a lure for additional business development. Recent efforts to implement this long-recognized principle have been more symbolic than real, especially at the national level; however, the idea is commanding public attention once again.

Some Infrastructure Proposals

Congressman Robert Roe, chairman of the U.S. House Public Works and Transportation Committee,

has introduced a bill to fund local public works programs with \$10 billion in federal funds. In spring 1982, 100 economists called for a state and local assistance program that would cost some \$50 billion a year, while the U.S. Conference of Mayors has identified some 7,000 projects in 500 cities for which no funding was currently available. Infrastructure concerns have led many leaders to embrace "Rebuild America," a national investment program.

Infrastructure proposals are also receiving attention in Michigan. The House Democrats have proposed an ambitious infrastructure investment plan that includes the following:

- Expand transportation bonding from the governor's proposed \$200 million to at least \$1 billion. These funds would be for repairing roads and bridges, improving harbors and airports, and developing a high-speed rail corridor from Detroit to Chicago.
- Provide an additional \$1 billion in bonding for other improvements. These funds would be used for (a) special maintenance at colleges and universities (\$400 million) and community colleges (\$100 million), (b) and

for a number of other projects (\$500 million): an interactive communications network to connect all public education institutions; expanded solid waste and recycling technology and systems; a high-speed communication network; and improved sewer, drainage, and water systems.

- Ensure that reform school graduates have marketable skills.
- Improve and expand job training and adult education programs, including coordinating and retargeting current resources better.
- Create an ongoing business-labor-education partnership to improve workers' skills.

Funding would come from federal highway money plus revenue raised by revising the way in which current transportation revenue is collected and allocated.

This plan does not recommend a new revenue source, such as an increase in the gas tax. A tax increase of this kind, however, could be used to finance investment programs that could create thousands of jobs, encourage fuel conservation, and ensure that there would be no future burden on the state general fund that could divert resources from important areas, such as education.

The administration has its own infrastructure plan, beginning with Governor Engler's "Build Michigan" transportation package, which emphasizes rehabilitating roads and bridges and improving airport and public transportation facilities. The governor also has developed a low-interest loan program to help Michigan communities address the problem of combined sewer overflows by installing, expanding, or improving wastewater treatment facilities.

In addition, the governor has recently recommended that \$670 million be spent on higher education building projects and public protection projects for fiscal years 1993-94 and 1994-95. Funds would be allocated for at least one project at the 15 four-year universities and at 8 community colleges. Substantial funds would also be allocated to divide Jackson prison into four small prisons. These projects would be financed by increasing the State Building Authority (SBA) cap by \$600 million. The debt

service on the SBA bonds would be paid out of the state budget.

New Directions

All of these plans arise, at least in part, from the view that funding for capital construction has not kept pace with need, a view based on data comparing U.S. infrastructure investment with that of other countries. From this perspective, the United States lags far behind its international competitors. During the 1980s, France, Germany, Italy, Britain, Canada, and Japan spent a greater percentage of their gross domestic product on infrastructure than the United States did. Of the six other nations, Japan's percentage was the highest at 5.7, and Canada, with the second-lowest percentage, invested over 83 percent more than the United States. In contrast, U.S. infrastructure investment as a percentage of gross domestic product was a meager 0.3 percent in the 1980s.

The proposals proffered at both the federal and state levels look at the record and find it wanting. But many of the new proposals share a common thread: They propound an investment philosophy based on past needs and do not anticipate the dramatic changes likely to develop in the future.

The face of industry has changed, moving away from the traditional high-volume production of giant mills and factories to specialized, "high-value" goods and services, which are produced by small firms that develop and market specialty products. By cornering a strategic marketplace niche, such small firms do not rely on large-scale production for profit. Instead, they produce specialized goods and services tailored to a particular need. Their marketing challenge is defined not by how much they can produce but by how well they can unite a particular technology with a particular market.

In the global market, the focus is on the development of computer software, communications technology, "intelligent" highways (i.e., highways imbedded with computer-controlled devices that will aid the flow of traffic by making better use of existing roadways), and the specialized metals and materials of space-age alloys. The global enterprise of tomorrow will differ from the monolithic corporations of the 1940s and 1950s and it behave differently. Public decision makers will have to change today's strategies to attract tomorrow's businesses.

