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EDUCATION AND ECONOMIC GROWTH

by

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## EDUCATION AND ECONOMIC GROWTH

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## EDUCATION AND ECONOMIC GROWTH

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Education and economic growth are linked causally in much of U.S. economic history, notably since the Morrill Act of 1862 and the establishment of the land grant university system. The original purpose of this new educational system was the teaching of the mechanical arts to an agriculturally-dependent people, then starting the dramatic shift to an industrial age. Research to facilitate the teaching of the most-up-to-date methods of producing the newest crop and livestock products was conducted in the newly-established Agricultural Experiment Stations.

Some 25 years later the Agricultural Extension Service was organized to assist in the widespread dissemination of the research findings and to provide technical assistance to farmers on a one-on-one, as well as a group, basis. Thus, the direct linkage between higher education and economic growth was already perceived in the preparation and passing of the Morrill Act.

Subsequent events re-enforced the wisdom of this effort as U.S. agricultural output per worker increased dramatically and released unprecedented numbers of farm workers and young people from rural areas to growing urban places. Not until the 1950s, however, were attempts made to carefully document the magnitude of this linkage between education and economic growth and the increasing productivity of labor and capital in the U.S. economy.

Issues addressed in this paper focus on the documentation of the linkage between education and economic growth. First, the relation of education to individual earnings is anticipated in a factual presentation about the direct

expenditures of households and public educational institutions and the earnings of the employed work force. This is followed by a short review of human capital and economic growth accounting literature and its implications for the preparation and use of a state and local decision information system. Alternative approaches to investing in education are mentioned with attention given to the opportunity costs of education outlays and alternative resource deployment strategies for optimizing a given level of education spending. Finally, the role of education in the restructuring of rural and urban communities by reducing regional disparities in, and improving access to, information is cited.

#### Education Expenditures and Individual Earnings

Statistics on estimated outlays for education in the U.S.--kindergarten through grade 12 and post-graduate--are compiled periodically by the U.S. Department of Commerce for the National Income and Product Accounts (NIPA). Direct business expenditures for education are excluded from the NIPA. Thus, the total education expenditures presented here are about \$80 billion less than all education expenditures, including on-the-job and in-house training of U.S. businesses and, also, previously uncounted transfers from business to educational institutions. If direct purchases of private business were represented separately, along with direct purchases of public education, the total of all purchases would then exceed the GNP because of double counting.

#### Education Expenditures

The educational expenditure statistics from NIPA are summarized in current dollars for the 1976-1985 period in Table 1.1. These data show the level and distribution of the direct purchases of households and governments in the U.S.

For households, direct education purchases refers to that portion of the total cost of education paid directly by households. It does not include the

portion of the cost of education paid directly by business. For government, the three categories of education--post-secondary, elementary and secondary--account for their direct purchases of all goods and services utilized in providing public education. State and local governments account for the largest share--83 percent--of total direct expenditures for education.

Besides personal consumption expenditures and government purchases, the Gross National Product (GNP) includes direct expenditures for business capital formation and inventory changes with adjustment for net exports (i.e., exports less imports). Imports have exceeded exports by more than \$150 billion for the past three years, which has increased the relative importance of direct expenditures. For example, total personal consumption expenditures increased from 63.1 percent of GNP in 1976 to 65.6 percent of GNP in 1985.

Total direct expenditures are divided by total population to obtain direct expenditures per person in the U.S. for the 1976-85 period, as shown in Table 1.2. Total population grew at a one-percent annual rate during this period while inflation alone increased the cost of all personal consumption expenditures by 6.6 percent annually. By standardizing on population and adjusting for inflation, the annual rate of change in direct expenditures is made comparable from one year to the next.

Direct expenditures per person of households and government agencies in the U.S. increased from \$6649 in 1976 to \$14443 in 1985--an annual increase of nine percent for the entire period. When adjusted for inflation the annual increase is reduced to 2.3 percent. This compares with a 2.1 percent annual increase in real GNP.

Within the nine-year period, 1976 to 1985, sharp differences occurred between education and non-education expenditures and within the same

expenditure category from one sub-period to the next. For example, personal and state and local government direct expenditures for education dropped sharply from the 1976-80 recovery period to the 1980-82 recession period, but they more then regained lost ground in the 1982-85 recovery period.

Meanwhile, direct federal expenditures increased sharply from recovery to recession because of the escalation of income levels to higher tax brackets that greatly increased federal revenues. However, the high recession period increases were sustained only for national defense. Non-defense direct expenditure increases dropped from 6.9 percent to 1.0 percent from recession to recovery. The result of this apparant shift in national priorities has been a reduced rate of growth in state and local expenditures, including education. In addition, period-to-period changes in education expenditures reveal a high cyclical sensitivity because of the dependence of state governments on income and sales taxes. Many less cyclically sensitive consumer goods are excluded from the state sales tax.

Direct expenditures of households for private education and the direct expenditures of public education institutions in Minnesota are compared for the 1976-85 period in Table 1.3. The proportion of Gross State Product (GSP) accounted for by education and other final purchases is compared, also. These estimates generally show education-to-total direct expenditure relationships higher than those for the U.S.

The nine-year period in Minnesota from 1976 to 1985 is characterized by a doubling of the direct expenditures of state and local governments--from \$4.9 billion in 1976 to \$10 billion in 1985. During the same period, the direct expenditures of households more than doubled--increasing from \$18.6 billion, or 59.4 percent of GSP, to \$45.2 billion, or 66.2 percent of GSP. Direct expenditures of households for education and of educational institutions

increased from nearly \$2.5 billion , or 7.8 percent of GSP, to nearly \$4.8 billion, or 6.9 percent of GSP.

Direct expenditures per person for education and by public education institutions increased only slightly in real terms during the 1976-85 period, as shown in Table 1.4. In the trade-off between education and other public expenditures, Minnesota public education gained ground in the 1980-82 period, but lost ground to other expenditures in the 1976-80 period, the 1982-85 period, and the 1976-85 period as a whole. Direct expenditures per person in Minnesota nonetheless increased from \$625 in 1976 to \$787 in 1982 and \$1135 in 1985.

This brief statistical summary reveals a declining importance for education in U.S. household and government spending priorities. At the federal level, the 1980-82 increases were squeezed by sharply increasing military spending. At the state level, education expenditures have lagged behind overall personal spending, but so has growth in state and local spending. Yet, educational reform proposals count on increasing educational spending by \$20 billion to \$40 billion in the next 10 to 15 years (Kelly, 1986).

#### Individual Earnings

Earnings of the employed work force in the 1976-85 period are summarized for the U.S. and Minnesota to show trends in earnings per job that can be compared with corresponding trends in education expenditures. During the 1976-85 period, these earnings increased from \$11125 to \$18953 per job--a 70 percent increase. However, in constant 1985 dollars, the average earnings per job in 1976 was \$19690, or \$734 dollars greater than in 1985. Thus, the annual real change in earnings per job in the U.S. was a negative 0.4 percent. Total real earnings increased during this period only because of an increase

in total jobs.

