

# **The Falling Time Cost of College: Evidence from Half a Century of Time Use Data\***

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July 20, 2007

## **ABSTRACT**

Using multiple datasets from five different time periods, we document changes in time use by full-time college students in the United States between 1961 and 2004. Full-time college students in 1961 appeared to allocate 40 hours per week toward class and studying, whereas in 2004 they invested 23 to 26 hours. Declines in academic time investment were extremely broad-based, and are not easily accounted for by changes in the composition of students or schools. Findings suggest that previous research may have underestimated recent increases in the rate of return to postsecondary education by as much as 80 to 90 percent.

\*This work benefited from conversations with Kelly Bedard, Ted Bergstrom, John Briggs, Steven Brint, David Fairris, Peter Kuhn, Valerie Ramey, Doug Steigerwald, Aman Ullah, and Cathy Weinberger, and from comments by Charles Clotfelter, Caroline Hoxby, and others attending the NBER Higher Education Meetings, Spring, 2007. This research uses data from the Higher Education Research Institute housed in the Graduate School of Education and Information at the University of California, Los Angeles. We offer thanks to Alexander Astin and HERI Research Directors, Sylvia Hurtado, John H. Pryor, William S. Korn, and Victor Saenz for access to and assistance with the HERI data. We thank the Indiana University Center for Postsecondary Research for access to data from the National Survey of Student Engagement. Brianna Briggs provided excellent research assistance on this project.

## I. INTRODUCTION

“Hours worked” is recognized as a fundamental measure in applied economics, and trends over time in hours worked by U.S. workers have been carefully documented. Time use associated with education attainment has received less attention. In particular, there has been little or no investigation of trends over time in the actual time investment associated with a “year” of post-secondary schooling. Because time is the choice variable in models of human capital investment and production, this is potentially a serious omission. Our research documents and quantifies changes in time use by full-time college students at four-year institutions in the United States between 1961 and 2004. We find dramatic declines in academic time investment over this period. Full-time college students in 1961 appeared to allocate about 40 hours per week to academics, whereas full-time students in 2004 appear to have invested about 23 to 26 hours per week. Declines were extremely broad-based and are not easily accounted for by changes in the composition of students or schools: Study time fell for students from all demographic subgroups, within race, gender, ability, and family background, overall and within major, for students who worked in college and for those who did not, and the declines occurred at 4-year colleges of every type, size, degree structure, and level of selectivity. A “year” of college, then, is a nominal measure of time. It is a currency whose face value has eroded more or less continuously for over 40 years.

The relevance of this research is threefold. Firstly, if student effort is an input to the education production process, then declining time investment could signify declining production of human capital. To the extent that educators at post-secondary institutions are actively seeking ways to impart more human capital, the magnitude of the decrease over time in this fundamental input is worth knowing. Secondly, the long-run decline in time allocated toward college by full-time students may have major ramifications for economists. Obvious problems arise when a nominal measure is treated as real. Many studies of the impact of schooling on wages, as well as numerous studies in the economics of education literature, assume implicitly that the time

investment associated with a year of college has remained constant over time. When this assumption does not hold, results change significantly. We highlight a primary implication—that increases in the rate of return to postsecondary education since 1980 may have been greatly underestimated. Lastly, the decline in academic time investment by full-time college students is a puzzle in its own right. We investigate a number of potential mechanisms, but submit that it remains an open question.

The remainder of the paper is structured as follows. Section II reviews the relevant literature. Section III describes the data and assesses comparability of the data across time samples. Section IV documents the time trend in academic time investment and disaggregates the data to parse out and evaluate competing explanations. Section V explores the implications of these results. Section VI concludes.

## II. Previous Research

A number of recent books in the popular press have expressed concern about a perceived decrease in student “engagement.”<sup>1</sup> But perceptions of engagement are highly subjective. The evidence in the education literature has been incomplete, anecdotal, has covered short time periods, or has lacked strategies to account for composition bias and other confounding factors. Kuh (1999), for example, finds that “time spent on school work” by college students fell between the mid-1980s and the mid-1990s. But the dataset was not nationally representative or a random sample, and the set of schools sampled in the 1980s was not the same as the set sampled in the 1990s. It is not clear whether the observed changes derived from changes in the weighting and composition of schools in the sample between the 1980s and 1990s or from changes over time in time-use choices by students within the same institution.<sup>2</sup> Astin, Keup, and Lindholm (2002),

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<sup>1</sup> Hersch and Merrow(2005), Bok(2005), Nathan (2005).

<sup>2</sup> Moreover, the survey language was somewhat problematic. Respondents were asked if their time spent on school work was “About 50 hours or more a week,” “About 40 hours a week,” “About 30 hours a week,”

analyzing a consistent set of schools between 1989 and 1998, find that time spent studying fell by about .41 hours per week. Evidence in the education literature, then, is suggestive but non-conclusive, and is limited to a brief period between the 1980s and 1990s.

We have found no work in the economics literature investigating, reporting, or providing evidence of the academic time-use trend we study here. Two recent survey articles in the economics of higher education (Ehrenberg, 2004, Winston, 1999) make no mention of changes over time in academic time investment or of research on this point. In economics, previous research on time use by college students focuses on employment during college. Examples include Ehrenberg and Sherman (1997), Orzsag, Orzsag, and Whitemore (2001), Scott-Clayton (2007), and Stinebrickner and Stinebrickner (2003). These authors explore the effects on academic performance of working while in college. We will return to this topic in Section V. Most previous research by economists on college time use does not make reference to study-time measures. Stinebrickner and Stinebrickner (2004) is the only work we know of that does so—and we concur with the authors’ assessment on the dearth of existing research: “Knowledge of the relationship between educational outcomes and perhaps the most basic input in the education production process—student study time and effort—has remained virtually non-existent.” The authors find study time to be positively associated with student GPAs at Berea College. To further motivate our empirical investigation, we pause to determine whether there exists broader evidence that increased study time is associated with increased marginal product later in life.

The National Longitudinal Survey of Youth, 1979, includes data on time use in college and long-run wages. Data on study time are available for students who were in college in 1981. To construct Figure 1, we combined time use data from students who were in college in 1981 full time with subsequent wage data for these students at two-year intervals from 1986 to 2004. We regress log hourly wage from each of these years on hours studied per week in 1981, and then

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“About 20 hours a week,” or “Less than 20 hours a week.” Large time ranges and imprecise language could make this an unusually noisy measure.

plot the coefficient on “hours studied” against the year referenced by the wage. All regressions also include controls for gender, AFQT score, and year in college in 1981 (i.e., dummies for freshman, sophomore, and junior year) and recommended weightings. Though it remains difficult to separate the effect of pre-existing ability from acquired human capital in this simple OLS setting, we find a positive association between weekly study time in college and future wages. The estimates are not statistically distinguishable from zero in early post-college years, but the increase in wages associated with studying grows larger over time and becomes statistically significant in later samples. If productivity-enhancing characteristics that are difficult to observe by employers exert a stronger influence on wages as individuals spend more time in the workforce (and employers learn more about the individual’s marginal product), then this would be the expected pattern.<sup>3</sup> By 2004, a student who studied an hour more per week earned a wage premium of about .6%. The standard deviation of hours studied in the NLSY79 is 14.6. Thus, a standard deviation change in hours studied in 1981 is associated with a wage gain of 8.8 log points in 2004. We do not claim to have proven a causal effect, but conclude that—consistent with previous work, most economic models of human capital, and the intuitions of educators—increased effort in college is associated with increased marginal product later in the lifecycle.

### III. Data

#### A. Comparability of Time Samples

Documenting changes in time investment requires pooling a wide range of datasets from multiple sources. We examine data from 5 time periods, 2003-2005, 1995-1997, 1987-1989, 1981, and 1961. We restrict our analysis to full-time students at four-year colleges in each of these periods. Data for time use in the earliest time period, 1961, come from Project Talent. For the 1981 sample, we use the 1981 college module from the National Longitudinal Survey of

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<sup>3</sup> See Altonji and Pierret (2001), Farber and Gibbons (1996). We assume that study time in college is not observed by the employer.