BUILDING FOR THE FUTURE

In this context, the current proposals must do more than react to immediate needs. The first step is to choose carefully *what* to build. Prison construction is an example of the failure to examine all alternatives and develop a long-term plan to maximize available resources. Since 1984 the state has built 20 new prisons and remodeled three additional prison facilities, costing approximately \$840 million. Although three prisons have not been opened yet, in 1992 the annual operating cost of the facilities in use was \$665 million, excluding the debt payment on the bonds that financed construction. These expenditures annually consume nearly 9 percent of the resources appropriated from the state's general fund, and the prisons are still overcrowded, because the demand has expanded to meet the supply.

Plans for funding infrastructure needs at state colleges and universities should incorporate the long-term view. Based in part on needs identified by the institutions themselves—including the need for dormitories, classrooms, and other buildings associated with the traditional college campus—current plans do not address the possibility that the traditional campus may not be the primary locus of higher education in the future. The education needs of future generations may be best served if students work at home computers, receiving lessons beamed from a central location by satellite, transmitting homework by modem or fax, and “talking” to instructors by electronic mail. Neither these students, nor the adults of the future who require advanced training in specialized technologies, will have this opportunity if we commit all of tomorrow's resources to repaying debts incurred today. Clearly, any national investment strategy must be tied to reducing the massive federal budget deficit.

The second step is to review *how* we build. For example, highways built as part of the federal interstate system are designed to last about 20 years, after which they require “major rehabilitation,” according to the CBO. In contrast, European roads are built to last 40 years or more—twice the life of American roads. More durable materials, such as polymer-modified binders, and the practice of requiring contractors to guarantee their work for a specified period make European roads ultimately less costly and less bothersome. Contrast this practice with the

American reliance on the lowest bidder: We are, it seems, getting exactly what we pay for.

There is another, perhaps more profound reason to consider the future before proceeding with infrastructure plans: The nature of work is changing and will continue to do so. Terms such as “transnational corporation” and “global economy” powerfully describe a different way of life, not simply a way of doing business. As the face of industry changes, therefore, work and residence patterns also will change, as indeed they are already, and infrastructure needs will change as well.

It is possible, for example, that in the year 2040, personal transportation to work will be unnecessary. Those who still commute to work may well use trains or buses or even some variety of “hovercraft” rather than automobiles, which may be reserved primarily for recreational trips. People may shop by telephone or interactive television, and goods may be delivered by a local equivalent of the United Parcel Service. Our present intricate highway system, consequently, may become obsolete.

As work is reorganized and relocated, it also will become dispersed, either directly to the home or to “office satellites” removed from large cities. Traffic congestion in large cities—Los Angeles, for example—may mean that cities are out of date already. In the near future people may work out of their homes more, using home computers and other technology to move the work instead of the people.

A global communications system already exists. Internet, the U.S.-funded R&D network, already serves three million users in 30 countries. Databases in London are now accessible to scientists in East Lansing, and when the federal government's ban on commercial use is withdrawn, the possibilities for expanding Internet's applications are virtually endless.

For infrastructure investment, therefore, we need to consider seriously (1) how work will be performed in the future, (2) where markets are and will be, and (3) what mechanisms can be used to link the two. Clearly, the communications links of the future will depend less on the highway and more on the fax machine, the teleconference call, and vast networks of satellite-linked computers.

Does this mean that we should shift from roads to other forms of infrastructure? Not necessarily. We must instead begin now to invest wisely, making our decisions in the context of the new economic nationalism. Not only must the form of infrastructure investment follow the function of the emerging business enterprise, investments must be made in programs that will produce highly skilled, technologically competent, problem-solving workers.

The determination to link infrastructure development to a renewable funding source is especially important. There is ample evidence, for example, that we can neither build our way out of traffic problems nor afford to commit resources to projects whose future expenditure demands will increasingly claim state resources without adding to the state's revenue flow. For example, by the year 2012, the operating costs for the current prison system will, even at modest inflation levels, exceed \$1.4 billion. The actual cost will likely be much higher if the planned growth in the system is realized.

