



A Report from the Department of Business, Economic Development & Tourism

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Education and the Economy

This issue of Hawaii's Economy takes a broad look at the role of the education system in the state's economy. A primary purpose of education is to prepare our youth for successful adult roles in society. Of course, a successful and satisfying adult life is integrally linked to marketable job skills. Consequently, much of education's effort is directed at developing these skills and, at higher levels of the education system, helping to improve the economy and provide job opportunities for its clients.

Education also has a significant direct impact on the economy through its expenditures and large employment base. In Hawaii, education is a \$2 billion industry that produces an array of educational products for both local residents and thousands of out-of-state students. It also attracts millions of additional dollars to Hawaii through grants and contracts at the University level.

This first article explores the dimensions of education's role in the economy. In the article that follows, the economic size of the State's education system is explored through a new "education account" developed by DBEDT. Another article looks at imports and exports of educational services, particularly the "edu-tourism" market. A concluding article asks how much education really matters to people's future earnings and comes up with a few surprising answers.

Formal education plays a central role in the development of both individual potential and the economic potential of society. For individuals, formal education is their chief means of preparing for adult society and competing in the job market. For society, the level of knowledge and technical skills in the labor force, gained through the education system, is a major determinant of what kinds of industries and investment are possible in the economy.

Since the industrial revolution, most nations either provide or highly subsidize basic, and in many cases, higher education. One of the reasons for the

subsidy is that education has tremendous "spillover" effects that benefit society as a whole.¹

In the U.S., most formal education through high school is publicly provided. However, private educational institutions play an important role in filling niches not addressed by broad-based public education.

Education has a number of roles related to the economy. How well it succeeds in these roles is one way of assessing the effectiveness of the education system.

¹ Economists call these spillover effects "external" economies or simply "externalities."

Basic Education and Training

Probably the most important function of the education system is to provide individuals with the basic skills, advanced knowledge and specific job training that are essential to the economy and essential for successful participation in the labor force. Today virtually all members of the labor force need to read, write, perform computations and understand how to function effectively in a social context. This is primarily the task of the elementary and secondary levels of education. In addition, the economy also needs highly educated managers, professionals and technicians to keep the economy running smoothly and better over time. Universities, community colleges, and specialized technical programs are the primary source for this level of knowledge and skill.

Hawaii's education system has received mixed reviews in the past. On the plus side, Hawaii scores relatively well in educational attainment. For example, in 1993, 86.6 percent of the population aged 25 and over had graduated from high school compared to 80.2 percent for the U.S. as a whole. In the same year, 25.1 percent of this population had at least a bachelor's degree, while only 21.9 percent of the U.S. population at least aged 25 had this degree. In 1995, Hawaii's relative position to the U.S. slipped somewhat, but Hawaii continued to have a well-educated population in terms of length of schooling. The U.S., in turn, has the highest level of educational attainment among industrialized nations.

K-12 School Performance

Unfortunately the results of performance tests comparing Hawaii and U.S. students are mixed. As the accompanying sidebar discusses, Hawaii high school students appear to have done better on some batteries of standardized tests (SATs) than others (NAEP). However the range in these test results tend to place Hawaii kids at or below U.S. achievement levels.

If Hawaii achievement on tests is below the U.S. average, it is likely even lower on an international basis. This is because tests administered in about 17 advanced nations rank U.S. students below the median among these nations in math and science achievement, measured at the end of elementary school (see side bar).

This "middle of the pack" ranking for Hawaii could be a problem if the lion's share of future economic activity will be going to regions that make the most of their educational potential. It is even more of a problem for Hawaii where, for geographical and cultural reasons, workers must compete more frequently in the international arena. As trade barriers continue to fall, Hawaii will be competing more and more in international markets and a highly educated workforce is an advantage in that competition.

Performance of Advanced Education

Countering in part Hawaii's lower achievement rankings in the K-12 system is the tendency for Hawaii residents to add more years to their educational careers, as indicated earlier. This effort is facilitated in large measure by the availability of higher education within easy driving distance of more than 80 percent of the population. This includes the UH campuses at Manoa, Hilo and West Oahu; seven community colleges, three private universities, and countless vocational and

professional specialty schools. Moreover, resident tuition costs for the UH system are among the lowest in the country.

It is somewhat more difficult to assess the performance of higher education, partly because of its diversity of programs and also because of limited comparative information among institutions. The University of Hawaii has done an admirable job of constructing a wide range of benchmark measures to track progress in improving its performance.² This effort is an excellent means for focusing the attention of the University and the community on improving quality over time. Unfortunately, only a few of these measures can be directly compared with those of other universities. Moreover, little systematic information is available on the accomplishments of graduates of the UH system.

One often cited source for university performance is the annual ranking of col-

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Table 1. University of Hawaii at Manoa National Rankings, 1997-98
(by U.S. News & World Report)

Area of Rating	University of Hawaii Ranking	Total Schools Ranked
Undergraduate Level		
All Universities & colleges surveyed ¹	51-113 (tier 2)	227 (in 4 tiers)
All Public Universities	50	147
Graduate Programs (for programs in which UH earned a ranking)²		
Astrophysics/Space Physics	16	22
Geophysics	17	27
International Business	24	27
Library Science	25	25
Social work	29	62
Geology	32	48
Law	50	51
Creative Writing	62	94
Physics	76	89
Psychology	89	119
Fine Arts	89	90
Nursing (Masters)	95	121
Biological Sciences	96	119

¹ Schools were ranked individually for levels 1 to 50 only. Others were placed in "tiers" 2 through 4. Tier 2=51 to 113; Tier 3=114 to 172; and Tier 4=173 to 227.

² The ranking presumably takes similar programs among all 227 schools into consideration. In many cases two or more schools are tied for the same ranking and U.S. News awards each school that same ranking. Source: U.S. News & World Report (internet site), 1999 College Rankings, as of November 2, 1998, (site address <http://www.usnews.com>).

Student Performance Tests—Where Hawaii Stands

Hawaii Versus the U.S.

For a number of years Hawaii high school seniors have performed slightly above the U.S. average on the mathematical portion of the Scholastic Assessment Test (Figure 1). Hawaii's score in 1996–97 was 512, while the U.S. average score was 511. Hawaii seniors scored below average on the verbal portion of the test (Figure 2). In 1996–97, the Hawaii score was 483, while the U.S. average score was 505. This suggests that performance of Hawaii schools has been, on balance, near average.

On the other hand, in a sampling of public school results from the National Assessment of Educational Progress (NAEP) testing of math and science performance, Hawaii scored well below the average for 40 participating states. The percentage of Hawaii children scoring at or above basic proficiency on these 1996 tests ranged from 15 percent to 30 percent below the 40 state averages for tests at the 4th and 8th grade levels.

Of course, there are issues regarding the nature of the questions chosen and other possible biases in both the SAT and NAEP tests. For example the NAEP has been criticized for setting basic proficiency levels too high. In addition, a number of

large states including Illinois, New Jersey, Ohio and Pennsylvania did not participate in most of the NAEP testing.

U.S. Versus 17 Countries

Recent data indicate that among member nations of the Organisation for Economic Co-operation and Development (OECD), the U.S. has the highest percentage of the labor force between ages 25 and 64 with at least a high school degree (89%). Moreover, the U.S. spends a relatively large fraction of gross domestic product (6.6 percent compared to an OECD mean of 5.9 percent) on educational institutions. This means that in absolute terms, the U.S. spends the largest amount per student—\$7,790 in 1994 compared to OECD mean of \$4,880.

But when the performance of students is measured, the U.S. rankings fall. For example, in comparisons of 4th grade achievement in mathematics in 1995, the U.S. ranked 9th out of 17 countries. Countries that scored significantly higher than the U.S. were Korea, Japan, the Netherlands, Czech Republic, and Austria. The U.S. did somewhat better on a similar evaluation of 4th grade achievement in science. In this case, the U.S. ranked third behind Korea and Japan.

The relative position of the U.S. declines further by the time students reach the 8th grade. In mathematics, the U.S. ranking for the 8th grade fell to 13 out of 17, with the U.S. score significantly below the international average. In science, the U.S. ranking for the 8th grade was 10 out of 17, with the U.S. score about the same as the international average.

These rankings indicate that the U.S. test scores are no better than average and some are significantly below average. This implies that Hawaii's scores are also broadly average or below on an international scale.

This is a problem if the lion's share of future economic activity will be going to regions that make the most of their educational potential.

Hawaii's test results may reflect some of the challenges Hawaii's public school system faces. One challenge is that higher proportions of Hawaii's children attend private school, and they tend to be above-average achievers. Another is that 15 percent of Hawaii residents in 1990 were foreign-born compared with 8 percent nationally, suggesting a greater challenge in teaching language skills tested on the SAT and NAEP.

