Education Attainment Measurement "Gaps" and Income for Young Adults: Are Differences in GPA and the ACT a Predictor of Future Wages?

By: Kevin Modlin

This study seeks to determine the existence of "gaps" in the percentile ranking of high school GPA and the percentile ranking of standardized college admission tests to recognize the influence on wages among individuals who have recently started in the workforce. A review of the data by dividing it into quintiles and a regression analysis illustrates some observations and leads to the conclusion that there is a non-linear dynamic of the gap variable and that it has a minuscule effect on wages until an individual has a very significant gap.

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~~1)~~ *It is therefore ordered that every township in this jurisdiction, after the Lord hath increased them to fifty households shall forthwith appoint one within their town to teach all such children as shall resort to him to write and read, whose wages shall be paid either by the parents or masters of such children, or by the inhabitants in general, by way of supply, as the major part of those that order the prudentials of the town shall appoint; provided those that send their children be not oppressed by paying much more than they can have them taught for in other towns.* *Massachusetts General School Law of 1647*

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I. Literature and Theory Review

Economists from Adam Smith to Gary Becker have highlighted education as an asset that an individual uses in the workplace in the form of human capital development. Smith observes, "a man educated at the expense of much labour and time to any of those employments which require extraordinary dexterity and skill, may be compared to one of those expensive machines. The work which he learns to perform, it must be expected, over and above the usual wages of common labour, will replace to him the whole expense of his education."[1]

Becker argues that, "high school and college education in the United States greatly raise a person's income, even after netting out direct and indirect costs of schooling, and after adjusting for the better family backgrounds and greater abilities of more educated people"[2] In their 1992 study Mankiw et al elaborate on the Cobb-Douglas production function by including human capital(H) in the model $Q=A\,K^{\alpha}\,H^{\beta}\,(L)^{1-\alpha-\beta}$ asserting that the trade off is not just labor (L)

[1] Smith, Adam. The Wealth of Nations. Petersfield: Harriman House, 2007. Print. Page 66

[2] Becker, Gary S. Human Capital: a Theoretical and Empirical Analysis, with Special Reference to Education. Chicago: University of Chicago, 1993. Print. Page 17

and capital (K) but also within types of labor - educated or uneducated[3]

There have been a number of studies on the effectiveness of the generally accepted measurements of academic performance and success in life. Altonji studied the influence of various high school curriculums that show greater returns for backgrounds in the math and science fields, but that is, "much less than the value of a year spent in high school."[4] Also Richard J. Murnane, John B. Willett, and Frank Levy reviewed the influence of high school arithmetic as "an increasingly important determinant of subsequent wages."[5] While most of the objectives of improved education are generally accepted in societies, the definitions and metrics behind them are less exact. Using measurements most often associated with economics, we will assume utility is maximized based on personal financial gains given that other measures of maximized utility for an individual are difficult to quantify with this data.

It is important to consider the varying goals for young college graduates who may find utility maximization beyond wages. Economists Jack Fiorito and Robert C. Dauffenbach, point to the influence of "nonmarket influences"[6] in human capital development decisions. However, it would be difficult, and impossible within this data set, to ascertain each interviewee's full utility function. Furthermore, while researches have extensively reviewed the influence of academic achievements on financial future, there appears to be less work in the area of the gap between various measures of intellectual ability playing a predictive role. For example, after

[3] Johnes, Geraint, and Jill Johnes. International Handbook on the Economics of Education. Cheltenham, UK: Edward Elgar, 2004. Print. Page 171

[4] Altonji, Joseph. "The Effects of High School Curriculum on Education and Labor Market Outcomes." The Journal of Human Resources, 30. 3 (1995) 409-438

[5] The Growing Importance of Cognitive Skills in Wage Determination: Richard J. Murnane, John B. Willett, Frank Levy The Review of Economics and Statistics, Vol. 77, No. 2 (May, 1995), pp. 251-266

[6] Market and Nonmarket Influences on Curriculum Choice by College Students: Jack Fiorito and Robert C. Dauffenbach Industrial and Labor Relations Review, Vol. 36, No. 1 (Oct., 1982), pp. 88-101

taking a standardized test like the SAT or ACT an individual may express a belief that he/she performed better (or worse) on these tests than in the classroom environment. This paper questions the frequency of this occurrence by finding the absolute difference of the percentile ranking of the ACT and high school GPA measurements and seeks to measure the influence on future wages. This would in effect make the scores relative to each other in the context of a competitive system of measurements of academic performance within the student population. This analysis is based on the simple breakdown by quintiles and on the regression.