Youth, 1979. The data for recent time periods comes from the Higher Education Research Institute (HERI), based in the Graduate School of Education & Information Studies at the University of California, Los Angeles. We use HERI Follow-up Surveys (FUS) for the years 1987-1989 and HERI College Student Surveys (CSS) for the 1995-1997 and 2003-2005 periods. For simplicity here, we will refer to the multiyear samples by their midpoints (e.g., the 2003-2005 dataset is the “2004 sample”). We also obtained data from an additional source for the most recent time period: the 2003 National Survey of Student Engagement (NSSE).

Table 1 displays summary statistics and indicates how the samples differ from one another. The following differences will be most relevant to the analysis: 1) In the 1961 and 1981 surveys, respondents give a precise numeric answer to the time use questions, whereas in the HERI surveys (the 1988, 1996, and 2004 samples) and the NSSE survey (the 2003 sample) respondents answer time use questions by selecting from among time ranges; 2) The 1961 and 1981 surveys are nationally representative random samples, whereas the HERI and NSSE data are not; 3) The schools surveyed in the HERI data change from year to year, although the data do contain large consistent sets of schools across time periods; 4) The 1961 survey lacks information on class time, SAT scores<sup>4</sup>, and institutional characteristics; 5) The 1961 survey was administered to Freshmen, the 1981 to all grades, the HERI surveys to on-time Seniors and the NSSE survey to Freshmen and Seniors. In short, the samples are not all directly comparable with one another. We will address each of these concerns in more detail in Section IV. Here, we briefly describe the data.

### *1961 (Project Talent)*

Project Talent (1961) is a nationally representative random sample and it elicits time use response in hours, not ranges. The salient survey question is phrased: “*Indicate below how many*

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<sup>4</sup> Also, we lack SAT scores for over 80% of the 1981 sample. Because of this and the lack of SAT scores in the comparison 1961 sample, we do not use or report SAT scores for the 1981 sample.

*hours a week, on the average, you spent in each of the following kinds of activities during your first year in college.*” We focus here on the activity “*Studying (Outside of class).*” The question is asked in a one-year follow-up to an earlier survey of students who were high school seniors in 1960. Thus, students did not have to recall college study times from a distant past, as they were in the process of completing their first year in college. The survey also includes recommended weightings to account for survey design and attrition. We use the recommended weightings in all displayed tables and figures.

#### *1981(NLSY79)*

The 1981 college module of the NLSY79 asks current college students at all levels (Freshmen through Senior) how many hours in the last week they “*spent studying or working on class projects.*” They are asked the question in two settings, once in reference to studying “*on campus*” and once in reference to studying “*off-campus,*” and we sum these to obtain the weekly study times. This survey also elicits responses in hours, rather than ranges, and includes recommended weightings. We use the recommended weightings in all displayed tables and figures.

#### *1988, 1996, 2004 (HERI)*

HERI respondents, on-time seniors (in their fourth year), were asked “*During the past year, how much time did you spend during a typical week doing the following activities?*” One of the activities listed is “*Studying/Homework.*” Allowed responses are as follows: “*None, Less than 1 hour, 1 to 2, 3 to 5, 6 to 10, 11 to 15, 16 to 20, Over 20.*” For the 1988, 1996, and 2004 HERI samples, the survey question (and allowed response ranges) remained the same. However, the data are not a random sample of institutions, so it is important that we construct consistent sets of schools. To obtain a sufficiently large consistent set of schools, we pool three years of data for each time period. A school with data in both the “1988” and “1996” samples is one for which

data is available in one or more of the years 1987, 1988, or 1989, and in one or more of the years 1995, 1996, or 1997. The HERI data contain 40 schools of this type. Similarly, a school with data in both the “1996” and “2004” samples is one for which data is available in one or more of the years 1995, 1996, or 1997, and in one or more of the years 2003, 2004, 2005.<sup>5</sup> There are 89 such schools. In section IV.C, we will compare across consistent sets of schools to infer changes in academic time investment between 1988 and 1996 and between 1996 and 2004.<sup>6</sup> Following Dale and Krueger (2001), we weight individual observations by the inverse of the student population at the school multiplied by the number of observations for that school. Thus, if the universe of schools were the 89 schools in both the 1996 and 2004 samples, summary statistics, regression coefficients and confidence intervals calculated using the given weighting would be representative of this universe.<sup>7</sup>

### 2003 (NSSE)

The National Survey of Student Engagement asks students “*About how many hours do you spend in a typical 7-day week doing each of the following?*” One of the activities listed is “*Preparing for class (studying, reading, writing, doing homework or lab work, analyzing data, rehearsing, and other academic activities).*” Allowed responses are: “*0 hours/week, 1-5 hours/week, 6-10 hours/week, 11-15 hours/week, 16-20 hours/week, 21-25 hours/week, 26-30 hours/week, more than 30 hours/week .*” As was the case for the HERI sample, we weight individual observations by the inverse of the student population at the school multiplied by the number of observations for that school. The NSSE survey began in 2000; thus, unlike the HERI

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<sup>5</sup> The specific years (1987-1989, 1995-1997, and 2003-2005) were selected to maximize the set of schools for which data was available in multiple time periods.

<sup>6</sup> It is also possible to examine study times for schools with data available in 1988 and 2004 (a total of 42 schools), or to investigate schools that have data available in all three relevant time periods (26 schools). To save space (and for clarity of exposition) we have not reported these results. Available upon request, they show a similar downward trend in study times.

<sup>7</sup> We also drop schools for which there are less than 10 individual observations. Results change very little when these schools are included.



surveys, it cannot be used, by itself, to estimate long-run trends in academic time use. Moreover, both the set of schools surveyed and the allowed response bins differ from the HERI data. A major strength of this dataset, however, is that there are 156 schools in the 2003 NSSE for which we also have data in Project Talent. We will use the NSSE sample, then, to create 1961 and 2003 snapshots of what we will argue to be a representative set of institutions.

## IV. Results

### A. Overview

We use two main empirical strategies. First, we estimate overall declines in academic time investment between 1961 and 2003 (or 2004) at representative sets of four-year institutions. The strength of this approach is that there exist large sets of schools to analyze, that the schools appear representative, and that we are able to obtain bottom-line estimates of overall changes in time use. Second, we analyze changes in study time over three smaller, component time intervals at consistent sets of four-year institutions. The strength of the second approach is that subtle differences in survey questions and framing are accounted for and that it speaks to whether the changes in time use were one-time events or continuous and ongoing. We argue that the two strategies complement one another.

### B. Overall Declines in Academic Time Investment

Given that data from later time periods are grouped in bins or ranges, the most straightforward way to compare 1961 and post-2000 study time measures is to examine study time cumulative distribution values at common truncation points. This requires no assumptions about the underlying distribution for the grouped data samples. The second line of Table 1 shows CDF values (subtracted from 1) at common truncation points of 20 hours a week for all samples. Many colleges recommend and expect that full-time students study 24 hours a week or more. (See the discussion in Section V). The second line of Table 1, then, shows the fraction of students who

come close to the recommended level. In 1961, 67% of full-time students at four-year postsecondary institutions studied more than 20 hours per week. In the 2004 HERI sample, only 10% of students studied 20 hours or more a week, and in the 2003 NSSE sample, only 20% of students studied at least 20 hours a week. A primary concern, however, is the representativeness of the later samples. The 1961 dataset is a national random sample. The 2004 HERI and 2003 NSSE samples, which contain 89 schools and 156 schools, respectively, are not nationally representative. It could be that the schools surveyed in HERI and NSSE samples are “low-effort” colleges that would have featured low study times in 1961, as well. Is the apparent decline in study times due to non-random selection into the later samples?

