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EDUCATION -- HUMAN CAPITAL INVESTMENT

by
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Have you ever wondered if your high school diploma or advanced degree were worth all the effort? People routinely must make decisions concerning alternative opportunities available to them. One possible alternative is additional education. The value of education is multi-dimensional. The value may simply be the satisfaction of completing a difficult course of study or the opening up of job opportunities at a desired location. Another value from education is potential lifetime earnings, which is to some degree measurable in dollar terms. Through this analysis, readers are encouraged to view education as an "investment in human capital."

In this ***Commentator***, the author examines the potential lifetime earnings of an individual going into government service. Why government service? Because starting salaries for different education levels are clearly spelled out with definite step and promotion increases as long as the individual performs the job requirements. The values derived in this study may also be used as a guide for private industry lifetime earnings potential, even though beginning salaries are more variable and promotions and pay raises less predictable than in government jobs.

Base Salary Level – Methods

After talking to several government human resources persons, it was determined that variability in application of wage scales existed, but was small. Therefore, a government service salary table for 2002 was obtained and used for this analysis. The 2002 salary table presented in Table 1 applies to the area identified as Rest of United States. Thanks to Carter Anderson, of the SD Ag Statistics Service, for identifying a "typical" career ladder for government employees.

Employees begin at a grade level, step1, and then move up by steps until the next grade is reached at step 1 again. Typical movement from one step to another is as follows: steps 1-4 are annual, 5-7 every two years, and 8-10 every three years. In addition, promotion or time in grade averages around one year from GS-5 to GS-7; 18 months for GS-7 to GS-9; two years from GS9 to GS-11; and two to three years from GS-11 to GS-12. Promotion to GS-14 or 15 may take a longer period of time and steps become more important.

Table 1. Salary Table 2002

Step / Grade	1	2	3	4	5	6	7	8	9	10
GS-3	$19,667	$20,322	$20,977	$21,632	$22,287	$22,943	$23,598	$24,253	$24,908	$25,563
GS-5	$24,701	$25,525	$26,348	$27,172	$27,995	$28,819	$29,642	$30,466	$31,289	$32,113
GS-7	$30,597	$31,617	$32,638	$33,658	$34,678	$35,698	$36,718	$37,738	$38,758	$39,779
GS-9	$37,428	$38,675	$39,922	$41,169	$42,416	$43,664	$44,911	$48,158	$47,405	$48,652
GS-11	$45,285	$46,795	$48,304	$49,813	$51,322	$52,831	$54,340	$55,849	$57,358	$58,867
GS-13	$64,542	$66,693	$68,844	$70,995	$73,146	$75,297	$77,448	$79,599	$81,751	$83,902

Source: Portions of Salary Table 2002 - RUS, Effective January 2002. Thanks to Carter Anderson, SDASS, USDA for providing this table.

Table 2. Education requirements for beginning salaries and promotion potential in U.S. government service.

Education	Grade	Promotion Potential
High School	GS-3	GS-7
Bachelor's <3.0	GS-5	GS-15*
Bachelor's>3.0	GS-7	GS-15*
Master's	GS-9	GS-15*

*Potential to Senior Executive

For purposes of this analysis, step 1 pay grades and education levels were matched to obtain starting salaries, Table 2. High school diploma holders begin earning salary the first year after high school graduation, with Bachelor's degree and master's degree recipient's earnings beginning in years five and six, respectively. A cost of living allowance of three percent per year and an additional allowance for typical career advancement were derived. Performance and promotion advances were smoothed over the entire work period of 45 years after high school graduation. The percentage advancement allowances derived were two percent for high school and three percent for Bachelor's and Master's. The resultant earnings amounts are in nominal dollars and no allowance is made for enhanced retirement benefits that may be attributed to level of education.

The base salary for high school graduates in 2002 was $19,677. The 2002 base salaries for students seeking university degrees were inflated three percent per year for the time spent in school. This is consistent with the fact that new hire salaries increase from year to year.