Figure 1. Math Scores, U.S. and Hawaii SAT Test¹

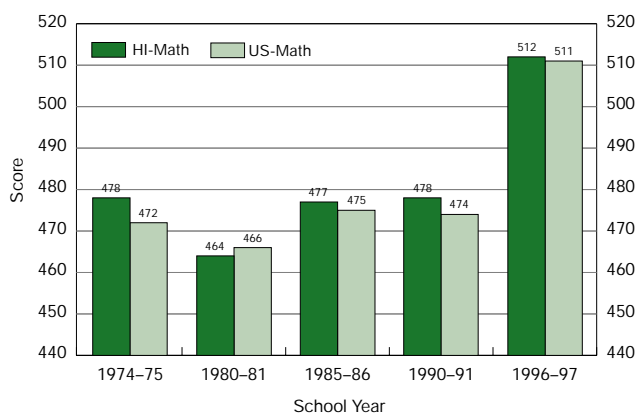
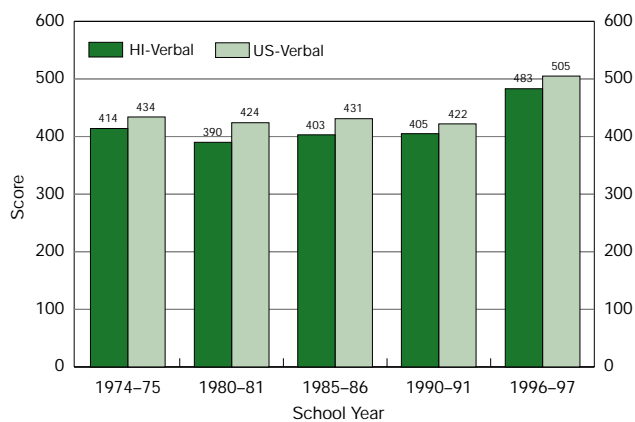


Figure 2. Verbal Scores, U.S. and Hawaii SAT Test¹



¹ "Scholastic Aptitude Test," usually taken by college-bound high school students. Nationally, 41 percent of eligible high school students took this test in 1994–95 compared with 57 percent in Hawaii. Source: College Entrance Examination Board.

leges and universities by U.S. News and World Report magazine. The magazine uses a number of indicators including reputation among peer schools to establish rankings for 227 national colleges and universities. U.S. News ranks the first 50 undergraduate colleges but simply places the remaining schools into second through fourth “tiers” of about 60 schools each.

As the rankings report in Table 1 shows, UH Manoa was grouped in the second tier (between 51 and 113). However, among the smaller subset of 147 public universities, UH Manoa was ranked number 50. The publication also provided rankings for programs within the schools. These range from a 16th ranking in Astrophysics/Space Physics to 96th in the biological sciences.

It is not clear how meaningful these rankings are. They do not compare salaries of graduates or other more objective outcome measures. Apparently about 25 percent of the weighting in the rankings are based on peer reputation among similar schools. The peer ranking may reflect a lack of familiarity with the UH, rather than actual program quality. Nevertheless, to the extent that such rankings are reviewed by prospective students, faculty and sources of funding, they are indicators of program quality. Consequently the rankings and how to improve in them are important.

Job Readiness, Retraining and Life-Long Learning

Educators and economic development planners also face the problem of ensuring that entrants into the labor market at all levels are prepared to excel in their jobs and adjust to the changing needs of the labor force over the years. By the year 2000, it is expected that 65% of all jobs will require specific skills acquired through programs of formal training as compared to 20% of all jobs that had such requirement in 1950. This not only means a need for new training programs for youth, but also retraining and skills upgrading for mature workers.

In pursuing the goal of making students and current workers more job-ready, education and economic development must

address some serious challenges. Among these are the current problems of high youth unemployment and low earnings, more competition and new technologies in the workplace, and shrinking demand for unskilled labor as the demand increases sharply for technically-trained employees. Moreover, many employers have expressed dissatisfaction with the workplace readiness of today’s youth.

Thus education, with the help of other sectors, must ensure that all children are: (1) prepared to get the most out of school; (2) are fully prepared to enter the labor force at the end of their formal schooling, and (3) have opportunities for updating or developing new skills as the needs of the economy change during their careers. Three important programs or concepts that are being developed to address these needs are the “Good Beginning Alliance,” the “School-to-Work” transition program and the concept of “Life-Long Learning.” Because of their importance, they are discussed in a separate article following this section.

Research and Technology Transfer

Another important role of education in the economy is the development of new knowledge and its transfer into the economy. This new knowledge ranges from basic scientific research to improved techniques of organization and production. Developing such new knowledge is primarily the role of universities and affiliated research units. Much of the activity at the graduate level in universities is focused on the development of new knowledge through student thesis and dissertation research, individual faculty research and organized research projects involving groups of students and faculty. The development of new knowledge is often funded by government, industry, and private research institutes.

In Hawaii, the premiere research center is the University of Hawaii’s Manoa campus on Oahu and its satellite programs in other areas of the state. UH Manoa research has attracted national attention in a number of areas. For instance, the University’s Institute for Astronomy has

attracted the world’s most powerful telescopes and astronomical monitoring stations to Hawaii—on Mauna Kea in Hawaii County and Haleakala in Maui County. These facilities have been responsible for numerous new astronomical discoveries. More recently, UH Manoa researchers in genetics attracted attention worldwide for the cloning of laboratory mice using their “Honolulu” technique.

Of course, new knowledge is not very helpful to the economy until it is commercialized and integrated into the production process. Thus, another important role for the education system is to take a leadership role in the transfer of technology and knowledge transfer to the private sector and government. This is often accomplished through “extension services” which send experts from the university into various sectors of the economy (agriculture for instance) to implement new research findings and techniques. It may also include attracting key firms to the state, sponsoring contacts between university researchers and industry and participating in economic development planning.

The University of Hawaii also maintains an Office of Technology Transfer and Economic Development, which helps find markets for UH research products. The University has also formed an organization called “University Connects” to facilitate communication and collaboration between the UH and private, technology-based companies.

The UH is moving to emulate a number of successful universities nationally by speeding the commercialization of technology developed on campus and creating more interaction between University research programs and advanced technology firms in the private sector.

Exporting and Attracting Investment

In addition to making the labor force and private business more productive through education, research and technology transfer, the educational system can be a direct source of new economic activity. One source of this activity is the sale (export) of educational services. Another is the attraction of investment and grants.

The international market for educational services is an immense and important one and may represent a significant economic development opportunity for Hawaii. This market includes both long-term, degree-oriented programs and short-term educational services, referred to as "edu-tourism," because they often com-

bine educational services with recreational travel. Because of the importance and interest in the export of educational services, a separate article in this report is devoted to the concept.

University programs can also attract considerable investment that has spill over effects on the community at large. A prime

example in Hawaii are the millions of dollars in investment made in Hawaii and Maui Counties to build and operate the astronomical facilities affiliated with the University's astronomy programs. In addition, considerable investment may be

continued on next page

Three Programs for Leveraging Education's Impact on Success in the Labor Force

Good Beginnings Alliance

Among the more important foundations for success in education and the work force is early childhood development. Hawaii's "Good Beginnings Alliance" (GBA) is a partnership among government, education and social service providers to develop a master plan and an integrated system of early childhood programs and services. The effort is community based, with community councils in each county delegated planning tasks in their respective communities. The organization was mandated by Act 77 of the 1997 Legislature and is funded by both public and private sources. The GBA dedicated resources to Hawaii's "First Five Years" public awareness campaign and was a factor in the creation of a Joint Legislative Committee for Early Childhood Education and Care, during the 1998 legislative session. The National Governors Association considers Hawaii's GBA a model program.

Hawaii School-To-Work Program

School-to-Work is a new approach to educating and training students for the workplace, introduced in Hawaii in 1994 as a result of the Federal School-to-Work Opportunities Act. It represents a new way of thinking about the linking of education and training, and requires the development of partnerships among education and organizations outside the traditional educational realm.

The primary purpose of School-to-Work is to integrate the acquisition of academic and industry-based skills that are necessary for high-paying, successful careers.

The initiative involves partnerships among schools, colleges, employers, labor organizations, the local community, and government. It is a means to connect economic development, workforce development, and education reform. School-to-Work improves economic development by improving education and providing a highly qualified workforce with leading edge skills. The program coordinates the classroom with the work site and uses both to improve student performance.

School-to-Work provides the framework to help current educational programs bridge the gap between their schools and the world of work. The program will help students in Hawaii leave school well prepared for employment, continuing education, and with an orientation towards life-long learning.

Since 1995 Hawaii has received nearly \$8 million in Federal funds for the School-to-Work Program. That total should exceed \$10 million by the year 2000. The State Legislature has appropriated \$500,000 per year for the program since 1997.

The economic development community through DBEDT is an active participant in the School-to-Work effort along with the DOE, UH, Department of Labor and Industrial Relations, Department of Human Services, and private sector groups. DBEDT has invested in-kind staff support to the School-to-Work initiative through participation in the program's Executive Council and Task Force meetings, organizing statewide business recruitment workshops, chairing the 1997 State Conference attended by 1,200 people, and organizing the Governor's Business Breakfast for

School-to-Work business partners.

Life-long Learning

Life-long learning is not a program in itself but rather depicts the need for all educational programs to instill this value in students from the early years. It is strongly emphasized in the Hawaii School-to-Work initiative and is used often with many educational programs.

One effort which encompasses this value of life-long learning is the Elderhostel program specifically for retirees. Other programs that fit into this niche include the continuing education courses offered by the Department of Education through its Community Schools, the community colleges and Outreach College at the University of Hawaii at Manoa. Employers are another group providing life-long education through the training and retraining of employees on new methodologies and technologies in the workplace. Life-long learning through technology applications could also be made accessible to Hawaii's citizens at community sites such as libraries.

More can be accomplished in this important area. It has been suggested that the UH could establish more programs focused on retaining and upgrading of skills for current labor force members. This should include expansion and broadening of the evening course schedules available at the Manoa and other UH campuses. This would provide course offerings at time slots more convenient to current labor force participants. In addition, life-long learning programs at all levels should be linked to specific business and industry needs and opportunities.

Education and the Economy continued

targeted at firms connected with the University's research and technology transfer activities. These companies are usually on the leading edge of applied science and technology. Partnerships often develop between companies and related research units in universities. These companies tend to establish a physical presence close to the universities with which they partner. These relationships can create a wealth of companies and investment in the surrounding area. The State of Hawaii is keenly interested in this potential connection and will be spearheading the development of a high technology park within the renovated Kakaako area of Honolulu to provide space for potential companies.