To address this possibility, we examine a core sample of 24 schools for which we have both HERI data in 2004 and Project Talent data in 1961, and a sample of 156 NSSE schools for which data are likewise available in both time periods. Figure 2A shows study time CDFs (subtracted from 1) at common truncation point of 20 hours per week for the 24 HERI core institutions in 1961 and 2004. (Because we have data for all these schools in 1996 as well, the figure also contains plotted statistics for 1996.) In the figure, schools are also divided by their Carnegie classification, as reported in the Integrated Postsecondary Education Data System (IPEDS) 2000.<sup>8</sup> There were 6 Doctoral/ Research universities, 10 Masters colleges or universities, and 8 Baccalaureate/Liberal Arts colleges in the HERI Core. Though students at Liberal Arts colleges appear to study more than students at other types of institutions, the decline in study times is visible for all types of institutions. Figure 2B repeats the above exercise using the 156 NSSE schools. A similar large decline is visible for these institutions.

Study time trends for a “typical” student may not be adequately captured by the CDF summary statistics reported above. Median study time may be a more attractive summary statistic

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<sup>8</sup> We do not know the institutional type in 1961, as this was before IPEDS data was collected.

here than mean study time, as it avoids the top-coding problem in the later samples.<sup>9</sup> Table 2 shows that median study time fell from 23.6 hours per week in the 1961 sample to 8.5 and 11.8 hours per week, respectively, in the 2004 HERI core and the 2003 NSSE samples. In all but the 1961 and NSSE datasets, students offered responses to a question about how many hours a week they spent in class. Table 2 also shows that students in recent cohorts spent less time in class than did their counterparts in earlier years. However, the decline is not as precipitous as for the study time measure.

Though stronger assumptions are necessary to calculate study time means, these are the relevant measures for the wage regressions of Section V. We report study time means in Table 2. In what amounts to an assumption of normality, we address the top-coding problem for the later samples by regressing study time or class time on a constant and no other regressors in a standard interval-coded (ordered probit) regression. We then report the estimated coefficient on the constant. We also report means calculated using a simpler algorithm. We assign to each observation in a bin the value of the midpoint of the range represented by the bin. Values in the top bin (>20 hours/week for the HERI sample and >30 for the NSSE) take on a value of 24 for the HERI sample and 32 for the NSSE. As is evident in Table 2, results from these two methods differ only very slightly.

Statistics in Table 3 allow a detailed analysis of the representativeness of the post-2000 samples for all colleges and divided up by Carnegie classification. The study time drops depicted in Figure 2 do not appear to have been artifacts of the CDF study time measure. A comparison of columns 2 and 5 reveals steep declines in all three study time measures between 1961 and 2004 for the 24 colleges in the HERI Core. Comparison of columns 3 and 6 reveals the same pattern for the NSSE schools. Further, the first line of Table 3 indicates that neither the 24 schools of the

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<sup>9</sup> Calculation of median study times for the 1961 and 1981 samples is straightforward and involves no additional assumptions. For the later samples, we use the standard method for calculating the median of grouped data. This involves assuming a uniform distribution over the range of values represented by the bin that contains the median.

HERI Core sample nor the 156 schools of the NSSE sample could be characterized as “low effort” schools in 1961: Columns 1 and 2 show students in the nation at large in 1961 studying slightly less than students in the HERI Core in 1961 for all three study time measures, and columns 1 and 3 show students in the NSSE schools in 1961 studying at about the national average. The institutions in the 2004 HERI Core and 2003 NSSE appear then to be representative in terms of study time choices by students in 1961. The schools for which we have data in both 1961 and the 2000s do not appear to have been “low effort” schools in 1961.

Are the samples representative along other dimensions? The remaining rows of the first panel of Table 3 allow comparisons by work status, race, gender, and parental education. Average characteristics for full-time students in NSSE schools in 1961 (column 3) look almost identical to the average for all full-time students at four-year institutions in 1961 (column 1). Average characteristics for HERI Core institutions in 1961 also look very similar to the overall averages for 1961, except that there were fewer female respondents in the HERI schools.<sup>10</sup> NSSE and HERI Core institutions also appear broadly representative of all institutions in 2004, in terms of their racial composition. Respondents in HERI and NSSE institutions had higher parental education than the 2004 average and there were more female respondents in these institutions. Also, NSSE institutions featured fewer students who were working while in school than the 2004 average. However, we will show that higher parental education is associated with higher study times in 2004 and female students studied more than males in 2004.<sup>11</sup> If anything, then, characteristics of the HERI core and NSSE institutions suggest that average study times reported for these institutions in 2004 (and 2003) may be *higher* than the national average—and the average overall decline in study times even larger than indicated in Figure 2.

The largest difference between HERI Core and national samples is there are fewer public schools in the HERI Core (23 out of the 24 institutions are private schools.) The NSSE data do

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<sup>10</sup> This should not be a major concern, as female students studied about the same as male students in 1961. See Table 4.

<sup>11</sup> See Table 4.

not have this limitation, as 67% of the respondents in the weighted NSSE sample attended public schools. Interestingly, public school students in the NSSE sample *study less* on average than private school students (12.7 hrs/wk compared to 14.6 hrs/wk). Again, the evidence suggests that study times in the 2004 HERI Core are, if anything, higher than the national average. We conclude that the study time drop is not a byproduct of nonrandom selection by institutions into the later samples—that, if anything, the magnitude of the study time drop may be larger than we have reported.

Schools in the 2003 NSSE sample appear to have modestly higher study times than schools in the 2004 HERI core sample. We offer several possible reasons for this. It is possible that the higher study times in NSSE schools result from there being a lower fraction of students at these institutions who were working while in college. But we do not rule out framing effects associated with the survey instrument. As indicated in section III, HERI and NSSE surveys have 8 allowed response bins to time use questions. However, the NSSE survey offers higher ranges of hours than the HERI survey (There are 3 bins capturing choices greater than 20 hours per week, rather than one bin.) Sudman, *et al.* (1996) find that higher allowed response ranges bias responses upward and lower allowed ranges bias responses downward. We do not take a stand on which survey instrument more accurately captures actual time investment in the 2000s. Rather, we use the NSSE and HERI results to provide an estimated range.

We revisit Table 2 for a summary of findings. Study time added to class time gives a measure of the total academic time investment associated with going to college (full-time) for a given cohort. Our estimate of the average academic time investment for the 1961 cohort is 40.2 hours per week, while the estimate for 2003-2005 is between 22.9 and 26.1 hours per week.<sup>12</sup> This yields a main finding of the paper: *Academic time use by full-time college students at four-year institutions fell from about 40 hours per week to 23-26 hours per week between 1961 and*

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<sup>12</sup> The lower estimate is based on the HERI data and the higher estimate on NSSE data. Here, we use the average 1981 class time estimate for average 1961 class time, as this measure is absent in the 1961 dataset. We use the HERI 2004 class time estimate for NSSE 2003 class time, for the same reason.

2004. In the 1960s, then, full-time college attendance entailed a time investment comparable to that of a full-time job.<sup>13</sup> For more recent cohorts, going to college full-time appears to have been, at best, a part time job. Has the drop been continuous or did it take place all at once? Is it an artifact of changes over time in the survey instruments? Have education standards fallen? Or is the observed decline explained by changes over time in the composition of the college-going population, their work choices, the types of colleges they attended, or the subjects in which they majored? In the next sections, we evaluate these and other competing explanations.