II. Study Methodology

This paper uses data collected from the National Longitudinal Study of Youth 1997 (NLSY97)[7] which is sponsored by the Bureau of Labor Statistics. This division within the Department of Labor sought to "gather information at multiple points in time on the labor market activities and other significant life events,"[8] from about 2,300 youth who were between 12 to 16 years old as of December 31, 1996, and who fit within the study criteria. As of the most recent update of the study, the responders were now between the ages of 23 to 27, which would begin to capture most individuals leaving four-year institutions of higher learning and entering the workforce full-time. There, of course, is the additional caveat that some students would have engaged in part-time or full-time work while in school, so the study looks at the highest income earned by each individual as a measure of his/her entry wage when the decision is made to enter the labor force full-time. This wage distinction is also made because of the absence of the

[7] "Welcome to Investigator." Investigator. U.S. Bureau of Labor Statistics, n.d. Web. 1 May 2010. <https://www.nlsinfo.org/investigator/pages/welcome.jsp>.

[8] "National Longitudinal Surveys Home Page." U.S. Bureau of Labor Statistics. N.p., n.d. Web. 2 May 2010. <http://www.bls.gov/nls/>.

graduation date within the NLSY97 data.

The graduation event may lead to expanded employment opportunities beyond human capital accumulation, as illustrated by Andrew Weiss.[9] He explains that education provides a useful means for employers to sort through prospective employees as an indication of the innate qualities of a worker including their ability to handle complex topics, interact with others, and be diligent workers. Also, this model does not fully account for labor demand, though the national macroeconomic condition was stable at the taking of this survey with the annual unemployment rate in 2007 at 4.6%.[10]

The groupings within this sample are already self-selective because the individuals who choose to take the test are aspiring college students who are most often required to take the SAT or ACT to be considered for enrollment at their schools of interest.[11] Table 1 compares the percentiles and averages of ACT and the converted SAT to comparable ACT scores,[12] the sample data was similar to data available from averages and standard deviations from the testing firms. The average ACT in this NLSY97 sample was 20.9 as compared to ACT reports of 21.0, and the standard deviation for the sample was 4.9 while ACT data was 4.7.[13] This close proximity of the actual population and the sample NLSY97 data is a statistically representative sample of the general college-aspiring population.

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[9] Weiss, Andrew. "Human Capital vs. Signalling Explanations of Wages." The Journal of Economic Perspectives 9.4 (1995): 133-54. Web.

[10] "Employment and Earnings, January 2008." *Household Data*. Bureau of Labor Statistics |, n.d. Web. 1 July 2010. <www.bls.gov/cps/cpsa2007.pdf>.

[11] Manski and Wise have written on youths expectations on college admissions and performance based on what their score is and the average of those students enrolled

[12] "ACT-SAT Concordance." ACT: Resources for Education and Workplace Success. N.p., n.d. Web. 2 May 2010. <http://www.act.org/aap/concordance/>.

[13] "ACT score averages and standard deviations, by selected characteristics, sex, and race/ethnicity: Selected years, 1995 to 2004." National Center for Education Statistics (NCES) Home Page, a part of the U.S. Department of Education. N.p., n.d. Web. 2 May 2010. <http://nces.ed.gov/programs/digest/d04/tables/dt04_132.asp>.

The quintiles show the average within a breakdown in the absolute gap between the percentile ranking of GPA and standardized college admissions test with the smallest gap (2.83%), second smallest gap (9.28%), medium gap (17.67%), large gap (28.62%), and largest gap (49.98%).