Nine of the 14 industry groups listed in Table 1.5 experienced a negative annual real change in earnings per job, with only manufacturing, transportation, communications and utilities, federal civilian, and state and local workers experiencing a net increase. Much of the loss in real earnings occurred in the period of rising inflation, both in the 1976-80 recovery period and the 1980-82 recession period.

In the post-1982 recovery period, real earnings per job in the U.S. increased at a 0.6 percent annual rate. In this period, negative annual real change in average earnings occurred in only three industry groups--agricultural services, mining, and transportation, communications and utilities. During this period, also the inflation rate dropped to four percent and output per worker increased above its low levels in the 1970s.

Despite the decline in real earnings per job, real income per person in the U.S. increased at a 1.6 percent annual rate. This increase was the result of a sharp rise in property income and transfer payments, with both income sources increasing in the 1976-80 recovery period and the 1980-82 recession period.

Real earnings per job of the employed work force in Minnesota also increased during the 1976-85 period but at a 0.1 percent annual rate. Only six of the 14 industry groups--farm, agricultural services, construction, wholesale trade, retail trade, and finance, insurance and real estate--experienced negative annual rates, as shown in Table 1.6. This compares with nine groups experiencing negative growth rates in the U.S. For the entire nine-year period, the mining, private services, and federal civilian industry groups experienced net real growth because of above-average growth in the 1976-80 period (for mining and private services) or the 1980-82

period (for federal civilian).

Growth of real income per person in Minnesota occurred at a 2.2 percent annual rate during the 1976-85 period, which exceeded the corresponding U.S. figure of 1.6 percent. Transfer payments, coupled with above-average growth in real earnings, contributed to the above-average per capita income growth. The increase in transfer payments occurred because of (1) the above-average proportion of older people in the total Minnesota population receiving Social Security payments and (2) the depressed economic conditions in Greater Minnesota in its farming, manufacturing and mining industries that contributed to early retirement and/or increased dependence on welfare assistance.

The lingering effects of the 1980-82 recession period in Minnesota are being felt in lagging population and employment growth. The loss of population and employment shares, that is, the percentage of the U.S. population and employment totals accounted for by Minnesota population and employment, occurred in spite of above-average per capita income growth. This apparant anamoly is a result of a declining economic base in Greater Minnesota resulting in a net loss of jobs and an erosion of pre-recession earnings levels, particularly in manufacturing. Less than a third of the young people leaving Greater Minnesota enter the Metropolitan Region labor market. In-migration from the other states into the Metropolitan Region is not enough to make up for this large Greater Minnesota population loss that is the result of job losses in manufacturing and, to a lesser extent, agriculture-related businesses.

Lagging growth in Minnesota GSP is also attributed to job losses and earnings erosion during the 1980-82 recession period. Implicit in the lagging growth in GSP is a corresponding decline in the rate of growth in industry gross profits as measured by the "value-added-minus-payroll (VAMP)" statistic.

### Human Capital and Economic Growth Accounting

Scholarly work in estimating benefits of higher education realized by individual graduates of educational institutions based on human capital and economic growth accounting was initiated in 1960. "The central idea," as noted by Mincer in 1979, "is that human capacities are in large part acquired or developed through informal and formal education at home and at school, and through training, experience, and mobility in the labor market."

The human capital approach to the estimation of lifetime earnings--the sacrificing of current income for increased future earnings--was first used by Becker in 1960 and subsequently followed by Miller, 1960, Schultz, 1961, and Hanson, 1963. Becker, in a 1964 study, showed private rates of return for investment in four years of college of 12.4 percent to 14.8 percent. These rates were believed comparable to those in industry. Later studies showed somewhat lower rates of return, ranging from 9 percent to 14 percent for college and 2 percent to 8 percent for advanced degree work (Douglass, 1979). Essentially the same concepts and tools of economic analysis were then and are now being used in measuring returns to investment in education as are used in measuring returns to physical capital.

Schultz, in 1961, related the increase in real earnings between 1929 and 1957 to the increase in accumulated education outlays, adjusted for school year and other differences. Using three different rates of return (9 percent, 11 percent and 17.3 percent), Schultz derived the portion of the increase in real earnings (36 percent, 44 percent and 70 percent) attributed to the additional education. Schultz used rates of return from Becker (1960) and his own (Schultz, 1960) estimates. These estimates are controversial, despite their comparability with other estimates of the returns to physical capital.

Additional explanatory variables were introduced in increasingly

sophisticated studies to show the effects of institutional and family variables, as well as educational attainment, on individual earnings in the 1970s. The results of such studies prompted cries of too many rather than too few college graduates as Freeman, in 1978, and others, wrote about the "overeducated American". The concerns were abated by the mid-1980s, along with the fear of job-competitive and wage-reducing consequences of the "baby boomers" of the late 1940s, 1950s and early 1960s entering the labor market.

In the human capital approach, benefits accrue from the additional lifetime earnings and other tangible and intangible values attributed to additional education while costs accrue from the direct and immediate expenditures for the education and loss of earnings attributed to it. However, the results of studies with estimates of lifetime earnings inferred for each age cohort from cross-sectional data are strongly doubted as to their validity.

The intervening variables between lifetime values attributed to education and its direct and immediate expenditures (and income losses) are the specific technical and social competencies that add to the value-creating capacities of individuals. These variables are directly affected by the education inputs, including the duration and quality of the teaching effort and the classroom and community environment in which the teaching occurs. Vastly different levels and qualities of education inputs are supported by a given level of education expenditure. Lack of measurement tools to verify educational outcomes and of accountability in relating inputs to outcomes in the education process also results in wide variations in the productivity of education inputs. Even with adjustments for year-to-year and place-to-place differences in school year and other macro variables, the human capital approach faces continuing criticism over its findings because of neglect of individual and

community differences that profoundly affect the value and cost of a given level of teaching effort. Recent findings show, moreover, that differences in rates of return among occupations are very large, ranging from negative to large positive values of 20 percent or more (Eckaus, 1973). Thus, individual benefits from education could also vary greatly depending on career choice.

In addition, occupational employment levels vary because of the peculiar dynamics of local labor markets, particularly for new entrants into the labor force. Job vacancies increase in periods of economic expansion, with many vacancies being filled by inter-occupation mobility. This triggers a chain of new vacancies for new entrants. Timing thus becomes the essence of matching a job vacancy with a job seeker. Because much substitutability occurs among educated job seekers, a job vacancy may be filled by one of many different job seekers, each with a somewhat different educational background and level of investment in formal education.