### C. Time Trend in Academic Time Use

Our second empirical strategy is to compare samples that used similar or identical survey questions and comparable samples across three different sub-periods within the 4-decade period analyzed above: 1961-1981, 1988-1996, and 1996-2004. Project Talent and the NLSY79 used very similar survey questions administered to randomized national samples. Thus, we compare the findings from these surveys directly to estimate the change in academic time investment between 1961 and 1981. The first 2 columns in the first row of Table 4 show median study time by full time students in 1961 and 1981, respectively. Project Talent respondents were freshmen, whereas students from all college years in 1981 responded to the NLSY79. However, when the NLSY79 sample is restricted to Freshmen students, median study time is **less** (16.3 hrs/wk, rather than 16.6 hrs/wk). Comparing Freshman to Freshman then yields an even larger drop in study times than indicated in Table 4. (We use students of all levels in the NLSY79 so that sample size is large enough to allow us to disaggregate by subgroups.) Because the survey question and allowed responses in the 1988 HERI sample differ from those in the 1961 and 1981 samples, our strategy in this subsection is to refrain from drawing inferences about changes in study times

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<sup>13</sup> There could be some concern that the early 1960s (or the Project Talent dataset) may be idiosyncratic. There exists evidence, however, that academic time investment by college students was also comparable to a full-time job *well prior to the 1960s*. Lundberg et al. (1934), analyzing time-use diaries, show average weekly academic time investment by college students in 1934 to be 39 hours per week.

between the 1981 NLSY79 sample and the 1988 HERI sample. Between 1988 and 1996, however, the HERI survey question (and allowed response ranges) remained the same. The third and fourth columns of Table 4 display median study times in 1988 and 1996, respectively, for students in the 40 schools for which we have time use data in both the 1988 and 1996 HERI samples. Survey questions and allowed responses also remain the same for the 1996 and 2004 HERI samples. The fifth and sixth columns of Table 4 compare weekly study times in 1996 and 2004 for the HERI schools with data in both time periods.<sup>14</sup>

Table 4, Row 1, is consistent with the analysis in Section IV.B, but offers new information. Firstly, it provides evidence that the decline in study times has been continuous and ongoing. Study times fell during every period for which comparable data on the beginning and ending points exist. Secondly, Table 4 demonstrates the decline in academic time investment is not simply an artifact of changes over time in the survey instrument (e.g., the change from exact numerical responses to grouped data responses.) Comparisons in Table 4 derive from student responses to similar or identical survey questions and response ranges.

#### D. Demographic Subsamples

Table 1 documents that demographic characteristics of the college-going population have changed over time. If current students were drawn from higher in the ability distribution or were better prepared for college, one might expect lower study times, as they might need less time to absorb the required material. Parental education is one predictor of college preparedness or academic ability. Do systematic changes in parental education over time explain study time trends? Table 4 shows median weekly study times by time period disaggregated by categories of parental education. Students with less-educated fathers appear to study less than students whose fathers attained higher levels of education. However, study times declined for all parental

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<sup>14</sup> We do not include NSSE statistics in Table 4, as the NSSE contains different institutions from the HERI data and features a different set of allowed responses to the survey question.

endowment categories—for students with fathers who did not attend college, for students whose fathers attended some college but did not earn a 4-year degree, and for students whose fathers graduated from college.

Similarly, employment choices by students have changed over time. The fraction of working students is .27, .43, .75, .78, .83 and .82 in the 1961, 1981, 1988, 1996(with 1988 available), 1996(with 2004 available) and full HERI 2004 samples, respectively. In more recent cohorts, a much higher fraction of students worked while going to college. It may be that students work more because college is less demanding. Alternatively, credit-constrained students who must work have less time left over studying. Do work choices explain the decline in study times? Table 4 shows that study time fell for students in all ranges of work hours in all but one time period. Moreover, *declines were largest for students who did not work at all*. Changes in hours worked by the college-going population do not appear to explain in any direct way the decline in study times.<sup>15</sup> Rather, the evidence suggests that college has become less time-intensive for students in every category of work choice.

Large changes in the gender-composition of the college-going population took place between 1961 and 2004. The share of women is .46, .48, .57, .58, .62 and .65 in the 1961, 1981, 1988, 1996(with 1988 available), 1996(with 2004 available) and 2004 samples, respectively. Table 4 shows weekly study times broken down by gender. The influx of women does not appear to explain reduced study times. The study time declines for men were in fact slightly larger than for women. Moreover, women now appear to study more than men. Median weekly study time for female students was 9.1 hours per week in 2004, compared to 7.5 for male students. The increase over time in the percentage of female undergraduates appears, then, to have dampened slightly the long-run aggregate study-time drop-off.

Racial composition of the college-going population has also changed over time. The 1961 sample contains no students who classified themselves as Hispanic, whereas the other samples do

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<sup>15</sup> We do not rule out *indirect* effects (i.e, changes in strategic behavior and equilibria.) See Section V.



have Hispanic students. For simplicity of exposition, then, we do not include Hispanic students in Table 4. Study times declined for all racial groups, overall and in every time period. (Study times for Hispanic students declined during all time periods for which we have data on them.)

Interestingly, the gap between median study times of White and Black students has narrowed, as effort choices of Black students have declined less than effort choices of White students.

Table 4 also shows weekly study times broken down by college preparedness as captured by terciles of verbal SAT scores. We lack SAT scores for the 1961 sample and thus limit the analysis to the 1988-1996 and 1996-2004 intervals (for which we have more SAT verbal score data than SAT math data.) Table 4 indicates that students with lower SAT scores study less than students with higher SAT scores in all time periods. Also, study times fell for students of all test score ranges for all observed time periods. Systematic changes in student composition by SAT score do not appear to explain the aggregate study-time trend. By this we mean that absent a lowering of standards or requirements at colleges, changes in the ability distribution do not explain study time declines. Results here do suggest students from lower in the ability distribution may be less motivated or have higher disutility of effort (because they appear to study less). Colleges may have lowered standards in response to changes in the ability distribution of college students. See the discussion in Section V.

In Sabot and Wakeman-Linn (1991), college students sort into majors based on major-specific grading standards. Different majors, then, may feature systematically different students and different time requirements. It is worth investigating major-specific trends in study-times to determine whether sorting into “easier” majors explains the aggregate study-time trend. Table 4 shows weekly study times by major. We aggregate individual majors into 8 broad categories, based on similarities in subject matter and study time choices: business, education, engineering, biology, physical sciences, arts and letters, social sciences, and health. Appendix B shows the specific majors assigned to these categories. Study times fell for every major in almost every time period. Some majors appear to have experienced much smaller declines than others. Engineering

majors have always studied more than other students, but their study times have fallen less over time than other majors. This could perhaps be due to the more objective and quantifiable performance standard that may characterize these fields. Business majors, by contrast, appear to study less than students in other majors. Declining study times—evident within in all majors over almost all time periods (23 out of 24 possible intervals)—do not appear to have been an artifact of changes over time in major choice.

Does the downward study-time trend hold for all types of colleges? For the 1988-1996 and 1996-2004 time periods, we have data at the institution level. Table 4 disaggregates the data by college selectivity, as proxied by the average verbal SAT score for the students attending the college<sup>16</sup>, and by Carnegie classification and size. Study times fell for colleges of all different levels of selectivity. With one exception, declines in study time are also visible for all Carnegie classifications in all time periods. The exception is that study times rose modestly in the 1988-1996 period for liberal arts colleges. We also note that students at liberal arts colleges appear to study more than students at other colleges in all time periods. Lastly, study times appear to have declined at small, medium, and large colleges. The aggregate trend in study times does not appear to be an artifact of changes over time in the types of colleges students attended. An important caveat is that we lack data on college characteristics (and individual achievement scores) prior to 1988 and cannot infer the effects of compositional changes of this type during earlier time periods.

#### E. Regression Framework

An alternative to the non-parametric analysis above is to regress study time on time period dummies with controls for work choice and demographic traits. Columns 1-3 of Table 5 summarize regressions on the pooled 1961 and 1981 samples. The dependent variable is average study time and the regressor of interest is the 1981 dummy variable. Column 2 includes controls

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<sup>16</sup> These scores are self-reported in HERI. The table uses cut-offs that create approximate terciles.

for all demographic characteristics listed in Table 1 and dummies for majors, but does not include hours worked. (This covariate is added in column 3.) Student's studied 4.7 hours less on average in 1981 than 1961. When changes in the demographic composition and work and major choices of students are accounted for, students studied 3.1 hours less in the later time period. Columns 4-6 of Table 5 summarize regressions on the pooled 1988-1996 sample. Students studied 2 hours less in 1996 than 1988, given the full set of controls, and the addition of controls increased the magnitude of the coefficient on the 1996 time dummy. Lastly, columns 6-8 indicate that students studied 1.4 hours less in 2004 than in 1996 (with or without controls.) Clearly, work choice and study choices are jointly determined and the reduced form regressions here do not depict causal relationships. They are included to complement the non-parametric analysis above.

