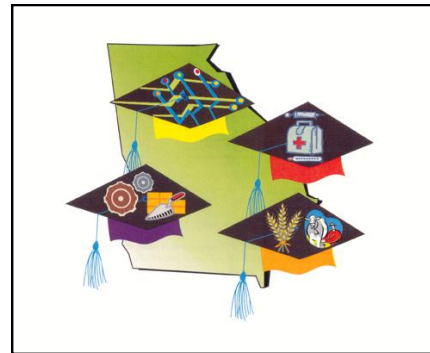


# Georgia's \$10 Billion Payoff

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A recent analysis conducted for the University System of Georgia's (USG) Intellectual Capital Partnership Program concluded that in 1998 recent USG graduates contributed over \$1.25 billion to Georgia's economy. This contribution was measured by calculating the difference between the wages of each 1993-1997 USG graduate, and the typical wages of a high school graduate. When we sum these values for all USG graduates working in Georgia, this amount (\$1.25 billion) represents the USG's one-year economic contribution to the state from five year's worth of recent graduates.

Section 5 of the project report (*The Value of University System of Georgia Education*) provides many additional details including crosstabulations of the economic value of USG education by institution, program, and county. These findings are interesting and useful, but they represent only a portion of the true economic impact of higher education. College education is an expensive investment, but that investment is worthwhile because we expect that its full benefits will extend over an entire career, not just a few years after graduation. This observation raises the tantalizing question: would it be possible to estimate the career-long benefits of USG education? If so, we could then compare the USG's statewide economic benefits to its annual cost, thus estimating the return on the state's substantial investment in higher education.

The purpose of this paper is to report the results of two additional economic impact analyses intended to supplement the results reported in *The Value of University System of Georgia Education*. The first analysis calculates the full, career-long, economic value of one-year's cohort of USG graduates to the state of Georgia. The second investigates the results of reducing USG enrollment and estimates the additional increment of wages that employers would need to pay to attract replacement out-of-state residents.

Both analyses use recently-released 2000 Census Public Use Microsample (PUMS) data for Georgia and the other 49 states. The PUMS dataset is a very detailed one-percent sample of the full population. Unlike other Census tables it is not a summary tabulation but individual microdata, so researchers can cross-tabulate the data in an infinite variety of ways rather than be limited to the Census-provided tables. The analyses utilize (1)

PUMS data for Georgia, which contains information on persons living in Georgia in March 2000 including both continuous residents and recent (1995-1999) in-migrants from elsewhere, and (2) PUMS data for the other 49 states, which includes information on former Georgia residents (out-migrants) who left the state in 1995-1999.

#### A. Long-term economic value of the University System of Georgia

How is it possible to estimate the career-long value of a college degree? One approach might be to follow individuals throughout their careers. However, calculating the career-long benefits would require the conversion of earnings over multiple decades to constant dollars corrected for inflation and the time-value of money. An additional complication is introduced by the problem that the value of education is most likely to increase over time, rendering it very difficult to compare values over four different decades.

In June 2002 the U.S. Bureau of the Census released a report entitled “The Big Payoff: Educational Attainment and Synthetic Estimates of Work Life Earnings.” This report posed the question of whether or not higher education was a good investment for the individual, and it pioneered a new, cross-sectional approach to the estimation of life-long earnings. Instead of attempting to follow individuals, “The Big Payoff” used national data from the Current Population Survey to calculate earnings by both age and educational attainment. By assuming that an individual with a typical “synthetic” career trajectory would pass through each of the age groups, the Census was able to estimate life-long earnings for individuals at different levels of educational attainment. All estimates are in 1999 dollars, so the complications of discounting and inflation are neatly sidestepped. Figure 1 summarizes the Census findings.

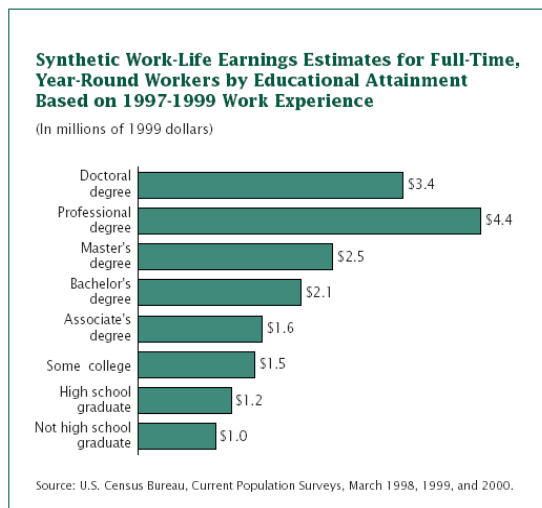


Figure 1: Career-long earnings by levels of educational attainment (from “The Big Payoff” p. 4)

To calculate the economic value of all USG graduates, we will adopt the Census method with three modifications. First, we will use Georgia-specific 2000 Census data, rather than national data. In recent years the USG has produced nearly half of all the higher

education graduates in Georgia, so we would expect the wages of all Georgia college graduates would provide a valid representation of the wages of USG graduates. Second, because there is year-to-year fluctuation in age-specific wages, we will use smoothed data by fitting a third-degree (cubic) polynomial to wages over time. Last, the Census restricted its analysis to full-time, year-round workers, but we can not assume that all USG graduates will fall into that category, so we will lift that restriction for our analysis.