The economic growth accounting approach introduced in the 1960s by Kendrick and Denison complements the human capital, or benefit-cost, approach in relating education to economic growth. Economic growth is attributed to (1) the use of more labor, (2) the use of more physical capital, (3) improvement in the productivity of labor, (4) improvement in physical capital, and (5) the more effective organization of these resources in production (Douglass, 1979). Education expenditures relate most closely to improvement in the productivity of labor. They relate also, but less directly, to improvements in the efficiency of physical capital use through research and development efforts. In one way or another, through improvements in the quality of labor and advancements in knowledge, education is believed to affect each of the five sources of economic growth. However, isolation of the direct effects of education on economic growth has proven to be a difficult, if not

an impossible, task to accomplish.

Kendrick (1979) and Denison (1980) analyzed education's contribution to economic growth along with other factors of production. Kendrick found that education and training accounted for 19 percent of annual economic growth between 1929 and 1948. By including advances in knowledge, the percentage of annual growth accounted for by these two inputs increased to 46 in the 1929-48 period, 67 in the 1973-78 period. Even larger percentages of yearly productivity growth attributed to education in the 1966-73 period and 1973-78 period--113 percent and 125 percent, respectively. Denison, on the other hand, found that education alone accounted for 16 percent of annual economic growth in the 1929-48 period. Together with advances in knowledge the percentage increased to 32 in the 1929-48 period and 41 in the 1948-73 period.

Because of controversial and conflicting findings, like those of Schultz, Kendrick and Denison cited earlier, studies on the contribution of education to economic growth offered few, if any, clear policy guidelines and recommendations. Additional studies have been commissioned in recent years to further explore the linkage of education to economic growth (National Institute of Education, 1981). The conclusion of one such study is that more research is needed and that the new research findings may still be only a beginning in determining needed data (Mansfield, 1982). None of the studies address the actual information needs of legislators and administrators engaged in the allocation of public revenues to education and other governmental functions.

#### Investing in Education for Economic Development

Despite the inconclusive findings about economic returns to investment in education, legislative bodies continue making important decisions on education outlays. These decisions invariably involve some examination of what is given

up in other sectors by increasing education outlays. If no credible linkage can be established between education expenditures and economic growth and well-being, a strong presumption exists to reduce education's share of total state and local government expenditures, especially in the face of competing pressures for additional tax revenues and particularly the categories of post-secondary education that show the lower rates of return.

Earlier discussion of U.S. and Minnesota trends in direct expenditures for education pointed to the reality of education's declining share of public and private expenditures. This reality suggests two tasks in building a decision information system for educational planning purposes, namely, estimation and assessment of the opportunity costs of each dollar of additional education expenditures and estimation and assessment of alternative research and teaching resource deployment strategies for given levels of education expenditures. The first task relates to the size of the education budget, the second to its internal allocation.

#### Opportunity Costs of Education Outlays

Estimation and assessment of the opportunity costs of education outlays is no less difficult a task than the estimation and measurement of the benefits and costs of investment in education. Indeed, the two tasks are much the same except for the essential difference in purpose. However, benefit-cost accounting based on the human capital approach still remains largely an academic exercise, which is not to demean its importance, but rather to sharply address its purpose. Benefit-cost accounting based on the opportunity cost approach starts with the design and use of an information system that depends on much of the methodological content of the human capital approach. Additional funding for education, for example, means less funding for private and/or other public purposes. Reducing private spending by increasing taxes

to support existing or new educational efforts results in a redistribution of income from tax payers to educators and from the beneficiaries of private capital formation to the beneficiaries of public investment in education.

How the income would have been used that is transferred from the private sector to the public sector is a question that is being, and can be, addressed on a recurring basis with the use of currently available measurement and assessment tools, at least as well as the estimation and assessment of lifetime earnings of individual beneficiaries of the income transfer. Comparable estimates are needed for these activities that represent alternative uses for the educational expenditures.

The monitoring of the overall effects of income transfers from the private to the public sector adds to the measurement difficulties cited earlier by requiring assessment of the various uses of income that are precluded because of its transfer. These difficulties are reduced to the extent that the income uses, including education, are compared at their respective margins and with reference to well-defined evaluation criteria. These include the contributions of the income transfers to employment, income and earnings in a state or regional economy and the incidence of these contributions on specific industries and sectors, much in the way that the regional effects of manufacturing plant closures and the replacement employment options are being addressed with input-output methods (Maki, et al, 1985).

The proposal of the Carnegie Forum on Education and the Economy to increase state and local education expenditures by \$20 to \$40 billion in 10 to 15 years is viewed as an integral part of its education reform proposals (Kelly, 1986). The proposed expenditures would be added to existing expenditure levels, which can be represented for the post-1985 period by sets of projections--one based on 1976-85 annual growth rates, the other based on

1982-85 annual growth rates.

If the 1976-85 growth rates in state and local education expenditures were extended to the year 2000, the U.S. expenditures would increase from \$251.7 billion in 1985 to \$291.7 billion (1985 dollars) in 2000, while the Minnesota expenditures would increase from \$4.090 billion in 1985 to \$4.422 billion in 2000, as shown in Table 1.7. The corresponding shares of GNP and GSP would drop from 5 percent to 4 percent for the U.S. and from 5.9 percent to 4.1 percent for Minnesota. On the other hand, if the 1982-85 growth rates were used, the year 2000 expenditure levels would reach \$355.3 billion and \$5.563 billion, respectively, with corresponding expenditure shares of 5.7 percent and 5.6 percent.

Additions of \$40 billion for the U.S. and \$0.872 billion for Minnesota (based on its 1985 share of total U.S. state and local education expenditures) to the year 2000 baseline projections yield corresponding expenditure shares of 4.6 percent for the U.S. and 5.3 percent for Minnesota, using the 1976-85 baseline rates. Using the 1982-85 baseline rates, the year 2000 expenditure growth shares would remain at 4.6 percent for the U.S. and drop by 0.1 percent to 5.2 percent for Minnesota. Neither assumption yields education expenditure shares larger in 2000 than in 1985 for either the U.S. and Minnesota.

In summary, the annual rates of increase in state and local education expenditures that are calculated for the 1976-85 and 1982-85 historical periods range from 0.5 percent to 3.9 percent. Attainment of the levels proposed by the Carnegie Forum would increase this range from 1.7 percent to 4.6 percent. None of these rates approach the growth in real earnings attributed to investment in education. Because the historical baselines from which these rates are calculated implicitly take into account some measure of

the opportunity costs of these expenditures, it is also likely that the calculated returns on investment in state and local government functions other than education are larger than the actual rates of increase in their annual expenditures.

The budgetary process in state and local government provides a framework for varying the level of education expenditures relative to other expenditures. According to a recent study, the level of state education expenditures is determined by its level the previous year, plus some share of the anticipated increase in state revenues, and plus or minus a negotiated increase or decrease in the base allocation (Johnson, 1985). Education expenditures are an increasing share of general fund revenues. Annual growth in state education expenditures has exceeded the annual growth in state revenues. A negotiated year-to-year increase in education expenditure share of total state revenues has accounted for its above-average funding. To the extent that these increases are linked to a quid pro quo of specific educational reforms for additional education expenditures, future increases would likely differ from the simple additions to the 1976-85 and 1982-85 baseline trends illustrated in this report.