Leading edge research at the university level can also attract major funding grants from the Federal government and private institutes. This inflow of funds expands employment and can translate into construction and activity and business sales in the community (See sidebar on UH funding).

Efforts to Improve Education

The State, private sector and educational community recognize the key role played by education in the economy. These groups are working to improve the performance of education in each of the areas

discussed above. Certainly if Hawaii is to compete in an increasingly technical and knowledge-intensive world, it must upgrade the capacity of its "human capital" relative to the U.S. and other advanced nations.

Education in Hawaii moved closer to its goals during the 1998 Legislative session with the passage of Act 309, which directs public schools to establish standards for foreign language competency and computer literacy by the time students graduate from high school. Only 8 percent of the world's population speak English. If Hawaii expects to participate fully in the world economy, we must be able to communicate with the remaining 92 percent. Increasingly, business, communications, and data management will take place via computer; a student without these skills in the 21st century may be at the same disadvantage as someone today who cannot read well.

With Act 115, SLH 1998, Hawaii took the first steps toward giving the University of Hawaii more autonomy to generate and utilize resources. Ultimately it is hoped that this autonomy will create a more entrepreneurial environment by reducing state regulation. Turning creative endeavors into commercially successful enterprises will be an important part of

securing Hawaii's economic future.

Hawaii is also moving to ensure that human capital development is an ongoing process. Too many people think of education as ending with the last class in high school, the final examination in college, or the conferral of a professional or post-graduate degree. But over time this attitude can result in economic stagnation as new and productive technology and ideas are instilled in only the newly educated. The problem could be especially troublesome as the population ages and the rate of new ideas and technology accelerates.

Learning, therefore, must be considered a life-long process, and periods of education and training need to be viewed as natural events that take place repeatedly over a person's life span. When that happens, the full potential of society's members will be utilized.

Finally, Hawaii's people have a genius for anticipating and meeting the needs and desires of visitors. The rest of the world has come, or is rapidly coming, to the conclusion that education is the key to prosperity. Hawaii is working to help meet this emerging demand by developing education products directed to the visitor. The edu-tourism industry is likely to be high value-added and low-impact on the environment and other resources.

Education impacts the economy in several important ways. It is certainly essential for developing and maintaining a productive labor force. It is an important source of new ideas and techniques, and it absorbs a good deal of both public and private resources. It is also a major industry, in the sense that it provides a large number of consumers with a range of products, maintains a large work force and makes considerable investment in plant and equipment.

Most of education's products are for the benefit of local consumers or clients. But like Hawaii's other major industries,

Measuring Education's Role in the Economy

education also exports a portion of its product and must compete with educational imports from elsewhere.

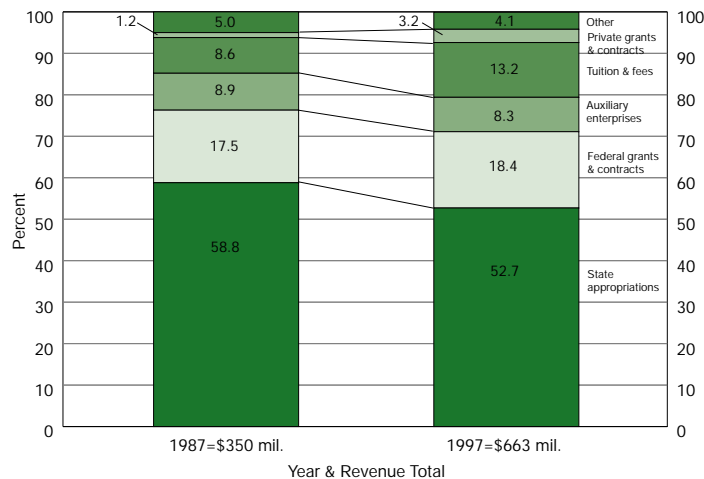
Jobs and Students

Employment data and student enrollment for public and private schools in Hawaii provide one measure of the size and growth of education and the relative roles of private and public sector institutions. As shown in Table 1, the educational sector accounted for about 44,800 jobs or nearly 8 percent of all jobs in Hawaii in 1997. Of the total education jobs, the private sector accounted for about 22 percent

Funding the University System

Over the last decade, the University of Hawaii system has made progress in broadening the source of financial support for its operations. As Figure 3 shows, the University's reliance on State general funds has declined from 59 percent of all revenues in 1987 to under 53 percent today. Tuition and fees, which represented less than 9 percent of total revenue in 1987, now account for more than 13 percent. Also increasing significantly have been grants and contracts. Federal and private sources for grants and contracts rose from 19 percent of revenues in 1987 to 22 percent of total revenues in 1997. UH system revenues totaled \$663.2 million in 1997.

Figure 3. Distribution of UH Revenues by Source, 1987 & 1997¹ (percent of total)



¹ Tuition and some other funds have been reallocated from State funding to UH revenue sources. In past years these funds were transferred directly to the State General Fund and not shown as revenue sources. Source: UH Financial Reports, 1987 & 1997.

Measuring Education's Role continued

in 1997.

The estimate of students in Hawaii at all levels (1997-98 school year) numbers about 285,000 (Table 2). The private education system accounted for about 18 percent of all students. About 21 percent of all students were enrolled in higher education.

The Economic Size of Education

Numbers of jobs and student enrollments give only a limited view of the economic implications of the education system. To better measure the role of education in the economy, DBEDT recently constructed an "Education Account" as part of its Gross State Product (GSP) Accounting system. The education account is shown in Table 3.

The account was constructed with several purposes in mind. First, it is meant to show the relative size of education in the economy. Second, it shows how residents, government and non-residents share in the cost of the education system. Finally, the account shows the scope and size of

basic activities within education.

It must be stressed that both the data

and organization of the account are a "work in progress." Education is not a well-

Table 1. Jobs in Education & Support Activities

	1992	1997	Percent change
All Jobs in State	599,779	578,582	-3.5
All Educational Jobs	41,369	44,791	8.3
Government	32,605	34,940	7.2
Schools	32,017	34,378	7.4
Elementary & Secondary	22,760	25,590	12.4
Post-secondary	9,257	8,788	-5.1
Other	588	562	-4.4
Libraries	570	562	-1.4
Private	8,764	9,851	12.4
Schools	7,863	8,946	13.8
Elementary & Secondary	5,123	5,465	6.7
Post-secondary ¹	1,566	1,893	20.9
Other learning ²	1,174	1,588	35.3
Transportation Serv.	901	905	0.4

¹ Includes libraries.

² Business, vocational and other schools and private educational services. Source: Hawaii Dept. of Labor & Industrial Relations.

defined industry in the economy. Much of education is a government function and a good deal of the data must be “teased” out of government accounting sources that were prepared for differing purposes. In some areas of the account, trial estimates are used due to the unavailability of authoritative data. Also, because the account is in current dollars the growth of education indicated in the table includes the effects of inflation. A goal for the future will be to construct a “constant dollar” account in which the effects of inflation are removed to provide a clearer view of growth patterns.

Those caveats notwithstanding, the Education Account provides an illuminating look at the economic role of education in Hawaii. First, it is clear that education’s role is a sizable one. In 1997, DBEDT estimates show that education accounted for about \$1.8 billion, or 5.4 percent of total GSP. Moreover, the GSP value of educational expenditures increased 20 percent from 1992 to 1997, in current dollars. By comparison, total GSP in current dollars expanded by 13 percent over the same period.

The estimates of education’s contribution to GSP are shown from three perspectives in Table 3. The “sources of funding” perspective shows who paid for educational services. The middle section of the table shows the kinds of educational ser-

vices produced and the respective roles of the public, private and out-of-state sectors in providing these services. Finally, the last part of the table shows how the GSP value of education in Hawaii is calculated.

The data in the account include all levels of formal education from kindergarten through the highest levels of college graduate work. They also include private and public schools as well as adult and specialty education. However, they do not include pre-schools, private proprietary training programs, or employment-training programs. They also do not include estimates of most edu-tourism activity, for which reliable data are not yet available.

Funding of Educational Services

As shown in Table 3, consumers in Hawaii spent an estimated \$532 million on all educational services in 1997, an increase of 36 percent over spending in 1992. This mainly reflects tuition payments for higher education, both in Hawaii and elsewhere, and private schools serving the K–12 grades. The spending estimate for consumers also includes educational support spending, such as room and board for out-of-state students and some transportation costs. It does not include the portion of general taxes paid by consumers that government uses to fund public education.

A substantial portion of consumer spending on schooling, \$172 million or 32 percent of the total in 1997, was on education purchased from outside the state. Most of this spending was on behalf of Hawaii students traveling overseas to colleges on the Mainland and elsewhere. The amount of consumer spending for out-of-state education grew by more than 36 percent from 1992 to 1997. This reflects an increase in both the numbers of students obtaining their education outside of Hawaii as well as higher costs. This purchase of outside education is not counted towards the GSP value of education. Only education produced in Hawaii with Hawaii resources is counted as part of Hawaii GSP.

The growth in consumer spending on education within the state also grew about 36 percent between 1992 and 1997. Most of the increased spending for in-state education was likely due to increases in tuition at private schools and the UH system. The overall number of students attending these schools has not grown much if any in recent years. In fact, enrollments in the University of Hawaii system declined 8 percent between 1992 and 1997.

It is important to note that residents’ spending on education may be funded from a number of sources besides current household income. A major source of consumer education spending is from loans. Two other important sources are grants and scholarships from private or government sources. Data are not readily available at this time to estimate the magnitude of these various sources as supplements to household educational spending.