III. Gap Contributors

For this study data was segmented it into quintiles to review any unique characteristics between the groups of individuals to draw out meaningful observations (Table 1). Generally, in many, but not all of the points of interest, the quintiles in the middle are toward the center of the distribution, as could be expected. The quintile with the smallest gap shows some noticeable differences between it and the largest gap. The average parental household income, a measure of familial influence, as referenced by the Gary Becker quote at the start of this article, for the smallest gap is $65,954.52 while the largest gap had an average income of $61,797.59. Some of these differences may be explained by the lowest socioeconomic status students who were "35 percent more likely to receive lower grades during the sixth through the eighth grades than high income counterparts."[14] Cabrera, Nasa, and Jossey argue that this point can be significant because it is a time period when many students develop a predisposition to their college ~~future.~~

~~There~~future. There is a slight improvement in average ACT scores for those in the smallest quintile gap (21.33) and the largest quintile gap (20.43). GPA is close among all groups but slightly higher at the second largest quintile at 3.18 compared to the smallest quintile at 3.13. The quintile breakdown on the influence of gaps on future income seems to be positively

[14] Cabrera, Alberto , and Steven La Nasa . Understanding the College Choice of Disadvantaged Students: New Directions for Institutional Research (J-B IR Single Issue Institutional Research). San Francisco: Jossey-Bass, 2000. Print. 33

correlated for all but the largest gap. For the measure of highest income earning year the smallest academic gap was $22,702 and the second smallest gap was $24,794. The average income for the medium gap was $24,310, while for the large gap it was $26,193, and the largest gap was $23,346. Income earning years are also evenly distributed among groups with 3.7 years with reported income in all quintiles.

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IV. Quantifying the effects of the Gap

For my model, I consider the effect of gender, age, family income, years employed, and the gap variables in:

$$Future\ Income = \alpha + \beta\ Gender + \beta\ Date\ Of\ Birth + \beta\ Family\ Income + \beta\ Years\ With\ Income + \beta\ Years\ With\ Income^2 + \beta\ TestGPAgap + \beta\ TestGPAgap^2 + \beta\ TestGPAgap^4$$

The above regression findings show statistical significance or near statistical significance in most of the variables. The R^2 for the model is .2810. The gender binomial variable is negative to represent a loss in wages for female workers. As Table 4 shows, the average highest income was greater for males at $27,087 and females at $21,967. Morley Gunderson notes, "the increased participation of women in the labor market generally has been accompanied by an increase in their earnings relative to those of men." Some substantial differences remain. These

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differences exist even when controlling for the effects of changes in the skills and attributes of female and male workers.[15] Researchers have sought to explain this difference through various hypotheses. These include studies that suggest a prevalence of workplace discrimination from David Neumark, Roy Bank, and Kyle Van Nort.[16] As well there are other findings from Jane Waldfogel[17] that suggest various workplace and household choices are contributing factors.

While women constitute a larger portion of those who are seeking college in the NLSY97 sample, there are some similarities and differences between the two groups. Both saw near equal participation in nonpublic schools at about 13%. Recent work by Fryer and Levitt point to statistical differences in some testing scores between females and males. Their findings on math tests seem to complement observations in this study that showed males were on average stronger in the math portion.[18] At the beginning of a student's school experience the two genders are equal on math scores but Fryer and Levitt write that, "girls lose more than two-tenths of a standard deviation relative to boys over the first six years of school." In the section of the NLSY97 sample that only took the ACT there are slightly stronger scores for females in the English section: 20.9 compared to 19.5 for males, or about a quarter of a standard deviation less of females. But the math section shows slightly stronger scores for males: 21.1 relative to 20.3 for females or about .14 less of a standard deviation of males. The merged comparison of the two scores is 21.2 for males and 20.8 for females. There are also differences in high school

[15] Male-Female Wage Differentials and Policy Responses Author(s): Morley Gunderson Source: Journal of Economic Literature, Vol. 27, No. 1 (Mar., 1989), pp. 46-72

[16] Neumark, David, Roy J. Bank and Kyle D. Van Nort Sex Discrimination in Restaurant Hiring: An Audit Study *The Quarterly Journal of Economics*, Vol. 111, No. 3 (Aug., 1996), pp. 915-941

[17] Waldfogel, Jane Understanding the "Family Gap" in Pay for Women with Children *The Journal of Economic Perspectives*, Vol. 12, No. 1 (Winter, 1998), pp. 137-156

[18] Fryer, Roland, and Steven Levitt. "An Empirical Analysis of the Gender Gap in Mathematics." *Weatherhead Center For International Affairs* . Harvard University, n.d. Web. 25 June 2010. <www.wcfia.harvard.edu/sites/default/files/empirical%20analysis.pdf>.