The education expenditure share of any revenue increase or decrease is affected by the perceived contribution of education to state economic growth and development. Revised perceptions of the contribution of education to state and regional economic growth and vitality would depend, in turn, on an adequate documentation of this linkage and, also, on an understanding of opportunity costs as they relate to education expenditures.

#### Productivity Improving Budget Re-allocations

Estimation and assessment of the benefits and costs of re-allocating a given level of aggregate public spending on education is undoubtedly more

readily accomplished than the determination of the aggregate level itself. In this case, the essential task is one of eliminating all activities that do not meet previously negotiated objectives of teaching and research and then using the release time for high-priority activities that enhance the productivity of the teacher or researcher. Micro studies of the daily activities of each employee of an educational institution and the assessment of the skill and training requirements of these activities, the personnel available and their hourly rates, are readily documented. Studies based on these data show that a re-allocation of the daily and hourly responsibilities of the educator can sharply reduce the costs of education as well as improve productivity in the classroom and the office.

Beyond the immediate benefits of professional activity optimization are the improvements in productivity that can be achieved by careful and judicious determination of educational objectives in the classroom and the research laboratory or office. Each educational system--public and private, K-through-12 and post-secondary--has its own special mission and each decision unit of each system faces commensurate tests of accountability. For the public schools, specific competency tests for measuring student achievements at each grade level are available, but these, in turn, must relate to the skills and contributions of each teacher insofar as they make a difference in the acquisition of student/learner competencies. For the post-secondary educational institutions, the specific competency testing and documentation can provide a sharper focus than now exists on the acquisition and transfer of new knowledge.

#### Education and the Information Economy

Not clearly understood is the role of education in the economic restructuring of both rural and urban communities in the emerging information

economy. In Minnesota, this linkage is the focus of numerous discussions about the changing economy and the implications of these changes for the state's educational agenda in this decade and the next. Nor is this agenda isolated from the political repercussions of growing disparities in employment opportunities and income growth between the metropolitan core region and its rural periphery.

#### Reducing Regional Disparities

While the rural periphery in Minnesota (and in other developed countries) suffers from the adverse consequences of a declining share of the world's commodity markets, the metropolitan core region prospers from an expanding and increasingly demanding service economy. The expanding metropolitan economy is marked by a wide range and variety of professional and business as well as personal and retailing services.

For the service economy, the adverse impact of price competition on producers is lessened by product differentiation, with information being the most highly differentiated of the new products. The highest concentration of information-producing industry is in core metropolitan areas and here also is the highest concentration of high levels of personal and business income as well as the greatest variety of skills in the region's work force. This concentration of employment and income is fed by a corresponding migration of people from rural to the core metropolitan area. Rural counties face continuing population decline while those linked to metropolitan area industry are the destination of at least a portion of the rural migrants.

The transition to this new phase of the post-industrial economy raises broad policy concerns about the increasing disparities in access to information and economic opportunity between the core area and its rural periphery. These disparities are being addressed, in part, through income

redistribution, that is, the use of state taxes to assist lagging rural areas in supporting their local school systems. State financing of K-to-12 and post-secondary educational systems provides an important leverage whereby citizens acting through their state and local governments, can support the education of a skilled and productive work force in lagging rural areas and thus ensure the economic vitality and prosperity of both rural and metropolitan areas.

In 1980 total education outlays were \$385 per person for the Metropolitan Region and \$315 per person for Greater Minnesota--a \$70 difference. By 1985, the education outlays had increased to \$476 and \$472, respectively--to near equality--through fiscal sharing. This leverage has a price tag attached to it of \$250 million dollars a year which is likely to double in a few years (Table 1.8).

To reduce the burden of revenue transfer from the Metropolitan Region to Greater Minnesota, the emergence of new business development in rural Minnesota is essential. With wage rates a third or more below Metropolitan Region wage rates and site costs 25 percent or less of those in the Metropolitan Region, the potential for profitable business expansion in Greater Minnesota is large, provided that access to essential decision information for local entrepreneurs can be improved. Lack of access exists because of a lack, not only of critical business decision information, but of knowledge about the application of this information in developing credible business and market plans that can secure needed financing for new or expanding business ventures.

Earnings per worker are low in Greater Minnesota because investment per worker is low, which, in turn, is a manifestation of disproportionately difficult access to essential business information. Minnesota's

post-secondary institutions, particularly those in the Metropolitan Region, face a most important opportunity to improve productivity in the work place of Greater Minnesota and thus reduce the growing tax burden on the residents of the Metropolitan Region that eventually will erode support for post-secondary institutions throughout the state.

Without productivity improvement in the greater Minnesota work force, the prospect of a declining education expenditure share of GSP translates into reduced rates of education expenditure growth in both the Metropolitan Region and Greater Minnesota. Larger and larger income transfers from the Metropolitan Region to Greater Minnesota would gradually reduce the expenditure share of GSP for the Metropolitan Region while the increase in the Greater Minnesota expenditure share would be eroded by a lagging economic base. The increase in the Metropolitan Region revenue share to support its own income transfer to Greater Minnesota would eventually exceed the calculated increase in education expenditure share associated with the proposed \$40 billion addition to U.S. state and local education expenditures.

#### Improving Labor Market Information

A focus on education and economic development highlights the issue of labor market information and its linkage to educational institutions in a state or region. This linkage varies with the type of institution, being strongest for vocational schools and technical institutes.

Local labor markets, like many commodity markets, experience periods of tremendous volatility because of their internal interdependencies. As vacancies occur in local businesses, a vacancy chain is formed with the filling of the first vacancy, in that it creates a second vacancy in another occupation and in turn, other vacancies until one becomes available to the new entrant to the local labor force.

A pool of new entrants exists for any job vacancy that is characterized by a broad commonality of training and interests. The several pools of new entrants with broadly-defined skills represents a volatile but nonetheless predictable supply of labor from which employers draw to meet their skill requirements.

The monitoring of substate regional labor markets is a function of state labor departments and/or related agencies. The labor market information is related to state and national employment projections by industry and occupation that take into account the changing staffing patterns and production technologies of individual industries (Maki and Akhavipour, 1984). The conversion of occupational requirements into educational programs would be most difficult to accomplish except for the fact that educated job seekers within broadly-defined job/skill pools are readily substitutable. Thus, a wide range of educational programs qualify for the preparation of new entrants into each job/skill pool.

With industry restructuring, manufacturing has become increasingly dependent on services. At the same time industry staffing patterns are shifting more and more to the high-skill occupations with correspondingly high educational attainment options. Earlier concerns about the de-industrialization of some regional economies in the wake of their internationalization, especially the commodity-producing sectors, are being replaced by new concerns about impending labor shortages among certain high skill occupations. New challenges thus face K-to-12 and post-secondary educational systems in the preparation of their clients for the changing employment opportunities now provided by many regional labor markets.