Figure 2 shows the expected career wage trajectories for year 2000 Georgia residents. Each line represents a different level of educational attainment, and the total area under each curve sums to the expected career-long earnings (assuming a 40-year career from ages 25 to 64).

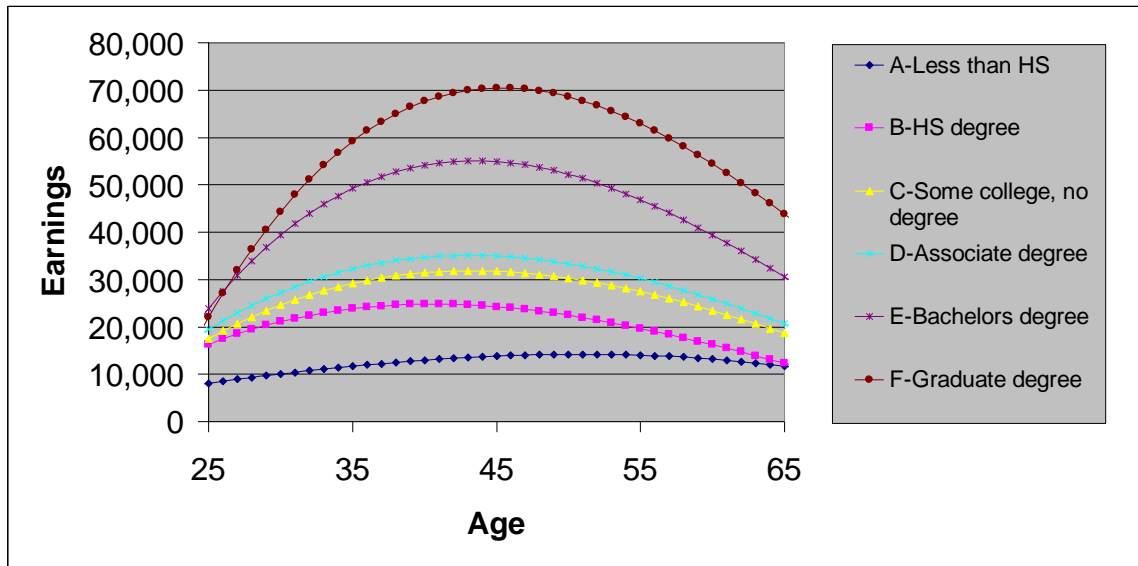


Figure 2: Career wage trajectories of Georgia residents calculated from 2000 Census PUMS data

The area between curves E-Bachelors degree and B-HS degree is the expected career-long difference in earnings between a Georgia high school graduate and a Georgia college graduate. Table 1 shows the estimated career earnings for each level of education, then the increment of earnings for those with educational attainment beyond a high school degree.

Table1: Economic value of USG education

<b>Education Level</b>	<b>Career Earnings (Ages 25-64)</b>	<b>Higher Education Increment</b>	<b>Increment Less 3% Outmigration</b>	<b>2000 USG Completions</b>	<b>Less Those Not in Workforce</b>	<b>Total Economic Impact</b>
A-Less than HS	\$ 498,932					
B-HS degree	\$ 838,994					
C-Some college, no degree	\$ 1,086,588	\$ 247,594	\$ 152,423	1,190	893	\$ 136,000,000
D-Associate degree	\$ 1,199,157	\$ 360,162	\$ 212,654	4,570	3,428	\$ 729,000,000
E-Bachelors degree	\$ 1,824,488	\$ 985,494	\$ 531,741	20,259	15,194	\$ 8,079,000,000
F-Graduate degree	\$ 2,306,906	\$ 482,417	\$ 244,360	8,570	6,428	\$ 1,571,000,000
<b>Total</b>				<b>34,589</b>	<b>25,942</b>	<b>\$ 10,515,000,000</b>

However, before calculating the total economic impact of the USG we must correct for two additional factors. First, each year some number of USG graduates leave the state and contribute the value of their education elsewhere. Through analysis of the 2000 Census PUMS data we calculated outmigration rates for each level of education and determined that from 1995-1999 about three percent of the state's college graduates left Georgia each year. Therefore we have reduced the "typical" graduate's earnings by three percent each year, to account for this slow but steady outmigration. (The outmigration of college graduates is more than compensated by the immigration of graduates from elsewhere. In fact, for each outmigrating college graduate Georgia gains two immigrating graduates. But we have not included this "windfall" in our analysis since we are evaluating the benefits of the USG, not educational institutions in other states.) Over a period of 40 years, this correction reduces benefits by nearly 50 percent.