GPA, with males at 3.06 and females on average at 3.25. Some of this may be attributed, as Fryer and Levitt explain, "since college attendance rates are presently higher for females [the study] may be drawing more heavily from the middle or left tail of the ability distribution."[19]

The average gap in college test scores and GPA between the two is also interesting because it is nearly exact 21.6%. Also among both gender groups 66.8% agreed with the question that 75% or more of their peers were planning to go to college. Also, in number of years attending college, they are equal at 4.8 in each gender group. For degree attainment there is a slight difference, 42.8% for males, while 44.1% for females within the NLSY97 sample have at least a bachelors degree. These observations seem to be supported by studies from the Department of Education that show increased college enrollment and degree attainment rates for more women than men including among traditional students.[20] The parental household income for each interviewee was different with males at $67,219, while the household income for females was $60,824. This may be a reflection of parental decisions on the makeup of the family or other decisions deserving further study. Though Lundberg and Rose have written extensively about household decisions related to the gender of the child and income, their findings are more subtle than the average difference above.[21]

There does not seem to be a reason for the negative effect date of birth has on the individual and future wages other than to hypothesize that workers in this earlier state may be forgoing wages. This variable could be encapsulating that decision. Also, there is a positive influence on the wages from the parents' household. This influence is statistically significant,

[19] Ibid.

[20] Peter, Katharin, and Laura Horn. "Gender Differences in Participation and Completion of Undergraduate Education and How They Have Changed Over Time, The Education Statistics Quarterly: Vol. 7, Issues 1 & 2, 2005." *National Center for Education Statistics (NCES) Home Page, a part of the U.S. Department of Education*. N.p., n.d. Web. 1 July 2010. <http://nces.ed.gov/programs/quarterly/vol_7/1_2/5_7.asp>

[21] Lundberg, Shelly-, and Elaina Rose. "The Effects of Sons and Daughters On Men's Labor Supply and Wages*." *Review of Economics and Statistics* 84.2 (2002): 251–268. Print.

but the benefit for the individual is pennies on the dollar earned by the parent(s).

As some would expect, the influence of parental income in the education variables appears to have some significance. When breaking down each income earning group (about 1760 interviewees provided relevant data) into quintiles (Table 6) we are able to extrapolate some qualities. The highest income group (relative to the NLSY97 sample) saw an average ACT score of 23 and the lowest income group saw a score of 19, while the middle quintile groups were between 21 to 20. This shows that significant income can be beneficial for investment in education including measures of attainment. This can be further elaborated as 77% of the students from highest income families went to public schools while 92% of the lowest household income went to public schools.

Among those with parents with the highest wages their highest earnings on average were $27,318, while those who came from middle income households saw $24,784 (Table 6). The lowest income households saw the highest individual income on average $22,949. When looking at the goals of the interviewee peers in high school we see that among the highest income earning households 83.8% of the interviewees said 75% or more of their peers were planning to go to college. This number falls to 63.3% for middle income households, and for the lowest income group 57.3% agreed. As far as the gap being an accurate predictor of completion of college among all of the quintiles, the results are interesting because it is hard to detect a significant differentiation among the quintile groups when looking at the breakdown. Of those students with the two smallest quintile gaps, 38% had bachelors degree as their highest degree while the second smallest quintile group had significantly more students with advanced degrees (6.5%) compared to the smallest quintile group (3.9%). Returning to the bachelors degree measure, the two quintiles that display the largest gaps show 39% with bachelors as the highest

degree within the sample group. Also, the time spent in higher education at the point of measurement for this survey averages 4.8 years across all of the quintile groups.

When looking at issues related to race, the lowest income earning group consisted of 41.7% minorities while the highest income earning group contained 23.8% minorities. And for college based achievement, 46.3% from the highest income earning household had a bachelors degree or higher while the middle income had 43.4% completed and 42.0% for the lowest income. In the measure of unemployment (Table 3), those who had a small academic difference were unemployed for 0.44 months while those in the largest quintile gap were unemployed for 0.52 months. Uniquely, there was variation within the other quintiles with the medium quintile also at 0.52 months while the longest duration in unemployment (0.57 months) was for the second smallest quintile gap.