#### Summary

Documentation of the linkage between education and economy remains a

continuing challenge for the academic and the practitioner. Firstly, estimates of returns on investment in education and of the importance of education as a factor in regional economic growth vary widely, depending upon the time span covered and the methodology used. Secondly, even if the estimates were widely accepted, which they are not, their applicability in choosing among alternative spending strategies in the governmental budgeting process is limited.

Governmental spending decisions invariably involve trade-offs between public and private uses of the total income of a region and between alternative public uses of a given governmental budget. In addition, the agency use of its legislatively determined allocation is subject to various levels of optimization depending upon the agency's own decision rules.

Documentation of the linkage between education and economic growth is thus a task barely begun in the context of public choice. Much needed work still remains undone in determining the benefits and costs of alternative uses of public revenues, including their prior use in the private sector.

In building the new research and action agendas for education and the economy, we learn much from each other. We learn about the purposes of education as viewed by education providers and their clients at each level of our educational delivery systems. We learn about the opportunity costs of investment in education, not only at each level of our educational delivery systems, but for all of our education. We also learn about "doing more with less" in each classroom, office and laboratory for we now address the issue of improving human and physical resource productivity with increasing budgetary constraints, not only as providers, but also as clients.

Productivity is multi-dimensional. It includes the three essential elements of efficiency, effectiveness and occupancy (Dahl, 1986). The

budgetary constraints impose a severe discipline for increasing output with the same or even reduced revenue base by improving the management of teaching, by eliminating outdated or redundant education activities, and by achieving a fullness of teaching effort in each working day.

The last bastion of low productivity of an expanding service economy is said by some to be our educational institutions. Part of the basis for that charge stems from the many expectations that have currency among those engaged in the organization and financing of our educational delivery systems.

Education is now linked with economic growth, not as an unanticipated benefit of some high purpose for education, but as intentional reward for the public support of it. For this reason, human capital and economic growth accounting and other academic approaches to the linking of education and economic growth call for re-examination in the context of public choices, which means in the context of the public budgeting process. In this context, the additional concerns of reducing regional disparities and improving labor market information became part of the research and action agendas now being proposed for education.

Rather than having expectations lessened for education, they are now, in fact, increased and, also, sharpened. At least educators need no longer usurp the roles of other service workers. If they succeed in ways that indeed contribute to economic growth by improving the productivity of human effort they probably will not have the time to serve also as caretakers or building custodians, important as these tasks may be.

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Table 1.1

Direct expenditures of households and governments in the U.S. continued to shift in the 1976-85 period from education to national defense and other personal consumption expenditures, thus reducing total education spending from 6.8 percent of GNP in 1976 to 6.1 percent in 1985. At the same time defense expenditures increased from 5 percent of GNP in 1976 to 6.5 percent in 1985 and other personal consumption expenditures increased from 62.1 percent of GNP in 1976 to 64.5 percent in 1985.

| Type of Direct Expenditure             | Total Direct Expenditure <sup>1/</sup> |          |          |          | Total Direct as Proportion of GNP |        |        |        |
|--|--|----------|----------|----------|-----------------------------------|--------|--------|--------|
|  | 1976                                   | 1980     | 1982     | 1985     | 1976                              | 1980   | 1982   | 1985   |
|  | (bil.\$)                               | (bil.\$) | (bil.\$) | (bil.\$) | (pct.)                            | (pct.) | (pct.) | (pct.) |
| Post-secondary education               | 29.9                                   | 43.5     | 51.4     | 65.5     | 1.7                               | 1.7    | 1.7    | 1.6    |
| Elementary and secondary <sup>2/</sup> | 77.5                                   | 109.9    | 1324.9   | 157.1    | 4.5                               | 4.2    | 4.1    | 3.9    |
| Other education services               | 9.4                                    | 13.6     | 15.5     | 22.3     | 0.6                               | 0.5    | 0.5    | 0.6    |
| Total education                        | 116.8                                  | 167.0    | 191.8    | 224.9    | 6.8                               | 6.3    | 6.3    | 6.1    |
| Other state and local                  | 134.3                                  | 201.5    | 232.7    | 264.5    | 7.8                               | 7.7    | 7.6    | 6.6    |
| National defense                       | 86.0                                   | 131.2    | 179.5    | 259.3    | 5.0                               | 5.0    | 5.9    | 6.5    |
| Other federal                          | 42.3                                   | 57.9     | 78.0     | 93.0     | 2.5                               | 2.2    | 2.5    | 2.3    |
| Other personal                         | 1067.1                                 | 1641.6   | 1953.3   | 2586.3   | 62.1                              | 62.4   | 63.6   | 64.5   |
| Total government and personal          | 1446.4                                 | 2199.3   | 2635.3   | 3448.0   | 84.2                              | 83.6   | 85.9   | 86.0   |
| State and local                        | 232.9                                  | 340.8    | 391.5    | 464.7    | 13.6                              | 13.0   | 12.8   | 11.6   |
| Federal                                | 129.2                                  | 190.4    | 258.9    | 353.9    | 7.5                               | 7.2    | 8.4    | 8.8    |
| Personal consumption                   | 1084.3                                 | 1668.1   | 1984.9   | 2629.4   | 63.1                              | 63.4   | 64.7   | 65.6   |
| Gross National Product                 | 1718.0                                 | 2631.7   | 3069.3   | 4010.3   | 100.0                             | 100.0  | 100.0  | 100.0  |

<sup>1/</sup> U.S. Department of Commerce, Survey of Current Business

<sup>2/</sup> Includes libraries and related education activities.

Table 1.2

Direct expenditures per person of households and governments in the U.S. grew from \$6649 in 1976 to \$9677 in 1980 and \$14443 in 1985, with annual increases in real terms of 1.6 percent and 2.9 percent, respectively. Direct expenditures per person for education increased from \$536 in 1976 to \$729 in 1980 and \$1026 in 1985--a decrease in real terms of -0.1 percent per year in the 1976-80 period and an increase of only 1.7 percent per year in the 1980-85 period.