If students have been studying less, what have they been doing with the extra time? It is not clear how best to model the joint determination of work, study, and leisure in a way that would plausibly account for the long-run decline in study times. A rigorous structural analysis of substitution patterns is beyond the scope of the present inquiry. The answer that emerges from the reduced-form analysis here is that students have substituted primarily into leisure. When "hours worked" is removed as a control in the 1961-1981 (Table 5, column 2), the estimated magnitude of the year dummy rises by only .6 hrs. Removing the "hours worked" covariate from the later period regressions (column 5 and column 8) leaves the coefficient on the time dummy virtually unaltered. Students appear to have reduced study time, but only a small portion of the reduction is associated with changes in hours worked, and only in the earliest time period. Students appear then to have substituted largely into the excluded category—leisure.

In Table 6, we explore substitution patterns in more detail by dividing time use into 4 categories: studying, class, work, and leisure. We define leisure as the excluded category—encompassing whatever time is left after work, class, and study have been deducted (from the 168 hours in a week.) Table 6 shows average weekly class, study, work and leisure time choices for full time students. Between 1961 and 1981, study time falls, work time rises, and leisure remains

virtually unchanged. One might conclude that the 1981 cohort cut back on studying (relative to their 1961 counterparts) in order to work more—i.e., that they substituted working for studying at a one-to-one rate. But in comparisons across students with similar or identical work choices, students in 1981 studied less (see Table 4). To put it differently, students who worked a given number of hours per week in 1961 consumed less leisure than did students who worked the same number of hours in 1981. In cross section, working students consume less leisure. The reason average leisure time did not fall between 1961 and 1981 is **not** that students who worked maintained the same study levels as their working counterparts in 1961; rather, it is that more students worked. An identical analysis applies to the 1988-1996 period. Between 1996 and 2004, average work and study times both fell and consumption of leisure rose. In summary, students appear to be working more and studying less, on average, but they are also studying less when work hours are held constant.

Though consumption of leisure appears to have risen over time, a caveat is that leisure is defined here as the excluded category. This category may capture work-like activities, such as volunteer work. While we lack consistent data on detailed leisure and non-leisure activities across all time periods, later (HERI) surveys contain data on volunteer work. Average volunteer work by students rose from 1.44 to 1.85 hours per week between 1988 and 1996 for students in the 40 schools with data in both periods. However, time spent doing volunteer work fell from 1.89 to 1.82 hours per week between 1996 and 2004 for students in the 89 schools with data in both periods. Volunteer work appears not to explain the 1996-2004 decreases in study or class time, but could have been a factor between 1988 and 1996. While we cannot speak directly to the earlier periods, the time spent on volunteer work in 2004 appears much smaller than the overall decline in academic time investment since 1961.

We hesitate to draw strong conclusions about whether the rate of decline in study times has been accelerating or decelerating. Without controls, the steepest yearly rates of decline occur between 1961 and 1981; however, regression-adjusted coefficients in Table 5 show the steepest

yearly rates of decline to have occurred between 1988 and 1996 and the slowest declines to have occurred between 1961 and 1981. In addition, inference is complicated by the fact that we use different consistent sets of schools for the different time periods.

#### F. Class Times

Longer completion times could explain in part the study time trend. Students could be studying less because they are taking fewer classes and requiring more years to graduate. Using the earliest and latest samples for which we have both study time and class time responses (the 1981 NLSY79 and 2004 HERI samples, respectively), we find that while study times and class time have both fallen, the ratio of study time to class time has fallen as well (from 1.33 to .79.) Students do appear to be spending less time in class, but they also study less for each hour they spend in class. Further, we note that lower reported time spent in class need not imply lighter course loads, as it could indicate students attended classes less often. But perhaps the most compelling evidence that declining study times reported above are not an artifact of rising time to completion is that **respondents in the HERI data samples included only on-time seniors in their fourth year.** Time to completion is held constant in the HERI samples, as all respondents took course loads allowing them to graduate in 4 years. Findings indicate that students taking course loads allowing them to graduate in 4 much studied less in recent cohorts, and thus that study times declined holding time to completion constant.

#### G. Explaining the Time Trend

Evidence indicates student study times fell markedly since 1961 and that compositional changes do not account for this in any direct way. Colleges elicit less effort from students than they once did. Two broad categories of explanations present themselves: 1) Education production technologies may have improved; 2) Standards or requirements may have fallen at colleges. We discuss these in turn, and attempt to bring some evidence to bear on their relative merits.

### *Improved instruction technologies*

Information technologies may have reduced time requirements for some study tasks (e.g., term papers may have become less time-consuming to write with the advent of word processors.) If education technology and effectiveness have improved continuously over time, one would expect to see ever greater gains in human capital per unit of student time investment. Decreased inputs of student time might not then yield a decreased output of human capital. Human capital of college graduates is difficult to quantify, but there exist achievement and admissions exams for the subset of college students who pursue post-graduate education or certification. Adelman (1985) finds the performance of college graduates between 1964 and 1982 to have declined on 15 of 23 achievement and graduate admissions examinations, to have remained stable on 4, and to have advanced on 4, with the largest declines occurring in subjects requiring high verbal skills. We extend Adelman's time trends in Figure 3, which displays average test scores on 7 achievement and graduate admissions examinations through 1999. In recent years, the evidence is much less clear than for 1964-1982. We also note that selection into post-graduate training (and admissions examinations) remains a serious confounding factor in all of this work. Though there is some evidence of declining outputs between 1964 and 1982, it would not appear that improved instructional technology can be ruled out as an explanatory factor for the study time trend.

### *Declining standards and/or requirements*

For improved instruction technologies to explain the study time trend in its entirety would require the continuous introduction, decade by decade, of new modes of instruction that were extremely effective substitutes for student time. Bok(2005) finds no evidence of significant changes over time in pedagogical practices at four-year colleges.<sup>17</sup> More generally, educators give little indication of having concluded that student effort is of modest or diminishing importance for

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<sup>17</sup> See also Pascarella and Terenzini (2005).

learning, given new technologies.<sup>18</sup> Another possible explanation, motivated by the above, is that universities may have lowered standards or effort requirements. This begs the question of why such an institutional change might occur.

#### a) Student Empowerment

Increased competition may have increased the pressure on administrators to cater to student preferences, i.e., to reduce rents by providing valued services. If leisure is highly valued, then colleges that attempt to maintain standards for current cohorts could suffer high attrition or lose market share. Another instrument of student empowerment is course evaluations. The 1970s marked the introduction of this instrument and its use for purposes of faculty evaluation and promotion. If the market value of a college degree depends in part on the college's reputation, and if this, in turn, depends on effort invested by previous student cohorts, then current students have an incentive to free-ride on the effort contributions of their predecessors. Over time, mechanisms may have evolved that allow students to pressure educators to reduce effort requirements for their own cohort. Instructor ratings provide students with one such opportunity. Instructors may be rewarded with higher evaluations for making classes less demanding.<sup>19</sup> Student evaluations of instructors are an obvious mechanism, but we note that other types of student empowerment could have similar effects.

Some educators appear to have reached this conclusion. In Hersch and Merrow(2005), David L. Kirp argues that market pressures have caused colleges to cater to students' desires for leisure. In the same volume, Murray Sperber emphasizes changing faculty incentives and research requirements: "A non-aggression pact exists between many faculty members and students: Because the former believe that they must spend most of their time doing research and the latter

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<sup>18</sup> See discussion in section V.

<sup>19</sup> Weinberg, Fleisher, and Hashimoto (2007), for example, find student evaluations to be positively related to current grades but uncorrelated with learning once current grades are controlled. Babcock and Marks (2006) find higher average grades to be associated with lower study times and higher instructor ratings, holding fixed instructor and course.

often prefer to pass their time having fun, a mutual non-aggression pact occurs with each side agreeing not to impinge on the other.” There is some perception, then, that colleges face a growing incentive to cater to the leisure preferences of students.<sup>20</sup>

b) Student-parent bargaining games.