Another set of unique variables that were statistically significant was the number of years in the workforce, as well as the same variable squared to detect any nonlinearities. The first variable of the group shows a positive relationship between the value of experience and seniority on wages. The squared years worked variable has a negative return showing that there may be a point where the return is possibly diminished, or not as beneficial, because those years worked were not allocated toward likely increased future wages from advanced education. These findings complement observations by Willis where the quadratic experience terms [the unsquared and squared years worked] are respectively positive and negative." [22]

The question and variable of focus in this paper, the absolute gap in the percentile ranking of performance of individual grades and college admission test scores, provides some interesting insight. The gap variable maintains significance (Figures 1 and 2) only when

[22] Willis, Robert J., (1987), Wage determinants: A survey and reinterpretation of human capital earnings functions, ch. 10, p. 525-602 in Ashenfelter, O. and Layard, R. eds., Handbook of Labor Economics, vol. 1

measured alongside the same gap variable that is squared and raised to the fourth power. The finding of these significant variables leads the author to conclude there is an existence of nonlinearities within the data. In short, a small gap in the two academic measures has a marginal influence on wages but very significant gaps would see a more significant effect on wages. To illustrate the influence of the raised variables, Figure 2 shows when those terms are removed and as a result the gap variable is insignificant. This project demonstrates the multitude of quantifiable variables to account for what may influence future income. The findings would suggest that only in a few cases would having a gap between the percentile ranking of the two academic measures result in an influence on future wages.

It is more likely that these measures would pick up on some idiosyncratic qualities within each individual that would manifest itself in future wages. A recent report from the Brookings Institute evaluating student and school achievement notes that, "hard work, intelligence, and persistence surely contribute to a student's academic success."[23] Card and Krueger have also argued, that with the difficulty in predicting outcomes from "imperfect" test scores, there has been greater focus "on how school resources affect students' educational attainment and earnings."[24] Another point is that variables that were not statistically significant could possibly reflect the constant workforce changes within the sample group. Similar observations have also been explained by Topel and Ward[25] that workers in their first ten years of employment change jobs an average of seven times due to the prospect of increased earnings.

V. Less Statically Significant Variables Excluded From Model

[23] Loveless, Tom. How Well Are American Students Learning?: The 2009 Brown Center Report on American Education: Washington, D.C.: Brookings Institution Press,(2010) Print. Page 17

[24] Card, David and -Krueger, Alan Source: The Journal of Economic Perspectives, Vol. 10, No. 4 (Autumn, 1996), pp. 31-50

[25] Topel, Robert, and Michael Ward. "Job Mobility sand Careers of Young Men." The Quarterly Journal of Economics 107.2 (1992): 439-479 . Print.

While many models take into account factors such as race, any time minority groups were added individually or collectively into the model they were statistically insignificant and lowered the predictive ability within the model. Self selection may come into play as well. Within the whole NLSY97 data set, 19.4% of African Americans and 14.2% of Hispanics took a standardized college admissions test, while non-African American or non-Hispanic (primarily Caucasians) 33.86% took the test. Fryer and Levitt call attention to their findings that, "students enter school, the gap between white and black children grows, even conditional on observable factors." While they acknowledge that they do not have data to support their conclusion[26] Fryer and Levitt believe the performance is because the minority elementary and secondary students may "attend lower quality schools."[27] While the regressions did not find any statistically significant role race may have played when, looking at the quintile breakdown we notice some unique observations. It is evident that a larger proportion of students designated as minority were in the smallest 33.6% and largest 35.8% quintile gaps, and with the smallest portions in the overall distribution in the middle quintiles.

To explore this issue further we can break down of the three racial groups designated in the NLSY97 study (Table 5). We see that 60.4% of African American students who attend college are female while still over half the other groups are slightly lower with Caucasians at 53.9% and Hispanics at 52.2%. Also ACT scores for Caucasians was 21.6 on average while for both Hispanics and African Americans it was 19.8 and 19.5, respectively. The average gap measure for each racial group was relatively close with Caucasians (21.5%), African Americans (22.5%), and Hispanics (22.1%).

[26] Fryer and Levitt believe that in order to accurately test their hypothesis they would need access to detailed data on schools, neighborhoods, and the general environment kids grow up in.