The second correction is necessary because the loss rate of very recent graduates is much higher than three percent a year. Out-of-state residents return to their home states or countries, (formerly) Georgia residents take jobs in other states, and some graduates choose not to enter the workforce for family or other considerations. Previous analysis of USG graduates has determined that about 25 percent of recent graduates can not be located in the Georgia workforce, so we reduce the number of USG completions by 25 percent.

Table 1 shows the results of these corrections, as applied to all year 2000 program completions from the University System. The right-most column shows the result of multiplying the number of graduates (reduced by 25 percent) times expected career-earnings (reduced by three percent per year). The result shows that the career-long economic value of the 2000 USG class will be more than \$10 billion. Since the USG annual budget is about \$4.5 billion (including the teaching, research, and service missions), the value of the USG's educational output alone is more than three times the system's total annual budget.

## B. Economic cost of reduced USG enrollment

The same PUMS Census dataset can be used to estimate the short-term economic impact of a reduction in USG enrollment and graduations. If the USG were forced to reduce enrollment due to facility or budget limitations, Georgia employers could (1) eliminate those jobs and decrease employment, (2) substitute workers with only a high school education, or (3) hire additional college graduates from outside of Georgia. The most likely overall outcome would probably be a combination of the three options, but unless the cost difference was prohibitive, we would expect most often employers to substitute college graduates from elsewhere.

How much more would this substitution cost Georgia's employers? We can estimate this wage differential by comparing wages of young full-time workers who recently moved into the state, to the wages of those who have been continuous Georgia residents. Table 2

shows the numbers of full-time workers who were in-migrants, out-migrants, or continuous residents, according to the 2000 Census. Table 3 shows the wage surcharge employers must pay to attract out-of-state graduates to work in Georgia. For holders of a Bachelor's degree, employers must pay an additional 14 percent (about \$5,800) per year, and for holders of graduate degrees they must provide almost 16 percent more (about \$7,750) per year.

Education Level	Number of In-Migrants	Number of Out-Migrants	Number of Continuous Residents	Number of 1995-1999 Net Migrants	Number of 1999 Net Migrants	Annual Net Migration Rate
Less than high school	15,969	4,125	47,566	11,844	2,568	4.2%
High school degree	26,683	11,920	113,974	14,763	3,085	2.2%
Some college, no degree	30,311	16,580	97,348	13,731	2,873	2.3%
Associate degree	9,298	4,606	20,667	4,692	1,003	3.5%
Bachelors degree	49,734	24,158	74,642	25,576	5,597	4.7%
Graduate degree	15,319	6,158	13,877	9,161	2,118	7.8%
Total	147,314	67,547	368,074	79,767	17,244	3.4%

Source: 2000 Census Public Use Microsample (PUMS) Data  
 Analysis includes full-time workers 23-30 years old.  
 Migration information based upon 1995-1999 period.

Table 2: Migration of full-time workers aged 23-30 to and from Georgia

Education Level	In-Migrants' Earnings	Out-Migrants' Earnings	Continuous Residents' Earnings	In-Migrants' Additional Earnings	In-Migrants' Earnings Surcharge
Less than high school	23,751	27,000	21,490	2,261	10.5%
High school degree	25,607	23,604	25,493	115	0.5%
Some college, no degree	28,900	26,638	28,432	468	1.6%
Associate degree	30,982	33,896	34,375	*	*
Bachelors degree	46,936	53,819	41,153	5,783	14.1%
Graduate degree	55,283	63,754	47,733	7,550	15.8%

Source: 2000 Census Public Use Microsample (PUMS) Data  
 Analysis includes full-time workers 23-30 years old.  
 Migration information based upon 1995-1999 period.  
 Earnings are for 1999 calendar year.

\* Small sample size for persons with Associate degree

Table 3: Earnings Differences Between Georgia Full-time Workers Who Were In-Migrants, Out-Migrants, and Continuous Residents

It is very interesting that the earnings of Georgia's out-migrants are even higher than those of our in-migrants. This could be interpreted to mean that Georgia's quality of life is higher than that found in those states to which we send our out-migrants, so it is more expensive to lure our young people to move out-of-state than it is to attract other states' young people to move to Georgia. But this is a research topic beyond the scope of the present investigation.