Incentives for parents and students may not be perfectly aligned. Changes in bargaining power between parents and students could account for changes in leisure choices by students (Owen, 1995). In particular, parents’ ability to monitor student effort choices may have changed over time. Though, again, a caveat is that the data do not extend to the early time periods, the National Postsecondary Student Aid Survey indicates that between 1987 and 2004 the fraction of full time students at four-year institutions who were living at home declined from .22 to .18. Also, more students attend college outside their home state now than in the past (Hoxby, 1997). Parents may have become less able to monitor students, as fewer students live at home while in college.

c) Demand for leisure

Students may have been empowered (vis-à-vis colleges or parents) so that their choices better reflect their leisure preferences. Alternatively, students’ demand for leisure may have risen over time. One potential explanation is that leisure is a normal good and incomes have increased. There exist data on parental income in the HERI 2003-2005 sample. A comprehensive treatment of the hypothesis is beyond the scope of this paper, but a first pass yields no evidence that higher parental incomes lead to lower study times. On the contrary: In cross-section, higher parental income is associated with higher study times.

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<sup>20</sup> Evidence on the non-aggression pact is unclear. Data are not available for early time periods. Between 1988 and 2004, however, average weekly time invested by instructors in teaching and preparation per hour of class time rose from 12.5 to 14.4 hours (National Survey of Postsecondary Faculty, Online Dataset Cutting Tool, 2007.) Increases occurred at all types of four-year institutions, including doctoral/research universities. While this suggests instructors have not reduced effort in recent years, it does not refute the student empowerment explanation, as instructors may be by requiring less work from students while simultaneously putting in time to make classes more engaging.



d) Signaling, sorting, and reduced within-school variance of ability

Hoxby (2000) finds that between-college variance in student aptitude increased over time while within-college variance in student aptitude decreased. In the past, some students may have worked hard to signal they were high ability types, relative to their schoolmates. But if students within a given college are very similar in ability, there is little content to the signal. The college from which one graduates may have come to matter more than one's standing within that college. If so, employers and students both would be more willing to accept a within-school pooling equilibrium. Supporting this explanation is the finding that employers in recent years have come to rely less on grade point averages in their hiring decisions and more on interviews (Rosovsky and Hartley, 2002). Also, students appear to put more time than they once did into preparing for college entrance exams, tailoring their high school resumes for purposes of college admission, hiring college admissions consultants, and filling out their college applications.<sup>21</sup> Students, then, appear to be allocating more time toward distinguishing themselves from their competitors in order get into a good college, but less time distinguishing themselves from their schoolmates academically once they get there.

## V. IMPLICATIONS

### A. Economic Implications

#### *The Rising College Wage Premium*

The long-run decline in academic time investment by college students yields a number of implications for economists. We focus here on wage regressions and the common finding that the wage premium for a year of college dropped during the 1970s then rose from 1980 to the present. Lemieux (2006a) concludes that a rising return to postsecondary education is the primary explanation for rising wage inequality between 1973 and 2005. We augment a large and vital

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<sup>21</sup> See, for example, Williams, "Lost Summer for the College-Bound," New York Times, June 4, 2006.

literature on rising wage inequality by demonstrating that changes in the return to postsecondary education may have been systematically underestimated in previous research.

Typically, the time measure in wage regressions is (or is directly related to) “years of schooling.” We argue that a “year” of post-secondary schooling is a nominal measure of time. Assuming it constant (without specifying a reference year) is analogous to ignoring the inflation of a currency. A year of college represents a smaller time investment than it once did, and thus a lower opportunity cost of forgone wages. The exercise we undertake is to calculate changes over time in the wage premium for a year of college after correcting for changes over time in time investment associated with a year of college.

For the calculations used to construct Figure 4, we follow a standard approach similar to Goldin & Katz (2001). In Figure 4.A, we use 1970 to 2000 IPUMS and 2005 American Community Survey data for male workers in the nonagricultural sector whose (potential) post-college experience is about 10 years (i.e., we follow male workers aged 29-32). The solid line shows the wage premia, by decade, if the “years of college” measure is taken at face value. The wage gain associated with a year of college rises from 3.8 log points in 1980 to 11.7 log points in 2005. The calculations underlying the hatched line in Figure 4.A take 1961 as the base year to account for changes in the “years of college” measure. Wage premia depicted by the hatched line, then, are increased wages associated with a college time investment equal to a “1961 year.” (Appendix A contains additional detail on the construction of Figure 4.) The hatched line in Figure 4.A shows a much greater increase in the college wage premium than the standard calculation yields. While the solid line shows an increase of 7.9 log points in the wage premium for a year of college between 1980 and 2005, the hatched line (for which a year of college is defined as a “1961 year”) shows an 86% larger increase of 14.7 log points. Figure 4.B shows the same set of calculations for men with 20 years of experience. A similar result holds for this age-experience group, with the solid line showing an increase in the wage premium of 6.1 log points between 1980 and 2005 and the hatched line showing an increase of 11.5 log points. Standard

methods appear to underestimate the recent increase in the wage premium for a year of college by as much as 80 to 90 percent.

The decline in the wage premium during the 1970s was less, and the increase between 1980 and 2005 much higher, than has previously been estimated. In essence, our finding deepens the puzzle of the rising college wage premium. Despite smaller and smaller time commitments allocated toward the acquisition of a “year” of college education, the wage reward for a year of college has continued to rise.

## B. Education Policy

We note first that a declining time cost of college need not imply declining social welfare. In pure signaling models, efficiency may rise when the cost of the signal falls.<sup>22</sup> Given concerns about rising tuition, it could be argued that a decrease in the time cost of college increases access.<sup>23</sup> We will not attempt to disentangle signaling from human capital channels here, or to measure social welfare losses or gains.

We observe, however, that the stated goals of postsecondary institutions often include preparing students for their future careers, and that educators, by and large, perceive student effort to be a primary input to education production. A common requirement is that students put in 2 hours study time per week for every hour of class time (or course “unit”).<sup>24</sup> This amounts to

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<sup>22</sup> Stiglitz (1975).

<sup>23</sup> Back of the envelope calculations suggest decreasing time costs have compensated for tuition increases. Average tuition and fees for four-year colleges for the 2003-2004 academic year amounted to \$7,091, and tuition and fees, net of grants, averaged \$5,558 (Barrow and Rouse, 2005). The time cost of college fell from 40 hours per week to about 23-26 hours per week between 1961 and 2004. Average annual earnings of a high school graduate less than 25 years old in 2003 were \$20,982 (from March 2004 CPS.) If full-time enrollment consists of three 11-week quarters, the potential earnings gain associated with a 14-17 hour per week reduction in time costs of full-time college attendance is between \$4,694 and \$5,759—a sum comparable to the **entire average net price for tuition and fees in 2003-2004**. Contrary to findings from previous research, the cost of college may not then have increased, because savings in time costs offset net tuition increases. Further, the cost of public college appears, if anything, to have declined. (A more detailed analysis is available from the authors upon request.)

<sup>24</sup> Regulation 760 from the Academic Senate of the University of California, for example, states: “The value of a course in units shall be reckoned at the rate of one unit for three hours' work per week per term

an expectation or requirement on the part of educators that full time students put in at least 24 hours per week of study time outside of class. Evidence indicates that less than 1 or 2 out of every 10 students even come close to meeting this standard. To the extent that human capital production is a goal of educators and policy-makers, and to the extent that student time is widely believed to be an essential input, these findings would seem of some interest to educators and accreditation committees.

## VI. SUMMARY AND CONCLUSION

Using data from multiple datasets and five different time periods, we document changes in time use by full-time college students in the United States between 1961 and 2004. We find large and continuous declines in academic time investment over this period. Full-time college students in 1961 appeared to allocate about 40 hours per week toward class and studying, whereas full-time students in 2003 appear to have invested about 23-26 hours per week. Study time fell for students from all demographic subgroups, within race, gender, ability, and family background, overall and within major, for students who worked in college and for those who did not, and at 4-year colleges of every type, size, degree structure, and level of selectivity. In short, evidence indicates that the time cost of college has fallen. We conclude that recent increases in the rate of return to postsecondary education may have been underestimated by as much as 80 to 90 percent. Lastly, the decline in academic time investment by full-time college students would appear to be a puzzle in its own right that warrants continued research.

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on the part of a student, or the equivalent.” Study time expectations and requirements appear similar for four-year colleges outside the UC system. See Kuh(1999).