Tax revenues channeled through government provided about \$1.8 billion in funding to education in 1997 or about 77 percent of all funds spent on education in Hawaii for that year. This subsidy was mostly from the State’s General Fund, appropriated to the Department of Education (DOE) and the UH system. The DOE and University also received a significant injection of Federal funds of more than \$96 million in 1997. The amount of Federal funds increased nearly 35 percent between 1992 to 1997.

Finally, Hawaii education services to out-of state students also brought in a substantial amount of funds, nearly \$141 million in 1997. This export of Hawaii’s educational services showed an increase

Table 2. Public and Private School Enrollment

School Year	All Students	Public Education			Private Education		
		Total	DOE	UH	Total	Elem. & High Schl	Colleges
1985–86	252,818	207,415	164,169	43,246	45,403	36,783	8,620
1986–87	252,952	207,322	164,640	42,682	45,630	36,548	9,082
1987–88	254,742	208,987	166,240	42,747	45,755	36,179	9,576
1988–89	255,495	210,424	167,899	42,525	45,071	35,459	9,612
1989–90	259,735	213,548	169,904	43,644	46,187	35,687	10,500
1990–91	264,061	217,535	171,793	45,742	46,526	35,765	10,761
1991–92	269,227	222,641	175,114	47,527	46,586	35,157	11,429
1992–93	273,170	227,218	177,806	49,412	45,952	34,642	11,310
1993–94	277,727	230,657	180,428	50,229	47,070	35,280	11,790
1994–95	282,408	234,544	183,164	51,380	47,864	35,429	12,435
1995–96	285,380	236,469	186,574	49,895	48,911	36,239	12,672
1996–97	285,802	235,545	188,470	47,075	50,257	37,048	13,209
1997–98	284,851	234,832	189,281	45,551	50,019	36,723	13,296

Source: State Data Book and DBEDT survey of private schools.

Table 3. Hawaii's Education Account, 1992 and 1997

Account Items	Value (millions of current dollars)		Percent change 1992-97
	1992	1997	
Sources of Funding for Educational Services			
All Sources of Educational Funds	2,059.5	2,490.9	20.9
For Education Services in Hawaii	1,933.2	2,318.5	19.9
Residents' Spending on Education in Hawaii	265.5	359.8	35.5
Public Subsidy of Hawaii Education	1,545.1	1,795.2	16.2
State and County Governments	1,387.5	1,582.4	14.0
Federal Government	157.6	212.8	35.0
Private Schools Capital Improvement Funding ¹	15.1	22.9	51.5
Spending by Out-of-State Students in Hawaii (Exports)	107.5	140.6	30.9
Residents' spending for education abroad (Imports)	126.4	172.4	36.4
Addendum: Hawaii Resident's Total Spending on Education	391.9	532.2	35.8
Educational Services Provided by Type & Provider			
All Educational Services Provided	2,059.5	2,490.9	20.9
Education Services Provided in Hawaii	1,933.2	2,318.5	19.9
Public Education System	1,590.6	1,889.9	18.8
Elementary & Secondary	970.4	1,201.4	23.8
Current Expenditures	895.1	1,082.5	20.9
Capital Investment	75.3	118.9	57.8
Higher Education-UH System	620.3	688.5	11.0
Current Expenditures	561.6	672.8	19.8
Capital Investment	58.7	15.7	-73.2
Private Sector Education Services	342.5	428.7	25.1
Schools (Elementary, High School, College)	245.6	310.2	26.3
Operating Expenditures	230.5	287.3	24.6
Capital Investment	15.1	22.9	51.5
Related Support Services	96.9	118.5	22.3
Transportation Services	30.8	34.1	10.8
Housing and Upkeep Services Sold to Out-of-State Students	66.1	84.4	27.6
Education Service Purchased from Outside of Hawaii (Imports)	126.4	172.4	36.4
Education's Contribution to GSP			
GSP of Education	1,540.4	1,849.1	20.0
Equals: All Education Services Provided ²	2,059.5	2,490.9	20.9
Less: Educational Services Provided Outside Hawaii(Imports)	126.4	172.4	36.4
Less: Goods & Services Imported by Hawaii Educational Institutions	392.8	469.4	19.5

¹ It is assumed that private school capital improvements are funded through gifts, interest income, or borrowings.

² Subtracting out all imported products and resources leaves the value-added portion of Hawaii education, or that created with Hawaii resources, which is the basis for measuring education's GSP contribution.

Source: DBEDT, Hawaii Income and Expenditure Account Project, Nov. 1998.

of 31 percent between 1992 and 1997. This promising market for Hawaii educational services is discussed in more detail in another article.

Educational Services—Scope and Costs

The middle portion of Table 3 shows that about 82 percent of the educational

services produced in Hawaii are through the public education system. The largest single service in the educational sector is public K-12 education, which cost \$1.2 billion to provide in 1997 and accounted for 52 percent of the value of education produced in the state for that year. However, public education was the slowest growing segment of education in Hawaii,

increasing only 19 percent in terms of expenditures between 1992 and 1997.

The \$689 million spent to support the University of Hawaii System in 1997, including community colleges, accounted for 30 percent of all education services produced in the state for the year. Due to a

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It may seem odd to view education as an export industry. However, the activity is, in fact, big business in the U.S. Thousands of communities across the nation prosper because they are near a major university campus. These “college towns” are supported in large part by the expenditures of students who have come hundreds if not thousands of miles to study there. Moreover, foreign students in the United States—who numbered nearly 460,000 in 1997—contribute about \$7 billion per year to the U.S. economy.¹

In Hawaii, the concept of education as an export industry has been given attention and support by State government and educational providers. So far that interest has focused on two broad areas: 1) provid-

¹ This and most of the information on the number and economic impact of foreign students in the U.S. and Hawaii is from the publication, *Open Doors 1996/97 Report on International Education Exchange*, Institute of International Education, Todd Davis, editor.

Exporting Education

ing formal degree and long-term training opportunities to out-of-state students; and 2) short-term educational programs and attractions, collectively grouped under the label of “education tourism,” or simply “edu-tourism.”

Exports of Formal Education

Hawaii’s export of formal educational services, along with imports of similar services, is shown in Table 1. The accounting shows that Hawaii had an imbalance in imports and exports of educational “trade” of about \$32 million on the nega-

tive side in 1997. On the export side, revenues from out-of-state students in Hawaii totaled an estimated \$141 million in 1997, an increase of 31 percent over 1992. About \$88 million, or 63 percent of this total, was contributed by students from foreign countries studying in Hawaii. This group showed the highest growth rate of any other group in the educational trade account, increasing 47 percent between 1992 and 1997.

However, the strong performance of foreign educational exports could not counter a stronger growth in educational imports over the period, and the deficit widened from 1992 to 1997.

Table 2 shows a detailed breakdown of estimated spending by foreign students in Hawaii enrolled in degree or certificate programs during the 1996–97 school year according to the *Open Doors Report*. About 58 percent of these students were in undergraduate programs, with the other

Measuring Education’s Role

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decline in capital spending, UH system expenditures grew just 11 percent from 1992 to 1997. However, overall operating expenditures showed a 21 percent increase.

Private Education

Information on private school expenditures is rather limited and the data for this section are “trial” estimates, which should be used with caution. Enrollment data indicate a decline in student loads in the private elementary and high school levels. On the other hand, higher education may have shown an expansion over the past five or six years thanks in part to the growth of such facilities as Hawaii Pacific University.

Exports of Education

In 1997 exports of educational services by Hawaii institutions totaled an estimated \$172 million. Exports of education, like imports discussed earlier, have grown faster than education in general—about 36 percent from 1992 to 1997. The

next article takes a closer look at the export of educational services.

GSP Value of Education

The last section of Table 3 estimates the value of education for Gross State Product purposes. GSP is meant to measure only what is produced by Hawaii resources. Therefore the total of all education services provided is reduced by the value of education purchased by residents from institutions outside Hawaii. Next, the goods and services that were imported by Hawaii’s educational system are subtracted. This amounted to about \$469 million in 1997 and includes intermediate purchases of supplies, equipment, materials and services that were not produced locally. The resulting figure represents the value added to the economy’s flow of goods and services by Hawaii’s educational resources.

Conclusions

This first attempt to construct an ac-

counting system for education has yielded useful results. It shows that educational activity has grown as a percent of GSP over the past five years. Within the educational sector, private schools have shown the greatest increase in expenditures followed by elementary and secondary schools. However, because data in the account are not adjusted for the effects of inflation, it is not clear if substantial “real” growth has taken place, although the sector has grown faster than the economy as a whole over the period under study. One of the most notable observations has been the rapid growth of educational imports and exports, both of which increased 36 percent between 1992 and 1997.

As the educational account is further refined, it will be possible to monitor more closely the trends in these important components of the educational industry. This should provide increasingly valuable information for planners and policy makers.

Table 1. Education "Balance of Trade"

Direction of Trade	Millions of dollars		Percent change 1992-97
	1992	1997	
Exports of education	107.5	140.6	30.9
U.S. mainland students	47.3	52.2	10.4
Foreign students	60.1	88.4	47.1
Imports of education	(126.4)	(172.4)	36.4
Educational trade balance	(18.9)	(31.8)	68.3

Source: DBEDT.