We must ask ourselves, If building starts now, what will we have in 20 years? If the answer is then—as it is now—prisons that we can't open for lack of funds, crumbling highways, and a bonded indebtedness that diverts scarce resources from Michigan residents to Wall Street financiers, future generations will suffer.

Where Does the Money Come From?

Hindsight reveals that funding strategies have played a key part in thwarting the success of previous infrastructure plans and signals that those now under consideration are threatened. The federal "Rebuild America" program, for example, proposes to induce private investment by changing tax laws, including a form of savings bond designed to be sold in small denominations, presumably to individuals. This program also recommends creating a federal "infrastructure bond bank" and expanding the revolving loan fund available to the states. Both would require a federal appropriation and would increase the federal deficit.

At the state level the proposed plans will use the state's bonding authority to provide the initial impetus for state infrastructure expenditures. Governor Engler's plans also use federal transportation and EPA funds as a substantial portion of the overall

investment, with state resources providing the necessary "match." The plans do not identify the revenue source for repaying the bonds.

Other drawbacks of the proposed plans are (1) their uniform reliance on state funds both to repay principal and interest on the bonds and to provide the revenue needed to earn federal dollars, and (2) more important, their reliance on nonrenewable revenue sources—none of these plans will necessarily generate new capital by opening up new forms of commerce.

The issue here is not the use of the state's bonding authority to fund capital investment, an eminently practical approach. The failure of these plans to provide a supplemental source of revenue to support the endeavors, however, will add to Michigan's structural deficit for years to come. Committing state funds to support the debt on the bond obligations diverts scarce resources from state programs for the next 20 to 30 years: Like their federal counterparts, Michigan officials are proposing to mortgage the future to pay for today's needs.

Unlike the federal government, however, Michigan does not suffer from the problems of a huge deficit. In fiscal year 1989–90, interest on the state's general debt was only 0.7 percent of personal income, ranking Michigan 4th lowest among the states. In addition, interest rates are currently near historic lows and there is substantial unused capacity in the construction industry. All of these factors, combined with Michigan's weak economic performance, suggest that instituting an infrastructure bonding program now makes a lot of sense.

Even the transportation projects that do not rely on state general fund dollars create a future obligation. Governor Engler's "Build Michigan," for example, anticipates an increase in the user fees that finance road and bridge construction. It appears, however, that even substantial increases in the gasoline tax, for example, will generate funds that will be sufficient only for repaying the bond obligations and providing the state's share of the funds needed to match federal dollars, but that will not cover future maintenance needs.

Possible Solutions

How, then, should these programs be financed? Although the term *tax increase* is anathema to

politicians, it is less offensive to the voting public. If Thomas Jefferson was right in believing that an informed electorate will make the right decisions, then voters must be provided with

- a clear explanation of what is needed,
- an effective plan for meeting those needs,
- details of how the plan should be financed, and
- convincing evidence that, for the short term at least, the best payment plan is a tax increase.

There are a number of possible approaches to a tax-increase plan. A one-cent increase in the sales tax, for example, will generate over \$800 million per year. A 0.5 percent increase in the income tax will produce over \$600 million. Extending the sales tax to specified services will generate varying amounts, ranging from \$1.2 billion for all services to \$350 million for a number of services (including personal and repair services and amusements, but excluding most business, health, and educational services).

Over a ten-year period, expanding the sales tax to services could generate from \$3.5 billion to \$12 billion. By bonding now—when interest rates are low—Michigan could begin an effective infrastructure investment program designed for the future, which would allow the state to begin work on a number of important advances: (1) critical projects needed to attract investors to the state (like those in Berea and Greenwood); (2) developing schools that will keep pace with developments in the broader culture through a statewide communications network, such as Internet; and (3) preparing Michigan for the global market by developing regional transportation hubs serving the Midwest, Canada, and beyond and by expanding the state's airports and harbors. When finished, these projects would be

paid in full, because the principal and interest on the bonds as well as the infrastructure costs themselves would be paid from revenue generated for that purpose.