| Type of Direct Expenditure             | Direct Expenditure per person <sup>1/</sup> |          |          | 1976-85 Annual Real Change |         |         |
|--|---|----------|----------|----------------------------|---------|---------|
|  | 1976  | 1980     | 1982     | 1985                       | 1976-85 | 1976-85 |
|  | (dol.\$)                                    | (dol.\$) | (dol.\$) | (dol.\$)                   | (pct.)  | (pct.)  |
| Post-secondary education               | 137   | 192      | 222      | 274                        | 1.4     | 0.6     |
| Elementary and secondary               | 356   | 483      | 538      | 657                        | 0.5     | -0.2    |
| Other education services <sup>2/</sup> | 43  | 60       | 67       | 95                         | 2.5     | -0.2    |
| Total education                        | 536   | 729      | 827      | 1026                       | 0.9     | 0.5     |
| Other state and local                  | 618   | 886      | 1003     | 1109                       | 0.2     | 0.1     |
| National defense                       | 395   | 577      | 774      | 1086                       | 5.0     | 1.2     |
| Other federal                          | 795   | 255      | 336      | 389                        | 1.3     | 1.7     |
| Other personal consumption             | 4905  | 7224     | 8420     | 10833                      | 2.5     | 1.1     |
| Total government and personal          | 6649  | 9677     | 11360    | 14443                      | 2.3     | 1.9     |
|  |   |          |          |                            |         | 1.6     |
| State and local                        | 1071  | 1499     | 1688     | 1947                       | 0.3     | 0.6     |
| Federal                                | 594   | 838      | 1116     | 1482                       | 3.9     | -1.1    |
| Personal consumption                   | 4984  | 7340     | 8556     | 11014                      | 2.5     | 0.8     |
|  |   |          |          |                            |         | 1.9     |
| Gross National Product                 | 7897  | 11580    | 13201    | 16798                      | 2.1     | 0.6     |
|  |   |          |          |                            |         | -0.5    |
|  |   |          |          |                            |         | 4.2     |

<sup>1/</sup> U.S. Department of Commerce, Survey of Current Business

<sup>2/</sup> Includes libraries and related education activities.

Table 1.3

Direct expenditures of households and governments in Minnesota grew from \$26.8 billion in 1976 to \$40 billion in 1980, \$48.4 billion in 1982 and \$62.1 billion in 1985. They increased, also, as a proportion of total GSP from 85.5 percent in 1976 to 90.1 percent in 1985 while education expenditures had declined from the 1976 peak level of 7 percent of GSP reached in 1976.

| Type of Direct Expenditure   | Total Direct Expenditure <sup>1/</sup> |                  |                  | Total Direct as Proportion of GSP |                |                |
|------------------------------|--|------------------|------------------|-----------------------------------|----------------|----------------|
|                              | 1976<br>(mil.\$)                       | 1980<br>(mil.\$) | 1982<br>(mil.\$) | 1985<br>(mil.\$)                  | 1976<br>(pct.) | 1982<br>(pct.) |
| Government and personal:     |  |                  |                  |                                   |                |                |
| Post-secondary               | 635                                    | 787              | 935              | 1132                              | 2.0            | 1.6            |
| Elementary and secondary     | 1672                                   | 2220             | 2717             | 3250                              | 5.3            | 4.5            |
| Other education and research | 161                                    | 209              | 253              | 377                               | 0.5            | 0.4            |
| Total education              | 2469                                   | 3216             | 3906             | 4759                              | 7.8            | 6.5            |
| Other state and local        | 2719                                   | 4196             | 5312             | 5904                              | 8.7            | 8.5            |
| Federal                      | 816                                    | 1203             | 1636             | 2236                              | 2.6            | 2.4            |
| Other personal               | 18364                                  | 28252            | 33617            | 44503                             | 58.5           | 59.2           |
| Total                        | 26836                                  | 40083            | 48376            | 62162                             | 85.5           | 81.2           |
| Education purchases:         |  |                  |                  |                                   |                |                |
| State and local              | 2205                                   | 2810             | 3422             | 4090                              | 7.0            | 5.7            |
| Personal consumption         | 264                                    | 406              | 484              | 670                               | 0.8            | 0.8            |
| All purchases:               |  |                  |                  |                                   |                |                |
| State and local              | 4924                                   | 7006             | 8734             | 9994                              | 15.7           | 14.2           |
| Personal consumption         | 18628                                  | 28657            | 34101            | 45173                             | 59.4           | 58.1           |
| Gross State Product          | 31370                                  | 49364            | 54760            | 69069                             | 100.0          | 100.0          |

1/ Based on MN-to-US ratios derived from annual reports of the Census, Government Finances, 1975-76, 1979-80, 1981-82, and 1984-85, and selected monthly issues of U.S. Department of Commerce, Survey of Current Business.

2/ Includes libraries and related education activities.

Table 1.4

Direct expenditures per person for education and by public educational institutions in Minnesota increased from \$625 in 1976 to \$787 in 1980--a real decrease of 2 percent per year. These expenditures gradually increased to \$940 in 1980 and \$1135 in 1985 at annual rates of 2.1 percent and 2.7 percent, respectively. At same time, annual increases in overall state and local government dropped from 3.4 percent to 0.1 percent.

| Type of Direct Expenditure      | Direct Expenditure Per Person 1/ |                |                | Annual Real Change |                   |                   |
|---------------------------------|----------------------------------|----------------|----------------|--------------------|-------------------|-------------------|
|                                 | 1976<br>(dol.)                   | 1980<br>(dol.) | 1982<br>(dol.) | 1985<br>(dol.)     | 1976-85<br>(pct.) | 1980-82<br>(pct.) |
| Government and personal:        |                                  |                |                |                    |                   |                   |
| Post-secondary                  | 161                              | 193            | 226            | 270                | -0.6              | 0.8               |
| Elementary and secondary        | 423                              | 543            | 658            | 775                | 0.4               | 2.6               |
| Other education and research 2/ | 41                               | 51             | 61             | 90                 | 2.4               | 1.9               |
| Total education                 | 625                              | 787            | 945            | 1135               | 0.3               | 2.1               |
| Other state and local           | 687                              | 1027           | 1285           | 1408               | 2.1               | 4.2               |
| Federal government              | 2067                             | 2942           | 3964           | 5337               | 4.3               | 8.2               |
| Other personal                  | 4641                             | 7140           | 8134           | 10614              | 2.9               | -0.6              |
| Total                           | 6783                             | 9812           | 11706          | 14932              | 2.5               | 1.8               |
| Education purchases:            |                                  |                |                |                    |                   |                   |
| State and local                 | 557                              | 688            | 828            | 975                | 0.1               | 9.7               |
| Personal consumption            | 67                               | 99             | 117            | 160                | 3.4               | 1.3               |
| All purchases:                  |                                  |                |                |                    |                   |                   |
| State and local                 | 1244                             | 1715           | 2114           | 2383               | 0.9               | 3.4               |
| Personal consumption            | 4708                             | 7015           | 8252           | 10773              | 2.9               | 1.0               |
| Gross State Product             | 7929                             | 12084          | 13251          | 16472              | 1.8               | -2.4              |
| Income Deflator                 | .635                             | .868           | 1.000          | 1.124              | 6.6               | 7.3               |

1/ Based on MN-to-US ratios derived from annual reports of the Census, Government Finances, 1975-76, 1979-80, 1981-82, and 1984-85, and selected monthly issues of U.S. Department of Commerce, Survey of Current Business.

2/ Includes libraries and related education activities.

Table 1.5.