Table 2. Estimated Expenditures of Foreign Students in Degree & Certificate Programs, 1996-97

Type of Student	Number	Expenditures in Hawaii					
		Average (dollars)			Total (\$millions)		
		Total	Tuition	Living	Total	Tuition	Living
All foreign students	5,490	13,916	7,577	6,339	76.4	41.6	34.8
Undergraduate	3,188	13,124	7,215	5,909	41.8	23.0	18.8
Graduate	2,302	15,050	8,088	6,942	34.6	18.6	16.0

Note: This compilation does not apparently include foreign students in a smaller technical and vocational schools in Hawaii. Those students are, however, included in the balance of trade estimates in Table 1.
Source: Open Doors 1996/97 report, Institute of International Education

42 percent pursuing graduate degrees. This is about the same distribution as found nationally. The roughly 5,500 foreign students attending degree and certificate schools in the 1996-97 school year was down about 5 percent from the previous school year. Nationally, the foreign student population increased one percent for the period, although students from Asia showed virtually no increase at the national level.

Economics of Attracting Outside Students

The economic value of providing out-of-state students with formal education probably varies depending on the circumstances of the institution and the economic value being measured. Tuition charged to resident students rarely if ever accounts for the major portion of revenues needed to sustain a public university. For instance, the cost in 1997 of operating the UH system amounted to about \$14,200 per enrolled student. However, full time, undergraduate tuition for a resident attend-

ing the Manoa campus was only \$2,800 in that year.² The resident tuition was lower at all other campuses.

Nearly all public colleges and universities charge a higher tuition to non-resident students, reflecting the fact that the students have not contributed through taxes to the public subsidy provided to public higher education in the state. However, even the higher out-of-state tuition falls short of the pro-rata share of college operating costs. For instance, the nonresident undergraduate tuition at the UH Manoa campus in 1997 was about \$9,300 for the year. While significantly above the resident tuition level, it is still well below the pro rata cost of running the UH system. It is also typical at even private colleges and universities that tuition does not cover operating and capital costs. The balance needed is made up from other sources, both public and private.

Since all students are more or less subsidized, it might appear that economically, recruiting students from outside the state would be a losing proposition. However, for a number of reasons recruiting foreign students may make good economic sense. First, the cost of operating a large facility like a university does not vary much with-

in a certain range of the student population. For instance, when UH enrollments declined 3 percent from 1996 to 1997, total operational costs did not decline. In fact they actually rose 1.4 percent. Thus, the additional cost of serving a new student may be very marginal and well below the tuition paid. In this case, the additional tuition of nonresident students can be used to help pay the fixed costs of running the institution—costs that would otherwise have been borne by tax revenues or other sources of funds. Moreover, the recruitment of foreign students and their tuition payments can help cushion periodic downturns in student enrollments such as the University of Hawaii system has recently experienced.

Another reason recruitment of non-resident students may make economic sense is that the additional students may help institutions or their programs achieve a "critical mass" or size. This would be the size needed to make the programs cost-effective; make them more competitive in recruiting top faculty; help them improve the quantity, if not the quality, of research; and help attract more outside funding and prestige. Such a strategy may be particularly helpful in places with small populations like in Hawaii. This strategy may have helped Hawaii Pacific University to grow and prosper in recent years. (Nearly 28 percent of HPU's enrollment in 1996-97 was composed of foreign students.) The same strategy could have potential for expanding campuses of the UH system on the Neighbor Islands, where the resident population is otherwise too small to support a college or university without substantial subsidy.

Third, there is a positive spillover effect on the community from the expenditures of outside students which is over and above the benefits to the educational institution. As Table 2 indicates, a large portion (nearly 46 percent) of estimated foreign student spending in Hawaii is for living expenses. These expenses range from food and clothing to entertainment and recreation. The expenditures flow into the community at large and support jobs and income outside of the educational system.

Market Potential

Is there a market for Hawaii's poten-

² Calculated from data in State of Hawaii Data Book 1997, DBEDT, Tables 3.18 and 3.21.

tial educational exports? The data suggest that there is a substantial one. Of the 458,000 foreign students in the U.S. during the 1996–97 school year, more than 57 percent, (about 264,000) were from Asia and Oceania (see footnote 1 on page 10). Even though total enrollments from this region have leveled off in the past several years, this still represents an immense market for foreign students and it is virtually on Hawaii's doorstep.

There is considerable variation in the Asian market. For instance, the Japan market is made up of about 70 percent undergraduate students. On the other hand, the China market, which has been sending nearly as many students to the U.S. as Japan, is made up of about 84 percent graduate students. About 22 percent of Asian students in the U.S. are enrolled in business programs. About 18 percent are enrolled in engineering programs, while another 18 percent are enrolled in math and science programs.

Hawaii has several advantages in the effort to attract a larger share of the existing Asian student market. Certainly, geographical proximity is a plus for the state. Hawaii can offer an easier cultural adjustment to American society, and statistically it is one of the safest places for parents to send their children. In addition, all of the programs of interest to Asian foreign students noted earlier appear to be available in Hawaii's colleges.

Enormous differences exist between the choice factors that influence students' selection of a city, state and country to study in. Research that has examined the decision-making process by students when choosing their study destination has found that in 60% of the cases, the target country for the education is preselected before any institution, course or city is considered. Other research has found that few Asian students make their decision to study overseas alone. Most are influenced by family, friends or staff at their school or college.

These research results suggest that destination institutions, even if competitors, would gain by working cooperatively to sell their region as a site for study. Otherwise individual institutions are forced to market both the destination and the merits of the institution. The results also suggest that strong ties with potential "feeder"

institutions and marketing through alumni and educational trade missions may be valuable strategies.

Education Tourism or "Edu-tourism"

Apart from exporting formal, degree-oriented educational services, there is a large and growing number of short-term educational programs that represent an emerging synthesis of education and tourism. This niche is being referred to as "educational tourism" or "edu-tourism." Broadly defined, the edu-tourism market includes short-term visitors to Hawaii who have as an important goal of their trip to participate in a program of education or instruction. Examples of such programs are the study of English as a Second Language, corporate executive training and informational meetings, and life-long learning programs geared to the "silver market."

Edu-tourism can include the combining of educational experiences with recreational travel to Hawaii. It can also include obtaining an extensive overseas cultural experience through a certificate program or undergoing specialized training in Hawaii. Education tourism attracts a variety of travelers to Hawaii to attend short- and medium-term training as well as longer-term educational programs, within the context of Hawaii's other tourism offerings.

Edu-tourism can provide an additional incentive and reason for prospective tourists to select Hawaii over other destinations. It adds value to a vacation and could be an important reason for potential repeat visitors to select Hawaii over other destinations.

Many Hawaii schools—including the UH Manoa, the UH community colleges, private colleges and vocational schools—have developed programs to serve short- and medium-term visitors interested in education. They offer language courses and special interest classes; cultural, scientific and hands-on, site visitation classes; courses tailored for a specific group and classes that mix visitors from the east and west with local residents; and certificate granting executive training classes. A sampling of these programs are listed in the accompanying side bar.

As in the case of the market for long-term education, Hawaii's attributes make

the state a competitive location for short-term training, research and specialized education. These attributes include Hawaii's compelling natural environment, its multicultural atmosphere, relatively safe environment, sophisticated conferencing infrastructure including the newly developed Hawaii Convention Center, well developed transportation network, advanced telecommunications systems and high caliber private and public educational institutions. These attributes are supported by the state's tourism infrastructure which helps position Hawaii as an ideal mid-Pacific locale and a convenient gateway to mainstream American culture.

Education tourism could also be a key link in the effort to market Hawaii as an international education and research center of the Pacific. While the number of individuals that can be accommodated in Hawaii for long-term education may be somewhat limited, effective programs in edu-tourism could cycle many thousands of students and scholars though the islands each year. This could significantly increase the familiarity of the Asian education community with opportunities in Hawaii and help the state expand its reputation for research and knowledge-based activity. This would be helpful in recruiting more educational and research activity, as well as countering the image of Hawaii as simply a sun-and-surf playground. Of course, a large edu-tourism sector would also help diversity and maintain above average growth in the visitor industry.

Conclusions

Education as an export industry for Hawaii has enormous potential for growth judging by the size of the current Asian market for such services. The exporting of long-term educational services could help bring a number of institutions in Hawaii to "critical mass" in terms of achieving significant accomplishments in research and knowledge development. It could also help fill classrooms that are currently below their optimal use.

Education tourism could also help diversify Hawaii's visitor industry and add to the awareness and prestige of Hawaii's educational and knowledge resources. Both long-term and short-term educational activity bring a considerable amount of export income into Hawaii.

Edu-Tourism Activities in Hawaii

Edu-tourism can cover a very wide scope and is, as yet, not precisely defined. However programs that appear to fall into this area have been grouped into the following categories for monitoring and marketing purposes:

1. Cross-Cultural Training/Executive Management Programs

Cross-cultural training, an ingredient of the overseas international education experience, provides individuals and organizations with information, insights, and skills to become more effective in the global business world. In this global economy, understanding cultural dynamics is an integral component in worldwide strategic development for many businesses. Hawaii is America's most Asian state, and provides a natural environment for cross-cultural training and acclimation.

Current program activities include:

- Asia-Pacific Center for Executive Development, UH-Manoa
- Pacific Business Center Programs, Pacific Asian Management Institute, UH-Manoa
- Hawaii International Hotel Institute, UH-Manoa
- Outreach College, UH-Manoa
- Intercultural Management Programs, Japanese-American Institute of Management Science (JAIMS)
- Master of Science in Japanese Business Studies, Chaminade University of Honolulu
- Programs of the East-West Center

2. English-as-a-Second Language Programs

- ESL Programs, UH Community College Campuses
- Hawaii English Language Program (HELP), UH-Manoa
- New Intensive Courses on English (NICE), UH-Manoa
- Specialized English Programs, UH-Manoa
- English Foundations Program, Hawaii Pacific University
- English-as-a-Second Language, Chaminade University of Honolulu
- Step-Up (Academic English) Program, Tokai International College
- TransPacific Summer ESL Program, TransPacific Hawaii College
- English Language Programs, Academia Language School
- Intensive English Program, Intercultural Communications College

3. Contract Training Opportunities

A number of programs of the University of Hawaii Community Colleges show tremendous export potential through contract training opportunities. These programs include (a) Culinary Institute of the Pacific, KCC; (b) Hospitality and Tourism Program, KCC; (c) Healthcare Programs, KCC; (d) Aviation and Training, HCC; (e) Automobile Technology Institute, HCC; (f) Marine Science Education Center, HCC.