## References

- Adelman, Clifford (1984), *The Standardized Test Scores of College Graduates 1964–1982*, Washington, DC: Office of Educational Research and Improvement, USOE.
- Altonji, Joseph G. and Charles R. Pierret (2001), “Employer Learning and Statistical Discrimination,” *The Quarterly Journal of Economics*, Vol. 116, No. 1, pp.313-350.
- Astin, Alexander, Jennifer R. Keup, and Jennifer A. Lindholm (2002), “A Decade of Changes in Undergraduate Education: A National Study of System ‘Transformation’,” *The Review of Higher Education*, Vol. 25, 2, pp.141-162.
- Autor, David H., Lawrence F. Katz, and Melissa S. Kearney (2005), “Trends in U.S. Wage Inequality: Re-assessing the Revisionists,” NBER Working Paper #11627.
- Babcock, Philip and Mindy Marks (2006), “Real Costs of Nominal Grade Inflation,” University of California, Santa Barbara, mimeo.
- Barrow, Lisa and Cecilia Rouse (2005), “Does College Still Pay?” *The Economists’ Voice*, Vol. 2, 4, Article 3.
- Ben-Porath, Yoram (1967), “The Production of Human Capital and the Lifecycle of Earnings,” *The Journal of Political Economy*, Vol. 75, No. 4, pp. 352-365.
- Bok, Derek (2005), *Our Underachieving Colleges: A Candid Look at How Much Students Learn and Why They Should Be Learning More*, Princeton, NJ: Princeton university Press.
- Bowen, William G.(1967), *The Economics of Major Private Research Universities*, Berkeley, CA: Carnegie Commission on Higher Education.
- Ehrenberg, Ronald (2000), *Tuition Rising: Why College Costs So Much*, Cambridge, MA: Harvard University Press.
- Ehrenberg, Ronald (2004), “Econometric studies of higher education,” *Journal of Econometrics*, Vol. 121, 1-2, pp.19-27.
- Ehrenberg, Ronald, and Sherman, Daniel (1987), "Employment While in College, Academic Achievement, and Postcollege Outcomes," *Journal of Human Resources*, Vol. 22, pp. 1–24.
- Farber, Henry S., and Robert Gibbons (1996), “Learning and Wage Dynamics,” *The Quarterly Journal of Economics*, Vol. 111, No. 4, pp. 1007-1047
- Flacks, Richard, Gregg Thomson, John Douglass, and Kyra Caspary (2004) “Report: Learning and Academic Engagement in the Multiversity - Results Of the First University of California Undergraduate Experience Survey,” Center for Higher Studies in Education.
- Goldin, Claudia and Lawrence F. Katz (2001), "Decreasing (and then Increasing) Inequality in America: A Tale of Two Half-Centuries," in F. Welch, ed., *The Causes and Consequences of Increasing Income Inequality*, University of Chicago Press.

- Grogger Jeff and Eric Eide (1995) "Changes in college skills and the rise in the college wage premium", *Journal of Human Resources*, 30(2), pp. 280-310.
- Heckman, James J., Lance J. Lochner, and Petra E Todd (2005), "Earnings Functions, Rates Of Return, And Treatment Effects: The Mincer Equation And Beyond," NBER Working Paper #11544.
- Hersch, Richard and John Merrow (2005), *Declining By Degrees: Higher Education at Risk*, Palgrave Macmillan.
- Hoxby, Caroline (2000) "The Effects of Geographic Integration and Increasing Competition in the Market for College Education." Harvard University mimeo.
- Hoxby, Caroline (1997) "The Changing Market Structure of U.S. Higher Education," Harvard University mimeo.
- Juster, F. Thomas and Frank P. Stafford (1991), "The Allocation of Time: Empirical Findings, Behavioral Models, and Problems of Measurement," *Journal of Economic Literature*, Vol. 29, No. 2, pp. 471-522.
- Katz, Lawrence F. and David Autor (1999), "Changes in the Wage Structure and Earnings Inequality," in O. Ashenfelter and D. Card, eds., *Handbook of Labor Economics*, Amsterdam: North Holland Press.
- Kuh, George (1999). "How are we doing? Tracking the quality of the undergraduate experience, 1960s to the present," *The Review of Higher Education*, Vol. 22, pp. 99-119.
- Lemieux, Thomas (2006a), "Postsecondary Education and Increasing Wage Inequality," *American Economic Review*, Vol. 96, No. 2, pp. 195-199
- Lemieux, Thomas (2006b), "Increasing Residual Wage Inequality: Composition Effects, Noisy Data, or Rising Demand for Skill?" *American Economic Review*, Vol. 96, No. 3, pp. 461-498.
- Lundberg, George A., Mirra Komarovsky, and Mary Alice McInerney (1934), *Leisure: A Suburban Study*, New York: Columbia University Press.
- Nathan, Rebecca. (2005), *My Freshman Year: What a Professor Learned by Becoming a Student*, Ithaca, NY: Cornell University Press.
- Orszag, Jonathon, Peter Orszag, and Diane Whitmore (2001), "Learning and Earning: Working In College," Sebago Associates, Inc., <http://www.sbggo.com>.
- Owen, John (1995), *Why Our Kids Don't Study: An Economist's Perspective*, Baltimore, MD: The John Hopkins University Press.
- Pascarella, Ernest T. and Patrick T. Terenzini (2005), *How College Affects Students: A Third Decade of Research, Volume 2*, Jossey-Bass.
- Rosovsky, Henry and Matthew Hartley (2002), *Evaluation and the Academy: Are We Doing the Right Thing?* Cambridge, Mass.: American Academy of Arts and Sciences.

Sabot, Richard and John Wakeman-Linn (1991), "Grade Inflation and Course Choice", *Journal of Economic Perspectives*, Vol. 5, 1, pp. 159-170.

Scott-Clayton, Judith (2007), "What Explains Rising Labor Supply Among U.S. Undergraduates, 1970-2003?" Harvard University mimeo.

Sudman, Seymour, Norman Bradburn, and Norbert Schwarz (1996), *Thinking About Answers: The Application of Cognitive Processes to Survey Methodology*, San Francisco, CA: Jossey-Bass.

Stinebrickner, Ralph and Todd R. Stinebrickner (2004), "Time-use and college outcomes," *Journal of Econometrics*, Vol. 121, 1-2, pp.243-269

Stinebrickner, Ralph and Todd R. Stinebrickner (2003) "Working During School and Academic Performance," *Journal of Labor Economics*, Vol. 21, 2, pp. 473-491.

Stiglitz, Joseph (1975), "The Theory of Screening, Education, and the Distribution of Income", *American Economic Review*, 65, pp. 283-300.

Weinberg, Bruce A., Belton M. Fleisher, and Masanori Hashimoto (2007), "Evaluating Methods for Evaluating Instruction: The Case of Higher Education," NBER Working Paper No.12844.

Williams, Alex (2006), "Lost Summer for the College-Bound," *New York Times*, June 4, 2006.

Winston, Gordon, 1999. "Subsidies, hierarchies and peers: the awkward economics of higher education" *Journal of Economic Perspectives*, Vol.13, pp.13-36.

## APPENDIX A

### Notes on Figures

In all figures, time-use data are for full-time students at four-year colleges.

**Figure 1** - Dependent variable in all regressions is log hourly wage in the given year. Plotted on vertical axis is the coefficient on hours studied per week in 1981. All regressions also include controls for gender, AFQT score, and year in college in 1981 (i.e., dummies for freshman, sophomore, and junior year) and recommended weightings from the NLSY79. Results are also robust to the inclusion of years of schooling as a control. Not all respondents had wage data available in all years. Dotted lines show 95% confidence interval.

**Figure 2** - College types are defined by Carnegie classification in 2000, as data on type is not available in 1961. Type not plotted is “Baccalaureate/Other.” There were no schools of this type in the HERI core. There were some schools with this classification in NSSE. These were included in the averages for “all,” and they show a similar downward trend when broken out. In HERI core sample, 1996 study time is plotted because all 24 schools in the HERI core also had data available in 1996. Data for 1988 was available for some of these schools, but not all.