[27] Fryer, Roland- and Levitt, Steven "Understanding the Black-White Test Score Gap in the First Two Years of School." The Review of Economics and Statistics, 86.2 (2004) 447-464

While almost 70% of interviewees who were Caucasian said that at least 75% of their peers were planning to attend college, it was lower for the minority groups, with Hispanics and African Americans each about 60%. College outcomes were also significant with 49% of Caucasians having earned a bachelors degree or greater and African Americans (31.1%) and Hispanics (31.8%). Analysis from the Department of Education also seems to indicate that those who are in racial minority groups and/or those who are economically disadvantaged take longer to complete college.[28] Extrapolating on this conclusion it would be reasonable to assume, given the age of the interviewees, that there may be a higher portion of minorities and low income individuals who may still be in school at the time of this survey. The average income earned in the early working careers for most of these individuals is for Caucasians $24,736.52, for African Americans $22,971.64, and for Hispanics $23,666.86. The relative closeness of these wages for individuals at this stage in life also illustrates why the race variable in this study is less significant. As A. Silvia Cancio, T. David Evans, and David J. Maume, Jr. summarize, "Blacks and Whites are more likely to be paid equally at the beginning of their careers-disparities emerge over time as workers are evaluated by their employers and sorted into positions that either promote mobility or lead to career plateaus."[29] The advanced degrees variable was also less statistically significant and more likely a result of the age of the sample as from the date of the most recent survey. Many prospective students attaining those degrees would not have had them completed.

[28] C. Dennis Carroll Project Officer National Center for Education Statistics Horn, Laura . *Placing College Graduation Rates in Context: How 4-Year College Graduation Rates May Vary With Selectivity and the Size of Low-Income Enrollment, Postsecondary Education Descriptive Analysis Report (National Center for Education Statistics, NCES2007-161)*. Washington, D.C.: Institute Of Education Sciences, 2006. Print.

[29] Reconsidering the Declining Significance of Race: Racial Differences in Early Career Wages Author(s): A. Silvia Cancio, T. David Evans, David J. Maume, Jr. Source: American Sociological Review, Vol. 61, No. 4 (Aug., 1996), pp. 541-556 Published by: American Sociological Association

VI. Alternative Gap Measures

One alternative gap measure from 1747 interviewees within the NLSY97 sample was utilized to compare the percentile differences within the ACT and the Armed Services Vocational Aptitude Battery (ASVAB) to detect any similar trends. It was also useful to provide some degree of standardization in measurements within the model given the frequency of debate concerning high school GPA inflation. As Figure 3 illustrates, this gap variable was not found to be statistically significant when substituted within the model.

By using GPA as the dependent variable and ACT as the independent variable the residuals for each individual (Graph 1) were inserted into the model as an additional gap measure. By inserting this gap measure in the previously outlined regression it was also found to not be an accurate predictor of future wages within the NLSY97 sample. (Figure 4)

An additional gap measure was employed within the base model by looking at the intrinsic academic qualities within each unique data point. The data was organized by each ACT score and each individual GPA was compared to the average GPA to detect any influence on this gap measure. (Graph 2) When substituting this variable for the other gap measurement within the previous model the results were not found to be of any statistical significance. (Figure 5)

~~The advanced degrees variable was also less statistically significant and more likely a result of the age of the sample as from the date of the most recent survey. Many prospective students attaining those degrees would not have had them completed.~~

VII. Recommendations

With the recent passage of legislation to make the public sector the underwriter of a high portion of student loans through the Direct Loan Program,[30] it is possible that there will be future

[30] "Student Aid and Fiscal Responsibility Act (updated 3.18.10) | EdLabor Journal | Committee on Education and Labor."

debates on the public return to this investment in human capital. Or, as Becker has observed, "What has stood out to me most is the realization of how important it is for a country to invest in its people in terms of human capital."[31] A few years before this statutory change a significant portion of students, nearly three out of four in the United States,[32] receive some form of direct government assistance. This writer would recommend, based on this study, that unless more accurate measures are created or perfected in time it may be most useful to continue adhering to currently established admissions policies that vary across institutions, but generally take into account multiple factors. This may be an attempt by institutions of higher learning to "produce a large pool of qualified applicants from which the best candidates can be selected."[33] It has also been argued that the role of the enrollment manager is influenced by multiple considerations and they have a multitude of roles to serve various interests in the university system including administrator, academic, revenue generator, and politician.[34]

Recent information from the Department of Education shows 85.8% of four year institutions have some measure of admission requirements with the individual's school record and college test scores being the leading measures used for admission.[35] Or, as writers with the