CONCLUSION

The federal and state proposals focus primarily on the need to stimulate present employment opportunities. Although this focus has a worthy goal, it is nevertheless shortsighted—not only because it focuses only on one sector of the labor force (i.e., the construction industry), but also because those jobs are not permanent additions to the work force. It is crucial to plan for the not-so-distant future when employment conditions will be different from those of today.

If infrastructure investment is to raise our nation's collective standard of living, investments in infrastructure projects must be carefully planned. Michigan's decision makers should consider the importance of (1) spending government dollars on infrastructure to stimulate private-sector investment and productivity, (2) evaluating technological, social, and economic changes to determine what kind of investments to make, and (3) embracing both domestic and international market needs by investing in human and intangible capital as well as physical infrastructure and advanced communication technology.

The key to investment strategies—particularly those for infrastructure—is to anticipate carefully and plan wisely. The quality of citizens' future lives depends on the quality of the investment plans made from now on.

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APPENDIX

TABLE 1. FEDERAL INFRASTRUCTURE INVESTMENT
(In billions of 1990 dollars)

Year	Highways	Transit	Sewage Treatment	Aviation	Water Programs	Rail	Total	Infrastructure Investment
								As a Percentage of All Federal Outlays
1956	3.5	a	a	0.1	2.3	a	6.0	2.0
1957	4.3	a	a	0.2	2.5	a	7.0	2.4
1958	6.8	a	0.1	0.4	3.1	a	10.4	3.3
1959	11.7	a	0.2	0.6	3.2	a	15.6	4.4
1960	13.2	a	0.2	0.7	3.3	a	17.3	5.0
1961	11.8	a	0.2	0.8	3.9	a	16.8	4.6
1962	12.5	a	0.2	0.8	4.4	a	17.9	4.6
1963	13.3	a	0.2	0.7	4.6	a	18.8	4.8
1964	15.8	a	0.3	0.6	4.6	a	21.4	5.1
1965	17.1	a	0.3	0.6	4.6	a	22.7	5.5
1966	16.5	0.1	0.3	0.8	4.9	a	22.6	5.1
1967	15.9	0.2	0.4	0.4	4.9	a	21.7	4.2
1968	15.9	0.3	0.5	0.5	4.6	a	21.8	3.9
1969	15.1	0.5	0.6	0.6	4.1	a	20.9	3.8
1970	14.6	0.4	0.7	0.6	3.6	a	20.0	3.7
1971	14.3	0.6	1.6	0.6	4.2	a	21.3	4.0
1972	13.5	0.8	1.3	0.9	4.5	a	21.0	3.9
1973	13.0	1.0	1.9	1.4	4.3	a	21.6	4.1
1974	11.0	1.2	4.0	1.1	4.6	0.1	22.1	4.2
1975	9.7	1.8	4.3	1.0	4.5	1.0	22.4	4.1
1976	12.5	1.9	5.3	0.9	4.7	1.5	26.8	4.6
1977	11.4	2.5	7.2	1.0	5.2	1.5	28.8	4.8
1978	10.2	2.3	6.0	1.4	5.2	1.3	26.3	4.2
1979	10.7	2.6	6.3	1.2	5.0	1.5	27.4	4.5
1980	12.2	2.7	6.5	1.2	5.1	1.6	29.4	4.7
1981	11.2	3.3	5.5	1.0	4.6	0.5	26.2	3.9
1982	9.6	3.2	5.2	0.8	4.5	0.7	24.0	3.4
1983	10.7	3.4	4.1	1.0	4.0	0.5	23.6	3.0
1984	12.4	3.7	3.5	1.2	4.0	a	24.4	3.0
1985	14.4	2.7	3.7	1.4	4.2	0.4	26.8	3.1
1986	15.4	3.0	3.8	1.8	5.0	0.1	29.2	3.3
1987	13.6	2.8	3.2	2.0	3.5	0.1	25.2	2.9
1988	14.5	2.5	2.6	2.0	3.9	a	25.5	2.8
1989	13.5	2.7	2.6	2.6	3.2	a	24.6	2.6
1990	14.0	3.1	2.6	2.7	3.7	a	26.2	2.5

SOURCE: Congressional Budget Office using data from the *Budget of the United States Government*, various years, and from unpublished Office of Management and Budget data.

a. Less than \$50 million.