4. Life-Long Education

- Programs of the Outreach College, UH-Manoa
- Adult Continuing Education Programs, Hawaii Pacific University
- Continuing Education and Training Programs of the Community Colleges
- UH Distance Learning Program—TV and Internet

A comprehensive guide to edu-tourism type programs can be found in the publication *Hawaii: Your Learning Destination*, produced by DBEDT in cooperation with the education community. An online copy of the publication is available at the Department's internet web site: <http://www.hawaii.gov/dbedt/edu/index.html>

Source: DBEDT, Service Trade Branch.

DBEDT's Role in Educational Exports

The State is encouraging the development of educational services for export, especially in the area of education tourism. For the reasons discussed in the accompanying article, the export of education services is seen as an opportunity to diversify the economy into knowledge-intensive areas that can create good jobs and bring new sources of income and investment into Hawaii.

Specifically, DBEDT attempts to serve as a link between the post-secondary education community and the visitor industry. As indicated, research suggests that in many instances, students tend to select a location before they select a particular school. This suggests a role for the State government in promoting Hawaii as an education/learning destination under whose banner all schools can be collectively marketed.

A number of edu-tourism marketing activities have been conducted over the past two years in partnership with schools. The schools themselves have shared in

the cost of paying for these activities. Examples include the publication, *Hawaii: Your Learning Destination*, an education directory, and video news releases distributed to television networks in Japan, Korea, and Taiwan. DBEDT promoted edu-tourism through an Education Hawaii, U.S.A. trade mission to Korea during the summer of 1998. The Department also participated in education fairs in Taiwan and will participate in similar fairs in Asia in the future.

In the coming year, DBEDT will be pursuing the following objectives in support of edu-tourism activities:

- Establishment of a Hawaii Edu-Tourism Network composed of representatives from the schools and representatives of the visitor industry. Through the network, programs can be developed by schools in partnership with the visitor industry, which will, in turn, package and market the programs.
- Collaboration with the HVCB to utilize general sales agents overseas to help market the schools in Hawaii.
- Work with the scope of edu-tourism programs to develop a database on programs, numbers and types of participants and estimates of their interests and spending.
- Organize video conferences with U.S. Embassies and Consulates in targeted geographic regions for Hawaii educational representatives. This interaction is designed to help Hawaii educational providers gain market insight and information on facilitating and expediting the processing of student visas.
- Convene a meeting of leaders of public and private institutions of higher education to develop a common strategy that will facilitate joint marketing of Hawaii as the Education Center of the Pacific.

Does the time and effort that individuals put into education pay off? If so, by how much? Economists have been investigating these questions since the late 1950s. It was around then that they began to recognize that a person's choice to go to school is an "investment," much like the decision to purchase new capital equipment is for a business. The investment is made because the newer, more productive assets, i.e., the skills and knowledge gained, are expected to increase profitability, more than making up for the cost of acquiring the education and/or training. That is, an individual's expenditure on more education was viewed as an addition to "human capital" which increased the person's productivity and income-generating ability. Economists also saw that there were significant benefits to society from increases in education, such as more competent and thoughtful

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citizens, reduced incentive for criminal activity, and so on (see accompanying side bar).

Returns to Education

If education is an investment, economists reasoned, we should be able to calculate a rate of return on that investment. The rate of return to the individual would be some measure of increased income due to the purchase of more education, minus the cost of acquiring it. Economists are interested in the rate of return for a couple of reasons. First, they wanted to measure how important it is for people to be educated and what level of education is optimal. That is, how much does each additional year of education add to future income and is there an optimum level of education where any more investment yields little or no additional return?

More recently, calculations of returns to education have received increased attention for another reason. This attention has grown out of the observation that income inequality—especially wage and

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earnings inequality—has risen dramatically in the last two decades. In investigating this issue, economists have found that education may be playing a role in income inequality with the earnings of those with more education (college and above) increasing faster than those with less education (high school or below).

The College Wage Premium—United States

A generation or more ago, one of the most often asked questions about the value of education was how much a high school degree mattered. Today the need for a high school degree is almost taken for granted. The issue now is how much college matters.

Figure 1 shows the average wage ratio between college and high school graduates. As would be expected, there is a clear premium associated with having a college degree. However, in recent years that premium has grown considerably.

For most of the period between the early 1960s to the mid-1980s, the wages of U.S. college graduates averaged between 1.4 and 1.6 times, or 40 to 60 percent higher, than the wages of high school graduates. The rise in the ratio in the 1960s and early 1970s probably reflects the dwindling supply of pre-baby boom, college graduates. The smaller supply of these workers may have prompted a larger premium until about 1971.

Thereafter, researchers believe that the

rising supply of baby boom college students drove the ratio down for the rest of that decade. Even after 1979, the supply of college graduates continued to increase. In fact the percentage of the labor force with a college degree grew from 22 percent to 29 percent between 1979 and 1994.

But curiously, the wage ratio between college and high school graduates reversed and began a long-term rise. By 1985, the ratio had reached 1.6, and by 1994, it reached nearly 1.8. This pattern has also appeared in other countries such as Sweden.

Further analysis reveals that the rise of the college premium over this period was due to a decline in the earnings of high school graduates, which fell 20 per-

Externalities, Subsidies and Rates of Return on Education

The added benefit to society from an individual's increased educational attainment is known in economics as a positive externality. Externalities are economic gains or losses that are by-products of investment and spending decisions. Externalities can be either positive or negative. For instance, a house with a fresh new coat of paint may have the external effect of raising the neighbor's property value. Alternatively, letting the property run down to save money may reduce the neighbor's home value. The externality "problem" is that the person causing it cannot readily charge others for the added benefit, nor can others readily charge a person for the harm done by a negative externality. What does this have to do with education? Simply this: if individuals do not reap a return from the external benefits to society of their education, they may not invest as much as would be optimal for society as a whole.

One way to encourage people to invest more in education is to subsidize that investment. In other words, society can help pay for the education so that individuals are encouraged to acquire more of it. In fact, the U.S. and many industrial

countries have been subsidizing education heavily for a long time. Of course, this subsidy reflects more than the added value of educated citizens to society. It also reflects the non-economic value that a basic education is deemed a "right" and that access to education should not be overly determined by the ability to pay.

Financing of the U.S. K-12 public school system reflects these goals. Public schools are mostly supported by funds raised from broad-based tax sources such as income, sales and property taxes. This guarantees that a minimum level of education will be encouraged since households have to pay for the educational system whether they use it or not. People with more income or assets pay more for education and people with less, pay less. This tends to equalize access to education. In addition, all taxpayers pay the taxes that support public education whether they have children or not. This reflects the notion of external benefits to education, which accrue to all members of society. Beyond high school, society's subsidy of individuals declines but is still quite substantial.

Externalities and subsidies give rise to three different rates of return on educa-

tion. The first is the return to individuals based on their portion of the total educational investment (the unsubsidized portion). This includes not only their direct expenses, but also an allowance for income they did not receive because they were in school instead of working.

The second is the "social" rate of return, which is the total return to both the individual and society, taking into account the total costs of the educational investment. The third rate is the "fiscal" return to government. This is a measure of the return on education in the form of additional tax revenues, as compared with the government's investment or subsidy of education.

Of course computing all of these rates would be a complex matter, assuming the data could be developed. Based on the availability of data, this research effort focused on the apparent return in terms of income earned at various levels of education. For that reason, it is not strictly a measure of rate of return because the cost of the investment for individuals and the government subsidy has not been included.

cent in real terms over the 1979 to 1994 period, rather than an increase in earnings of college graduates which increased only 5 percent in real terms.

Premiums at all Education Levels

In order to compare the educational premiums at various levels and especially with respect to Hawaii, DBEDT undertook a special tabulation of data from the U.S. Census Bureau's Current Population Survey (CPS) for selected years from 1979 to 1995.

United States

Figure 2 shows U.S. wage premiums for various levels of schooling—a high school degree, some college, a baccalaureate degree, and schooling beyond the baccalaureate. These average wage levels are compared to the average wage level of non-high school graduates, which is held constant at 1.00 for all years.

For the U.S. as a whole, the education wage premium appears to increase at all levels over the 16-year period. But the spread seems to be widest at the higher

college levels, particularly beyond the baccalaureate level.

Hawaii

The Hawaii patterns presented in Figure 3 show interesting deviations from the national patterns.¹ A high school diploma in Hawaii bestowed a higher premium in 1979, nearly 30 percent compared with 20 percent nationally. However, college work and even a baccalaureate appeared to confer no extra earning power in Hawaii. Indeed, average annual income was slightly lower for those with some college or an undergraduate degree than for the average high school graduate. A postgraduate degree in Hawaii did show a significant premium (nearly 70 percent), but it was a somewhat smaller premium than for postgraduates in the U.S. as a whole.