Lifetime Earnings Potential (COLA only)

Annual salaries with a cost of living allowance (COLA) of three percent per year are presented in Table 3. A high school graduate who has worked four years can expect an annual salary of $22,135 for the fifth work year which compares to a base salary of $27,801 and $34,437 for Bachelor's degree program graduates with grade point averages below 3.0 and greater than (or equal to) 3.0, respectively. This difference in base salary of $6,636 for a higher GPA helps one to see the importance of good grades in college. If students were to take five years to earn a BS degree, base beginning salary is higher but one year of earnings potential was lost. Student work income while earning a degree was assumed to offset debt. It was assumed that students paid for education with work earnings, scholarships, assistantships and parental assistance. The Master's degree holder begins earning the sixth work year with a base salary of $43,389. A person with a high school diploma works for 45 years (age 63) to attain a final salary of $72,206 and lifetime earnings of $1,823,522 assuming a three percent cost of living increase each year. This assumption means that the wage earner was not promoted or given merit pay above COLA. The same is true for BS and MS graduates who amass lifetime earnings of $2.19, $2.71 and $3.2 million, respectively. Over a lifetime of earning, a GPA of less than 3.0 costs the worker $522,010. The MS graduate lifetime earnings exceeded the BS>3.0 graduate by $562,657.

Of course, promotions and merit raises due to high job performance are necessary to beat the impact of inflation on real income. Salaries presented in Table 3 were derived using straight cost of living allowances with no promotion or merit raises. If you discount every salary in the table by three percent to account for inflation, every salary of each education level is the same as the base salary in real dollar purchasing power.

Table 3. Lifetime Earnings Potential by Education Level, 3% Inflation (in dollars)

Year	HS Diploma	BS < 3.0	BS > 3.0	Master's
1	19,667			
2	20,257			
3	20,865			
4	21,491			
5	22,135	27,801	34,437	
6	22,799	28,635	35,470	43,389
7	23,483	29,494	36,534	44,691
8	24,188	30,379	37,630	46,031
9	24,914	31,290	38,759	47,412
10	25,661	32,229	39,922	48,835
15	29,748	37,362	46,280	56,613
20	34,486	43,313	53,652	65,630
25	39,979	50,212	62,197	76,083
30	46,347	58,209	72,103	88,201
35	53,728	67,480	83,588	102,249
40	62,286	78,228	96,901	118,535
45	72,206	90,688	112,335	137,414
SUM	1,823,522	2,186,918	2,708,928	3,271,585

Lifetime Earnings Potential (COLA plus Advancement Increases)

Most individuals earn promotion and/or merit salary increases over the course of their work life. A typical advancement scenario was assumed and lifetime earnings were calculated and presented in Table 4. In addition to a COLA of three percent per year, workers were awarded two percent salary enhancement per year if a high school graduate and three percent per year if a college graduate with a BS or MS degree. This assumes that on the average, college graduates receive more and higher promotion salary increases than high school graduates.

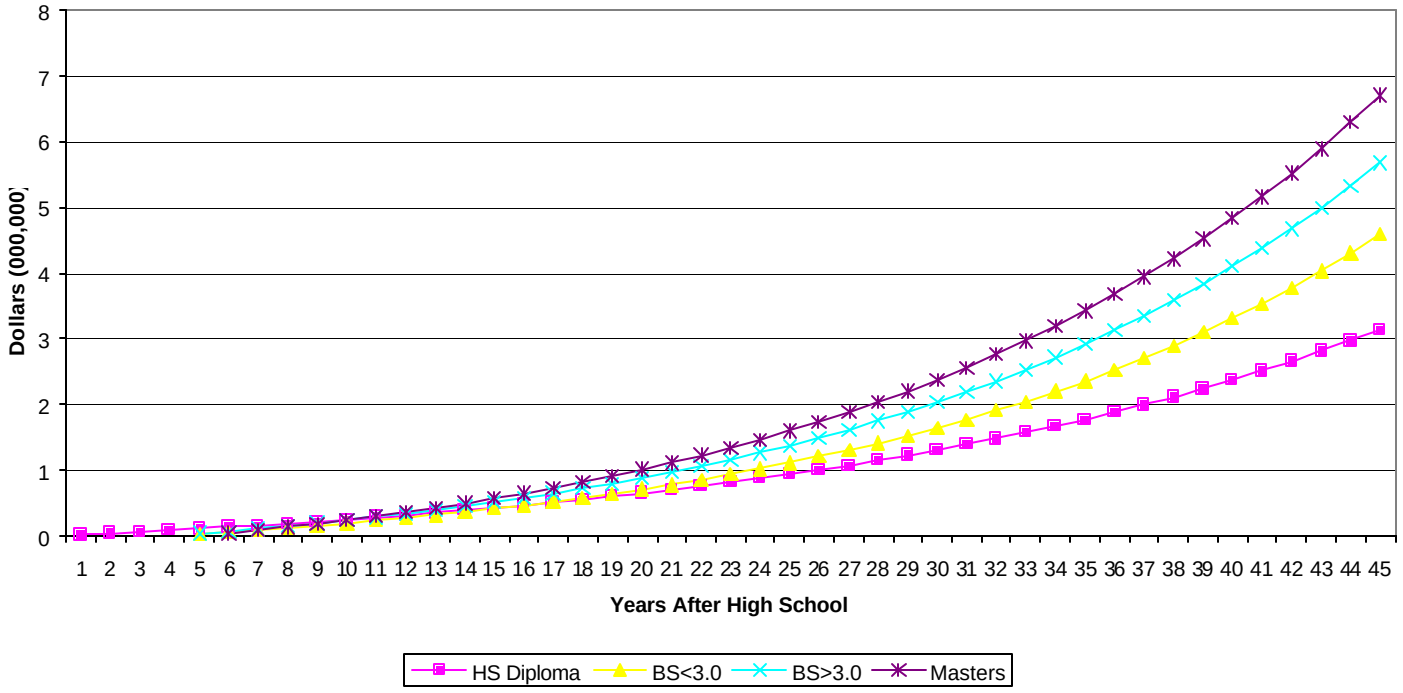
Table 4. Lifetime Earnings Potential by Education, 3% Inflation Plus Promotions (in dollars)