Average real earnings per job in the U.S. declined from \$19690 in 1976 (in 1985 dollars) to \$18956 in 1985, although real income per person rose from \$11765 in 1976 (in 1985 dollars) to \$13552 in 1985. Positive real earnings growth occurred only in the 1982-85 recovery period for a majority of industry groups.

| No. Industry                       | 1/ In 1985\$   |                | Annual real change |                   |                   |                   |      |
|------------------------------------|----------------|----------------|--------------------|-------------------|-------------------|-------------------|------|
|                                    | 1976<br>(dol.) | 1985<br>(dol.) | 1976-85<br>(pct.)  | 1987-80<br>(pct.) | 1980-82<br>(pct.) | 1982-85<br>(pct.) |      |
| 1 Total personal income <u>2/</u>  | 6647           | 11765          | 13552              | 1.6               | 1.9               | -0                | 2.3  |
| 2 Nonfarm income                   | 6524           | 11547          | 13881              | 1.7               | 2.0               | -0                | 2.4  |
| 3 Farm income                      | 123            | 218            | 170                | -2.7              | -3.8              | 1.8               | -4.2 |
| 4 Population (hundreds)            | 2175540        | 2175540        | 2387400            | 1.0               | 1.1               | 1.0               | 1.0  |
| 5 Employment (hundreds)            | 998696         | 998696         | 1233099            | 2.4               | 3.0               | 0.2               | 3.0  |
| 6 Total earn. by workpla <u>3/</u> | 11125          | 19690          | 18956              | -4                | -8                | -1.2              | .6   |
| 7 Less: pers. contributions        | 553            | 979            | 1213               | 2.4               | 1.0               | 4.6               | 2.9  |
| 8 Plus: residence adjustment       | -4             | 07             | -5                 | -3.8              | -7.5              | 4.1               | -3.8 |
| 9 Equals: net resi. earn <u>2/</u> | 4851           | 8586           | 9162               | .7                | 1.0               | -2.3              | 2.5  |
| 10 Plus: div., int., rent          | 826            | 1462           | 2347               | 5.4               | 6.6               | 7.1               | 2.7  |
| 11 Plus: transfer payments         | 970            | 1717           | 2043               | 2.0               | 1.9               | 3.6               | .9   |
| 12 Wages and salaries <u>3/</u>    | 10253          | 18147          | 18733              | .4                | -1                | .6                | .8   |
| 13 Other labor income              | 908            | 1607           | 1877               | 1.7               | 3.3               | 1.7               | -3   |
| 14 Proprietors' income, total      | 10878          | 19253          | 13651              | -3.7              | -4.5              | -12.4             | 3.6  |
| 15 Farm proprietors                | 7783           | 13775          | 11212              | -2.3              | -7.3              | -1.8              | 4.6  |
| 16 Nonfarm proprietors             | 11664          | 20644          | 14023              | -4.2              | -4.4              | -14.0             | 3.2  |
| 17 Farm income, total              | 6737           | 11924          | 10494              | -1.4              | -5.5              | .2                | 3.1  |
| 18 Nonfarm, income, total          | 14801          | 26196          | 26693              | .2                | .0                | .8                | .1   |
| 19 Private income                  | 11233          | 19881          | 18760              | -6                | -8                | -1.8              | .4   |
| 20 Agricultural services           | 8395           | 14858          | 9460               | -4.9              | -3.4              | -12.0             | -1.9 |
| 21 Mining                          | 19635          | 34752          | 31615              | -1.0              | 1.1               | -2.6              | -2.8 |
| 22 Construction                    | 15031          | 26604          | 23663              | -1.3              | -7                | -2.8              | -1.1 |
| 23 Manufacturing, total            | 14103          | 24970          | 27036              | .9                | .9                | .3                | 1.3  |
| 24 Nondurable goods                | 12533          | 22182          | 24061              | .9                | .8                | 1.1               | .8   |
| 25 Durable goods                   | 15227          | 26950          | 29055              | .8                | .8                | .0                | 1.5  |
| 26 Trans., comm., utilities        | 16648          | 29465          | 29515              | .0                | -1                | .5                | -2   |
| 27 Wholesale trade                 | 14422          | 25526          | 25000              | -2                | .3                | -2.0              | .2   |
| 28 Retail trade                    | 7525           | 13319          | 11667              | -1.5              | -2.3              | -2.5              | .4   |
| 29 Fin., ins., real state          | 10438          | 18474          | 17482              | -6                | -2.4              | -3.5              | 3.9  |
| 30 Private services                | 9234           | 16343          | 14943              | -1.0              | -2.0              | -1.5              | .7   |
| 31 Government, total               | 10628          | 18811          | 20019              | .7                | -8                | 2.1               | 1.7  |
| 32 Federal, civilian               | 15686          | 27763          | 27680              | -0                | -1.3              | 1.2               | .8   |
| 33 Federal, military               | 7496           | 13267          | 14329              | .9                | -1.3              | 4.8               | 1.1  |
| 34 State and local                 | 10089          | 17857          | 19427              | .9                | -6                | 2.3               | 2.1  |
| 35 GNP (per person)                | 7897           | 14995          | 16798              | 2.1               | 1.8               | -0.5              | 4.2  |
| 36 GNP (per job)                   | 17203          | 30353          | 32526              | 0.7               | 0.0               | 0.3               | 2.1  |

1/ Based on U.S. Department of Commerce, Regional Economic Information System, Unpublished reports.

2/ Total personal income and components divided by total population.

3/ Total earnings and components divided by total (job count) employment.

Table 1.6.

Growth in real earnings per job in Minnesota generally followed U.S. trends in the 1976-80 period, with principal exceptions in mining and private services. This growth, together with above-average growth in transfer payments, resulted in above-average growth in per capita income. However, growth in Minnesota's Gross State Product failed to keep pace with growth in U.S. Gross National Product, whether measured on a per person or per job basis.