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Committee on Education and Labor. Web. 01 May 2010.< http://edlabor.house.gov/blog/2009/07/student-aid-and-fiscal-respons.shtml>

[31] Monaghan, Angela. "Asia will be the world's new centre of gravity - Telegraph." *Telegraph.co.uk: news, business, sport, the Daily Telegraph newspaper, Sunday Telegraph - Telegraph*. N.p., n.d. Web. 30 June 2010. <http://www.telegraph.co.uk/finance/financetopics/profiles/7840272/Asia-will-be-the-worlds-new-centre-of-gravity.html>.

[32] Knapp, Laura G., Janice E. Kelly-Reid, Roy W. Whitmore, Shiying Wu, Seungho Huh, Burton Levine, Marcus Berzofsky, and Susan G. Broyles. "Enrollment in Postsecondary Institutions, Fall 2002 and Financial Statistics, Fiscal Year 2002, The Education Statistics Quarterly: Vol. 7, Issues 1 & 2, 2005." *National Center for Education Statistics (NCES) Home Page, a part of the U.S. Department of Education*. N.p., n.d. Web. 1 July 2010. <http://nces.ed.gov/programs/quarterly/vol_7/1_2/5_9.asp>

[33] Doermann, Humphrey, Howard Geltzer , and Philip Kotler . *A Role for Marketing in College Admissions* . New York: College Entrance Examination Board, 1976. Print. Page 61

[34] Humphrey , Keith . "At the Crossroads of Access and Financial Stability: The Push and Pull on the Enrollment Manager." *College and University Journal* 82 .1 (2006): 11-16. Print.

[35] "Number and percentage of degree-granting institutions with first-year undergraduates using various selection criteria for admission, by type and control of institution: Selected years, 2000-01 through 2008-09." National Center for Education Statistics

College Board assert, “considerable weight on test scores in making admissions decisions….[but] are almost always evaluated in relation to other indicators such as your high school transcript. Specifically, there has been a decline in the number of universities who have required prospective students to submit ACT or SAT scores. Individuals like Alfie Kohn assert that of the hundreds of studies published by the College Board have found, “that only about 12 to 16 percent of the variance in freshman grades could be explained by SAT scores.”[36] These points seem to have struck a chord as data from the Department of Education also shows that four year institutions that require a standardized test for admission have seen a 15.9 percentage point decline from the 2000-2001 to 2008-2009 school years. This would be beneficial in the case that a student would be able to attain a degree even though one measure of academic performance was lower than the other, thus the creation of the gap.

VIII. Conclusions

The quintiles and a regression analysis highlights some observations and leads the author to conclude there is a non-linear dynamic with the gap variable that has a minor effect on wages until an individual has a very significant gap.

A survey of admission standards across universities, as elaborated above, indicates the use of multiple variables in determining admission into a four-year university. The author concludes through the review of this data that an over emphasis on one of the admission measures used in this study would have the effect of focusing on this realized gap. In most cases this gap does not seem to influence the number of bachelors degrees attained, and in only the

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(NCES) Home Page, a part of the U.S. Department of Education. N.p., n.d. Web. 2 May 2010. <http://nces.ed.gov/programs/digest/d09/tables/dt09_328.asp>.

[36] Kohn, Alfie. "Two Cheers for an End to the SAT - Archives - The Chronicle of Higher Education." *Home - The Chronicle of Higher Education*. N.p., n.d. Web. 23 June 2010. <http://chronicle.com/article/Two-Cheers-for-an-End-to-the/15930>.

most extreme cases does it have an influence on wages. The data from the survey also does not elaborate on the quality of the institution where the degree was earned.

It is also appropriate to consider data released from the Department of Education that indicated of all the students seeking bachelors degrees 36.2%, had completed the four year degree in four years, with a majority of students requiring five or more to complete.[37] Also, an updated review may find additional significant variables as the interviewees become more established in the workforce and we are able to more closely review the endogenous qualities of these individuals as their incomes start to smooth with time.

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[37] "Postsecondary Graduation Rates." *Student Effort and Educational Progress*. National Center for Education Statistics , n.d. Web. 24 June 2010. <nces.ed.gov/programs/coe/2010/section3/table-pgr-1.asp >.