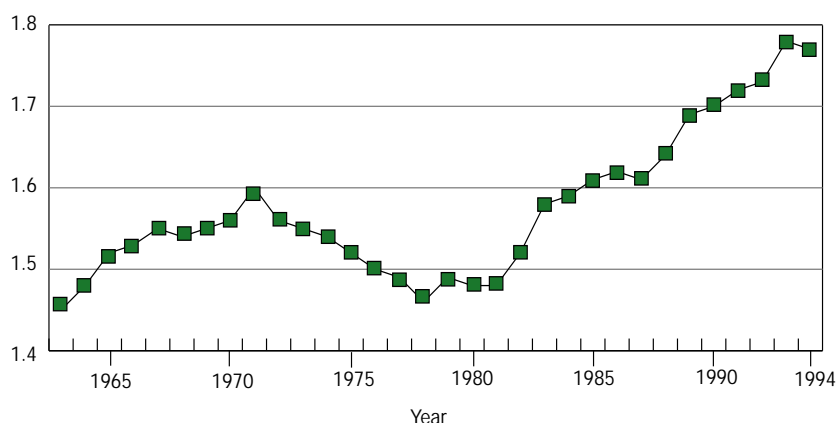
By 1989 the Hawaii patterns began to resemble those for the U.S. as a whole. The one exception is that the high school degree premium seemed to be slightly less valuable than before, compared to the income of someone who had not finished high school. Schooling beyond high school, on the other hand, conferred additional annual income at all levels. Having "some" college raised annual income by 39 percent, a bachelor's degree by 68 percent and the returns to postgraduate education by 117 percent.

By 1995, the high school premium over non-high school graduates had virtually disappeared. Also, the "some college" category slipped—from a 39 percent premium in 1989 to 30 percent in 1995. College graduates continued to show relative gains in earnings premium, although the sharpest gains were among the post-baccalaureate group, which showed a 179 percent educational premium.

Thus, it would appear that investing in a college degree and beyond has returned a large and growing benefit over the past two decades, although somewhat more so on the Mainland than in Hawaii. On the other hand, a high school degree and some college education has experienced a shrinking return in Hawaii.

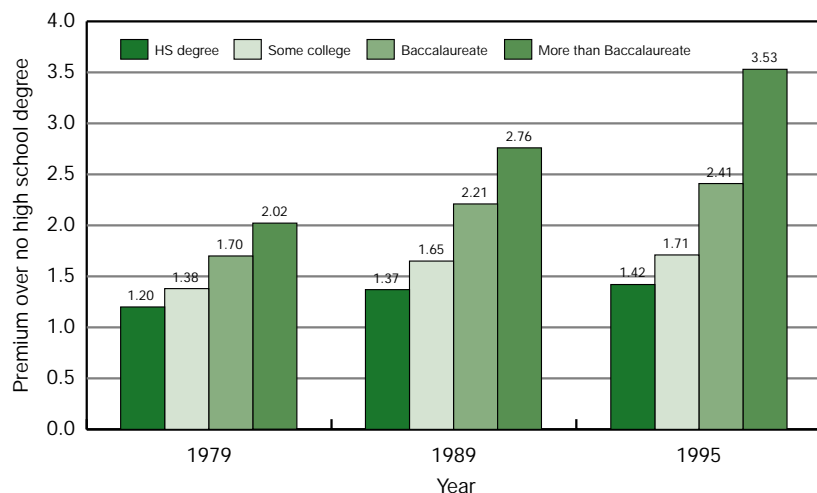
The reasons for this decline in wage premium of the high school degree are

Figure 1. Approximate College-High School Wage Premium for U.S. (ratio of college grad over high school grad income)



Source: Adapted from Topel, Robert H., "Factor Proportions and Relative Wages: The Supply-Side Determinants of Wage Inequality," 11 *The Journal of Economic Perspectives* 55-74 (Spring 1977).

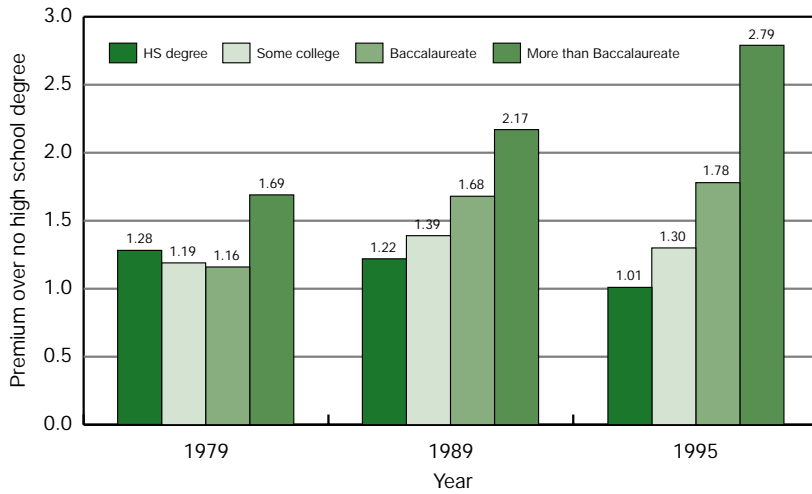
Figure 2. U.S. Educational Premium at Several Levels



Source: DBEDT calculations, based on data from the current population survey (CPS), conducted by the U.S. Bureau of the Census.

¹ The Hawaii results are based on smaller samples than the U.S. results and may therefore be subject to greater uncertainty.

Figure 3. Hawaii's Educational Wage Premiums



Source: DBEDT calculations, based on data from the current population survey (CPS), conducted by the U.S. Bureau of the Census.

not clear. It is possible that Hawaii's lagging economy in 1995 hit workers with less than a college education harder than others. Future work with data from the Current Population Survey may shed more light on this interesting result.

Why has the College Premium been rising?

Several explanations have been put forward to explain the growing college wage premium seen in the U.S. since 1979. One explanation suggests that the widening U.S. trade deficit and the movement of U.S. manufacturing capacity abroad have reduced demand for less-skilled labor in the manufacturing sector. However, some observers reject this scenario, saying that the shifts in trade are too small to account for the relative earnings changes. They note that earnings changes have occurred even in industries that are not prominently engaged in trade.

A second explanation put forth is that the relative demand for skilled (i.e., college-level) labor has increased in the U.S. because of technological change, which favors skilled workers. This seems to have occurred in industries that adopted robotics and other computerized equipment, where labor demand may have shifted to favor the more highly skilled labor needed to operate computers and robotic equipment. This skill-biased, technological-change explanation is also consistent with the rela-

tively stagnant average wage in the U.S. since the 1970s.

A more recent theory is that immigration and rising female participation in the labor force may have driven down low-education wages. However, the effects of immigration in depressing low-skill wages has been minor, according to many observers, and the evidence on female labor participation is inconclusive.

Human Capital Versus Screening

Of course, regardless of why the premium is increasing, it is clear that investing in a college education pays. It may come as a surprise, however, that economists differ about exactly why it pays. The most straightforward explanation is that education makes workers more productive. That is, education actually adds to the ability of workers to produce goods and services. Employers are willing to pay for that extra productivity and this explains the rising relative wages for more educated workers.

But there is another idea about the source of the college premium that centers on the notion of "screening." The argument is that the value of a high school or college degree may have less to do with what one learns in school than it does with sending a signal to employers about factors they value but cannot observe.

For example, an employer might hire

a college graduate rather than someone with only a high school degree because achieving the college degree demonstrates a certain level of perseverance, self-discipline, intelligence, and so on. In such a case, it is the general attributes, rather than the specific content of schooling, that the employer values. The college degree helps the employer in screening the applicant pool for characteristics that the employer cannot observe directly. From the other side, students may be pursuing an education in order to send potential employers signals about traits that the student knows cannot be easily or credibly conveyed.

There is some support for this screening notion. It has been found that measures of learning (such as test scores and grades) cannot help explain the correlation between schooling and wages; this suggests that something other than developing human capital is at work. Evaluations of a federal program for disadvantaged workers in the 1970s also suggest some screening at work in employer selections. It was found that while such training helped raise the earnings of women, it seemed to have had little or no effect on the earnings of disadvantaged men and youth. Moreover, job-specific training seems to be more effective than classroom training. If education as a means of screening is important, one would expect programs for retraining to be less valuable because it would be less clear what a completion certificate would signal; only when the training had specific skills, such as with job-specific training, would the programs lead to higher earnings.

This sorting or "signaling" theory of education still comes to the same conclusion as the competing, human capital theory; that is, more education pays. However, in signaling theory, education pays off for very different reasons than in the human capital theory.

The Future

Some researchers believe that the relative payoff to education will continue. Even though more people are going to college, the increase in supply is not sufficient to offset the rising relative wages. If this expectation is also true for Hawaii, then education may be one of the best investments around.

Hawaii's economy continues to send mixed signals. Indicators such as unemployment, personal income, and tax revenues point to improvements in economic performance. Yet, wage and salary jobs, visitor arrivals, and private construction activity still show weakness. The economy appears to be in a state of slow transition.

In the labor market, both the number of unemployed and the unemployment rate continue to fall. The number of unemployed in the first nine months of 1998 declined 11.0 percent from the same period in 1997. Over the same period, the unemployment rate fell by almost one full percentage point to 5.9 percent. Moreover, civilian employment is on the rise, growing 1.3 percent for the first nine months.

However, the number of wage and salary jobs continues to fall slowly, down 0.7 percent for the first nine months of the year. Jobs in most nonagricultural industries declined in the first nine months except the broad services category and state and local government. Agricultural wage and salary jobs, however, increased by 7.1 percent in the first nine months of 1998. The self-employed workforce may be accounting for the difference between the overall employment and job data, along with other factors.