Year	HS Diploma	BS < 3.0	BS > 3.0	Master's
1	19,667			
2	20,650			
3	21,683			
4	22,767			
5	23,905	27,801	34,437	
6	25,101	29,469	36,503	43,389
7	26,356	31,237	38,693	45,992
8	27,673	33,111	41,015	48,752
9	29,057	35,098	43,476	51,677
10	30,510	37,204	46,084	54,778
15	38,939	49,787	61,671	73,305
20	49,698	66,626	82,530	98,098
25	63,428	89,162	110,444	131,278
30	80,952	119,318	147,799	175,679
35	103,318	159,675	197,789	235,098
40	131,862	213,681	264,686	314,615
45	168,294	285,953	354,209	421,026
SUM	3,140,823	4,588,491	5,683,747	6,714,967

The tenth year after high school graduation, the diploma holder earns an annual salary of $30,510, BS<3.0 and BS>3.0 holders earn $37,204 and $46,084, respectively, and a MS degree holder earns $54,778. The MS degree holder has already accumulated more earnings than the BS degree holders and surpasses the high school graduate the next year. The BS degree holder with higher grades surpasses the high school graduate in lifetime earnings after two more years, but it takes the BS degree holder with lower grades another six years to surpass the high school graduate in lifetime earnings. Forty-five years after high school graduation, the lifetime earnings for a high school graduate, BS degree holder (<3.0 GPA), BS degree holder (>3.0 GPA), and MS degree holder are $3.14, $3.68, $4.59, and $6.71 million, respectively. Accumulated earnings were graphed and presented in Figure 1.

After ten years of working, the high school graduate's annual salary has increased by 55 percent, while the annual salaries of BS and MS degree holders have increased by 69 percent. Over the 45 years to age 63, the high school graduate's salary is 8.55 times their beginning salary, the BS degree holders salary is 10.29 times their beginning salary, and the MS degree holders salary is 9.7 times their beginning salary.

Figure 1. Lifetime Earnings Potential by Education Level



After 25 years of working, the MS degree holder earns $175,679 annually and 45 years after high school graduation is making $421,025. At first glance this last number looks huge. This must be a mistake! However, if one thinks back as I can after 25 years in the workforce, one finds that these multiples in salary increase are indeed appropriate in a *growing* economy. My current salary is five times what my beginning salary was and if I project forward with only COLA salary increases to 45 years after high school graduation, my salary would be between eight and nine times my beginning salary. With today's higher beginning salary bases and a growing economy, ten times starting salary is appropriate for this time frame. This is in nominal dollars of course. The power of compounding is strong and helps parents answer the questions surrounding their two income children's families buying what seems like expensive new homes and driving two SUV's. In 25 years, their incomes will most likely be four to five times what they are today in nominal terms and two to three times higher in real terms, assuming they work hard, get promoted, and receive merit pay increases.

OK, so this last scenario may be a little optimistic, but it is possible and an excellent goal to achieve. Given the history of the American economy, an outcome between the scenarios presented in Tables 3 and 4 is very likely. The three percent cost of living increase (Table 3) may be "stop and go" along with economic troughs and peaks, but most likely will be exceeded.

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