| No. Industry                  | In 1985 |         | Annual real change |         |         |      |
|-------------------------------|---------|---------|--------------------|---------|---------|------|
|                               | 1976 1/ | 1985 1/ | 1976-85            | 1980-82 | 1982-85 |      |
|                               | (dol.)  | (dol.)  | (pct.)             | (pct.)  | (pct.)  |      |
| 1 Total personal income 2/    | 6590    | 11664   | 14157              | 2.2     | 2.9     | 2.9  |
| 2 Nonfarm income              | 6383    | 11297   | 13362              | 2.3     | 3.0     | 2.8  |
| 3 Farm income                 | 207     | 366     | 295                | -2.4    | 1.3     | 5.4  |
| 4 Population (number)         | 3957000 | 3957000 | 4193100            | .6      | .8      | .5   |
| 5 Employment (number)         | 1939443 | 1939443 | 2371292            | 2.3     | 3.3     | 3.3  |
| 6 Total earn. by workpla 3/   | 10458   | 18510   | 18735              | .1      | .3      | .7   |
| 7 Less: pers. contributions   | 550     | 975     | 1305               | 3.3     | 2.7     | 2.7  |
| 8 Plus: residence adjustment  | -24     | -42     | -100               | 10.0    | 13.8    | 18.1 |
| 9 Equals: net resi. earn 2/   | 4855    | 8593    | 9801               | 1.5     | 2.5     | 3.3  |
| 10 Plus: div., int., rent     | 848     | 1501    | 2405               | 5.4     | 5.9     | 9.1  |
| 11 Plus: transfer payments    | 886     | 1568    | 1952               | 2.5     | 1.9     | 5.1  |
| 12 Wages and salaries 3/      | 9872    | 17473   | 18265              | .5      | .1      | .6   |
| 13 Other labor income         | 888     | 1572    | 1843               | 1.8     | 3.7     | 1.6  |
| 14 Proprietors' income, total | 8977    | 15888   | 11584              | -3.4    | -2.7    | 4.5  |
| 15 Farm proprietors           | 5835    | 10327   | 9598               | -8      | 3.8     | 10.6 |
| 16 Nonfarm proprietors        | 10661   | 18869   | 12247              | -4.7    | -5.3    | 2.4  |
| 17 Farm income, total         | 5514    | 9759    | 9166               | -7      | 3.9     | 5.3  |
| 18 Nonfarm, income, total     | 14104   | 24963   | 25990              | .4      | .1      | -1   |
| 19 Private income             | 10496   | 18577   | 18542              | -0      | .4      | .7   |
| 20 Agricultural services      | 9356    | 16559   | 10071              | -5.4    | -4.4    | -3.6 |
| 21 Mining                     | 18983   | 33598   | 37433              | 1.2     | 5.6     | -2.4 |
| 22 Construction               | 15819   | 27998   | 24661              | -1.4    | -8      | -1   |
| 23 Manufacturing, total       | 14402   | 25490   | 27487              | .8      | .3      | .6   |
| 24 Nondurable goods           | 14314   | 25335   | 26371              | .4      | .1      | 2.4  |
| 25 Durable goods              | 14466   | 25604   | 28223              | 1.1     | .4      | 2.2  |
| 26 Trans., comm., utilities   | 16697   | 29552   | 29815              | .1      | .0      | -1   |
| 27 Wholesale trade            | 15332   | 27136   | 26450              | -3      | .0      | .4   |
| 28 Retail trade               | 6852    | 12127   | 10638              | -1.4    | -2.3    | .2   |
| 29 Fin., ins., real state     | 9626    | 17037   | 16277              | -5      | -1.9    | 3.1  |
| 30 Private services           | 7956    | 14081   | 15920              | 1.4     | 2.4     | .9   |
| 31 Government, total          | 10251   | 18143   | 20027              | 1.1     | -5      | 4.3  |
| 32 Federal, civilian          | 15316   | 27108   | 27364              | .1      | -1.4    | 1.1  |
| 33 Federal, military          | 2785    | 4929    | 6427               | 3.0     | 1.0     | .9   |
| 34 State and local            | 10362   | 18340   | 20059              | 1.0     | -5      | 2.3  |
| 35 GNP (per person)           | 7929    | 14025   | 16472              | 1.8     | 2.8     | 1.3  |
| 36 GNP (per job)              | 16178   | 28635   | 29127              | 0.2     | -0.5    | 3.4  |
|                               |         |         |                    |         | 0.6     |      |

1/ Based on U.S. Department of Commerce, Regional Economic Information System, Unpublished reports.

2/ Total personal income and components divided by total population.

3/ Total earnings and components divided by total (job count) employment.

Table 1.7

State and local government direct expenditures for education grew at a 1.5 percent annual rate for the U.S. and a 0.5 percent rate for Minnesota during the 1976-84 period. They grew slightly faster in the 1982-85 period with a 3.9 percent annual increase for the U.S. and a 2.1 percent annual increase for Minnesota. If the historical rates were extended to year 2000 and an additional \$40 billion (in 1985 dollars) were added to the previously projected levels of total state and local government education expenditures for the U.S. and \$817 million (in 1985 dollars) for Minnesota, then the state and local education share of GNP or GSP would still decline for both the U.S. and Minnesota.

| Year  | 1976-85 Rates |        | 1982-85 Rates |         |
|---|---------------|--------|---------------|---------|
|   | US            | MN     | US            | MN      |
| State and local education expenditures<br>(billion 1985 dollars): |               |        |               |         |
| 1985 (actual)   | 174.5         | 4.090  | 174.5         | 4.090   |
| 2000 (historical rate)  | 251.7         | 4.422  | 355.3         | 5.563   |
| 2000 (with \$40 billion added)                                    | 291.7         | 5.239  | 395.3         | 6.381   |
| GNP or GSP (billion 1985 dollars):                                |               |        |               |         |
| 1985 (actual)   | 4010.3        | 16.472 | 4010.3        | 16.472  |
| 2000 (historical rate base)                                       | 6360.8        | 99.390 | 8511.5        | 122.909 |
| Annual real change in educ. exp.<br>(percent):                    |               |        |               |         |
| Historical rate   | 1.5           | 0.5    | 3.9           | 2.1     |
| Conditional rate (with \$40 billion added)                        | 2.5           | 1.7    | 4.6           | 3.0     |
| Educ. exp. as proportion of GNP<br>or GSP (percent):              |               |        |               |         |
| 1985  | 5.0           | 5.9    | 5.0           | 5.9     |
| 2000 (historical rate base)                                       | 4.0           | 4.4    | 4.2           | 4.5     |
| 2000 (with \$40 billion added)                                    | 4.6           | 5.3    | 4.6           | 5.2     |

Table 1.8

Minnesota state government education outlays per person in 1980 amounted to \$385 in the Metropolitan Region and \$315 in Greater Minnesota while total revenues originating from the two areas were, respectively, \$897 and \$704. Education outlays increased by 24 percent for the Metropolitan Region and 50 percent for Greater Minnesota while total revenues increased in roughly reverse proportions. Thus, a net transfer occurred from the Metropolitan Region to Greater Minnesota of approximately \$250 million.

| Government Function 1/                                     | Metropolitan<br>Region |      | Greater<br>Minnesota |      |
|--|------------------------|------|----------------------|------|
|  | 1980                   | 1985 | 1980                 | 1985 |
|  | (dollars)              |      |                      |      |
| Direct payments to students<br>in post-secondary education | 8                      | 10   | 12                   | 13   |
| K-to-12 and state university<br>system                     | 263                    | 332  | 293                  | 446  |
| University of Minnesota                                    | 114                    | 134  | 10                   | 13   |
| Total education  | 385                    | 476  | 315                  | 472  |
| Non-education  | 543                    | 766  | 466                  | 646  |
| Total outlays  | 928                    | 1242 | 828                  | 1119 |
| Total revenues   | 897                    | 1390 | 704                  | 1004 |

1/ Excluding regionally unallocated expenditures and revenues in data series from Minnesota Department of Revenue, 1986.