Although wage and salary jobs have been falling, the latest available data indicate that personal income rose during the first half of 1998. Overall, personal income grew 2.2 percent between the first half of 1997 and the first half of 1998. Moreover, the Honolulu consumer price index declined from the first half of 1997 to the first half of 1998. As a result, real personal income actually grew at a higher rate than personal income measured in current dollars.

Tax revenue has also exhibited recent growth. Overall State tax collections in the fiscal year which began in July, have increased 3.9 percent through September, compared with the same period in 1997. All but one major source of tax revenue showed gains in the first quarter of the fiscal year. Corporate income tax collections led the increases with a 46 percent growth in the first fiscal quarter compared with the same period the year before. Personal income tax collections were up 5.1 percent, while general excise tax collec-

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tion increased 1.1 percent for the period. The lagging source of tax revenues has been the Transient Accommodations Tax, which was down 2.1 percent for the first fiscal quarter compared with a year earlier.

The visitor market was also giving mixed signals. Total visitor arrivals through October showed a decline of 1.9 percent from the same 1997 period. However, because visitors were staying longer, the average daily count of visitors actually increased 0.4 percent for the period.

County Economic Conditions

In terms of economic growth, Hawaii County again turned in the strongest performance in the state so far in 1998. While all counties saw declines

Jobs and visitor arrivals will decline in 1998, but show modest growth in 1999.

in unemployment, Hawaii County was the only county to see an increase in wage and salary jobs (see table on back page). Moreover, only the Big Island has seen an increase in eastbound visitor arrivals this year.

The unemployment rate declined in all four counties in the first nine months of 1998 relative to the same 1997 period. Nevertheless, the number of wage and salary jobs has declined in all counties except Hawaii County. The greatest de-

cline has been in Honolulu, which experienced a 1.1 percent decline in the first nine months of 1998. Maui and Kauai experienced marginal job losses of 0.6 percent and 0.4 percent, respectively for the period. The gain in wage and salary jobs in Hawaii County amounted to 3.3 percent in the first nine months. The largest percentage increases for the Big Island came in construction (up 7.3 percent), transportation-communications-utilities (5.7 percent) and services (5.5 percent).

Visitor arrivals grew by 4.8 percent in Hawaii County for the first nine months of 1998. Westbound arrivals grew by 4.0 percent, while eastbound arrivals expanded 7.5 percent. Eastbound visitor arrivals declined in all other counties, although Kauai and Maui Counties were able to achieve modest gains in overall visitor arrivals for the period—a 1.0 percent increase for Kauai and 0.3 percent for Maui. However, on Oahu the overall visitor count declined a full 5.0 percent from the first nine months of 1997. Mirroring the visitor arrival results, hotel occupancy rates fell by more than 4 percentage points in Honolulu County. Occupancy rates were down slightly on Kauai, but up from the year before in Hawaii and Maui Counties.

Outlook

The Asian economic troubles continued to affect Hawaii's economy into late 1998, especially in the visitor industry. The November 1998 issue of the Blue Chip Economic Indicators showed further reductions in the consensus forecast for expected economic growth in Asia. Japan's economy was expected to show a decline of 2.3 percent in 1998, South Korea's real GDP was expected to fall by 5.8 percent, and Hong Kong's economy for 1998 was anticipated to show a 3.7 percent decline. The consensus forecast for these economies has shown deeper declines in recent months. The economic decline in these economies is not expected to continue in 1999, but neither will there be much growth.

The Blue Chip forecast for the value of the Japanese yen, based on October forecasts, was 130 per dollar for 1998 and 126 in 1999. The yen/dollar rate reached well over 140 per dollar this

year. But more recently the yen has appreciated to about the 120-per-dollar level. A stronger yen tends to bolster visitor arrivals and expenditure in Hawaii.

The November Blue Chip consensus forecast for U.S. real growth anticipated a 3.5 percent increase for 1998, slipping to a 2.1 percent increase in 1999. U.S.

inflation was expected to average a modest 1.7 percent in 1998, but accelerate to 2.4 percent in 1999.

For Hawaii, DBEDT expects visitor arrivals to decline somewhat for 1998 due to lower eastbound traffic, but thanks to more westbound arrivals the average count of visitors per day may match or exceed the 1997 level. Arrivals should

rebound in 1999 and beyond. Inflation should remain below 1 percent through 1999. Wage and salary jobs in Hawaii are likely to post a loss for 1998 and to grow modestly in 1999. Inflation-adjusted personal income will grow by about 2 percent in 1998 and 1999, with real gross state product growing at a slightly slower pace.

Selected Economic Indicators: State

Series	1998 (calendar year except for taxes)		Percent change from same period in previous year	
	September	January–September	September	January–September
Civilian Labor Force (persons) ¹	592,850	594,750	1.5	0.5
Civilian Employment	556,200	559,700	1.6	1.3
Civilian Unemployment	36,650	35,050	-2.0	-11.0
Unemployment Rate (percent) ²	6.2	5.9	-0.2	-0.8
Total Wage & Salary Jobs (number)	527,000	534,200	-0.7	-0.7
Total Non-Agr. Wage & Salary Jobs	519,900	526,650	-0.8	-0.8
Contract Construction	21,000	21,400	-6.0	-3.8
Manufacturing	16,000	16,200	-1.5	-2.7
Trans., Comm., Utilities	40,500	40,650	-1.8	-1.9
Trade	131,300	132,150	-1.8	-1.6
Retail	110,600	111,300	-2.0	-1.8
Finance, Insur. & Real Estate	34,900	35,150	-3.2	-2.9
Services & Miscellaneous	167,900	169,100	-0.7	0.1
Hotels	37,000	37,750	-3.0	-1.9
Government	107,400	111,900	2.9	0.6
State	60,000	64,500	5.6	1.2
Counties	17,200	17,050	0.6	1.2
Federal	30,200	30,350	-0.8	-1.0
Agriculture Wage & Salary Jobs	8,000	7,550	6.0	7.1
Taxes (\$thousands, State fiscal year July 1998–June 1999)				
Total State Tax Collections	288,975	822,441	-0.1	3.9
State General Fund Tax Revenues	273,919	738,957	0.0	4.9
(Selected taxes)				
General Excise & Use Tax	120,946	360,313	2.7	1.1
Personal Income Tax Collections	116,658	283,430	8.3	5.1
Corporate Income Tax Collections	11,128	15,480	-4.9	46.1
Trans. Accom. Tax Revenue	10,662	31,231	-10.0	-2.1
Visitor Arrivals (persons)	532,130	5,120,390	-3.9	-1.6
Westbound Visitors	314,360	3,196,230	5.7	3.8
Eastbound Visitors	217,770	1,924,160	-15.0	-9.5
Hotel Occupancy Rates (percent) ²	70.1	73.7	-3.8	-1.8

¹ Labor force and jobs averages are based on monthly rounded data. Labor force data were also benchmarked in March 1998. Self-employed data will no longer be published by DLIR.

² Change is expressed in percentage points rather than actual percent change of the rates shown.

Sources: Hawaii Depts. of Labor & Industrial Relations, Taxation; Hawaii Visitors and Convention Bureau, PKF Hawaii. Compiled by the Economic Planning Information System (EPIS) of DBEDT.

Table 1. Selected Economic Indicators by County, January through September 1998
(value and percent change from same 1997 period)

Indicator	C&C of Honolulu		Hawaii		Maui		Kauai	
	Value	Percent Change	Value	Percent Change	Value	Percent Change	Value	Percent Change
Unemployment Rate ¹ (percent)	5.0	-0.5	9.1	-1.6	6.5	-1.3	9.8	-1.9
Total Wage & Salary Jobs ²	400,150	-1.1	53,250	3.3	56,950	-0.6	24,150	0.4
Non-Agr. Wage & Salary Jobs	397,950	-1.2	50,800	3.1	54,950	-0.6	23,300	0.2
Construction	16,500	-4.3	2,200	7.3	1,750	-10.3	1,000	5.3
Manufacturing	12,400	-3.1	1,600	-3.0	1,800	-2.7	400	-11.1
Transportation, Comm. & Utilities	32,750	-2.1	2,800	5.7	3,500	-5.4	1,550	0.0
Trade	97,600	-2.1	12,850	0.4	15,050	-0.3	6,650	0.8
Retailing	80,300	-2.5	11,150	0.5	13,700	-0.4	6,450	0.8
Finance, Ins. & Real Estate	28,100	-3.3	2,600	0.0	3,050	-1.6	1,400	-6.7
Services & Miscellaneous	120,800	-0.2	18,300	5.5	22,300	1.1	8,300	0.0
Hotels	16,700	-5.1	6,850	2.2	11,000	0.0	3,400	1.5
Government	89,850	0.5	10,350	1.5	7,500	0.0	3,950	0.0
Agriculture Wage & Salary Jobs	2,200	12.8	2,450	6.5	2,000	0.0	850	6.3
Visitors, Total Number ³	3,613,350	-5.0	959,260	4.8	1,792,290	0.3	775,840	1.0
Westbound	1,720,870	-0.5	715,840	4.0	1,473,960	2.8	677,840	4.5
Eastbound	1,892,480	-8.8	243,420	7.5	318,330	-9.7	98,000	-18.1
Room Occupancy Rate (%) ¹	75.5	-4.4	70.3	3.3	73.9	0.4	69.2	-1.6

¹ Change represents absolute change in rates rather than percentage change in rates.

² Labor force and jobs averages are based on monthly rounded data. Labor force data were rebenchmarked as of March 1998.

³ Preliminary data.

Note: Data for 1995 and 1996 were rebenchmarked by DLIR.

Sources: State DLIR, HVCB, PKF-Hawaii. Compiled by EPIS/READ, DBEDT.

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