**Figure 4** - Source for wage data: IPUMS 1970-2000, American Community Survey, 2005. Following common practice, we discard extreme observations (wages less than \$1) and adjust top-coded earnings by a factor of 1.4. As in Goldin and Katz (2001), difference in mean log wage between workers with 12 and 16 years of schooling is calculated, decade by decade and the difference is divided by 4 to get wage gain associated with a year of college. We do this for two age-experience groups. Figure 4.A. uses white, male workers in the nonagricultural sector whose (potential) post-college experience is about 10 years (i.e., workers aged 29-32). Solid line shows difference in log wages (divided by 4) by decade. Hatched line shows difference in log wages associated with a college time investment equal to a 1961 year. A “years of college” index is constructed as follows: The index is 1 for the base year, 1961. Indices for subsequent years are weekly academic time investment (class time plus study time) *for white males* in the given year divided by weekly academic time investment for same in 1961. Standard wage premia are then divided by the index associated with the time period during which the worker attended college. Workers with 10 years experience in 1970 are assumed to have attended college in the early 1960s. Workers with 10 years experience in 1980 are assumed to have attended college in the early 1970s. The midpoint of the 1961 and 1981 weekly academic time investments (class time plus study time) for white males is used as the numerator in the index for this year. Workers with 10 years experience in 1990 are assumed to have attended college in the early 1980s, and 1981 college-time means are used to approximate their time investment. Workers with 10 years experience in 2000 are assumed to have attended college in the early 1990s. We interpolate between 1988 and 1996 to estimate their time investment. Workers with 10 years experience in 2005 are assumed to have attended college in the mid-90s and we use 1996 time use measures to estimate their time investment. An identical method is used for Figure 4.B.



## APPENDIX B

### Defining College Majors

The HERI surveys used for the 1988, 1996, and 2004 time periods allowed students to choose one of 83 majors. This survey then aggregated these majors into 16 broad majors (HERI-Agriculture, HERI-Biological Science, HERI-Business, HERI-Education, HERI-Engineering, HERI-English, HERI-Health Professional, HERI-Humanities, HERI-Fine Arts, HERI-Mathematics or Statistics, HERI-Physical Science, HERI-Social Science, HERI-Other Technical, HERI-Other Non-technical, and HERI-Undecided)<sup>25</sup> To ensure adequate sample sizes we further aggregated into nine majors, based in part on comparability of study times. We indicate below the component subjects and share of respondents in each category, and the largest two majors in that category.

**Biology** (11%): general biology\*, biochemistry or biophysics, botany, environment science, marine science, microbiology, zoology, medicine/dentistry/veterinarian\*, kinesiology, other biological science

**Business and Communication** (22%): accounting\*, business administration\*, finance, international business, marketing, management, secretarial studies, journalism, communication other business

**Education** (8%): business education, elementary education\*, music or art education, physical education, secondary education\*, special education, other education

**Engineering** (4%): aero/astronautical engineering, civil engineering, chemical engineering, electrical engineering\*, industrial engineering, mechanical engineering\*, architecture, other engineering

**Health** (4%): health technology, nursing\*, pharmacy, therapy (occupation, physical, speech)\*, other professional

**Letters** (16%): art (fine and applied)\*, English\*, language and literature, music, philosophy, speech, theatre or drama, theology or religion, other humanities

**Physical Science** (5%): astronomy, atmospheric science, chemistry\*, earth science, mathematics\*, physics, statistics, other physical science

**Social Science** (24%): anthropology, economics, ethnic studies, geography, history, political science\*, psychology\*, sociology, women's studies, other social science

**Technical/Vocational** (4%) : agriculture, building trades, computer science\*, data processing, drafting/design, electronics, forestry, home economics, law enforcement, library science, mechanics, social work\*, and other technical

Once these nine broad major categories were defined, the major codes in the NLSY79 and Project Talent were aggregated to create comparable major categories.

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<sup>25</sup> Copies of the HERI codebooks which contain a listing of all 83 reported majors can be found at <http://www.gseis.ucla.edu/heri/codebooks.html>

**Table I**  
**Descriptive Statistics - Full-Time Students at Four-Year Postsecondary Institutions**

	Project Talent		NLSY79		HERI		HERI		HERI		HERI		HERI Core		NSSE	
	1961		1981		1988		1996 (1988 avail)		1996 (2004 avail)		2004		2004 (1961 avail)		2003 (1961 avail)	
	(National Sample)		(National Sample)		(40 schools)		(40 schools)		(89 schools)		(89 schools)		(24 schools)		(156 schools)	
	Mean	St. Dev.	Mean	St. Dev.	Mean	St. Dev.	Mean	St. Dev.	Mean	St. Dev.	Mean	St. Dev.	Mean	St. Dev.	Mean	St. Dev.
Study (hrs/wk)	<b>24.43</b>	13.44	<b>19.75</b>	14.59	-	-	-	-	-	-	-	-	-	-	-	-
Study>20 hrs/wk	<b>0.673</b>	0.469	<b>0.442</b>	0.497	<b>0.173</b>	0.378	<b>0.166</b>	0.372	<b>0.143</b>	0.350	<b>0.101</b>	0.301	<b>0.103</b>	0.304	<b>0.198</b>	0.399
Study>16 hrs/wk	<b>0.723</b>	0.448	<b>0.539</b>	0.499	<b>0.336</b>	0.472	<b>0.320</b>	0.467	<b>0.282</b>	0.450	<b>0.212</b>	0.409	<b>0.214</b>	0.410	<b>0.344</b>	0.475
Study<5 hrs/wk	<b>0.067</b>	0.250	<b>0.138</b>	0.345	<b>0.167</b>	0.373	<b>0.218</b>	0.413	<b>0.243</b>	0.429	<b>0.323</b>	0.468	<b>0.330</b>	0.470	<b>0.186</b>	0.389
Class (hrs/wk)	-	-	<b>15.84</b>	7.61	-	-	-	-	-	-	-	-	-	-	-	-
Class>20 hrs/wk	-	-	<b>0.193</b>	0.395	<b>0.138</b>	0.345	<b>0.156</b>	0.363	<b>0.155</b>	0.362	<b>0.098</b>	0.297	<b>0.091</b>	0.288	-	-
Class>16 hrs/wk	-	-	<b>0.379</b>	0.485	<b>0.443</b>	0.497	<b>0.404</b>	0.491	<b>0.405</b>	0.491	<b>0.309</b>	0.462	<b>0.288</b>	0.453	-	-
Class<5 hrs/wk	-	-	<b>0.075</b>	0.263	<b>0.078</b>	0.268	<b>0.084</b>	0.277	<b>0.109</b>	0.312	<b>0.114</b>	0.318	<b>0.116</b>	0.320	-	-
Work (hrs/wk)	<b>4.12</b>	8.48	<b>8.25</b>	11.63	-	-	-	-	-	-	-	-	-	-	-	-
Work >20 hrs/wk	<b>0.05</b>	0.22	<b>0.15</b>	0.36	<b>0.15</b>	0.36	<b>0.22</b>	0.41	<b>0.24</b>	0.42	<b>0.19</b>	0.40	<b>0.20</b>	0.40	<b>0.09</b>	0.28
Work <20 hrs/wk	<b>0.22</b>	0.41	<b>0.28</b>	0.45	<b>0.60</b>	0.49	<b>0.56</b>	0.50	<b>0.59</b>	0.49	<b>0.62</b>	0.48	<b>0.60</b>	0.49	<b>0.46</b>	0.50
Not working	<b>0.73</b>	0.44	<b>0.57</b>	0.49	<b>0.25</b>	0.43	<b>0.22</b>	0.41	<b>0.17</b>	0.37	<b>0.18</b>	0.39	<b>0.20</b>	0.40	<b>0.45</b>	0.50
White	<b>0.96</b>	0.20	<b>0.74</b>	0.44	<b>0.86</b>	0.34	<b>0.74</b>	0.44	<b>0.81</b>	0.39	<b>0.80</b>	0.40	<b>0.78</b>	0.41	<b>0.82</b>	0.38
Asian	<b>0.01</b>	0.10	<b>0.01</b>	0.11	<b>0.06</b>	0.24	<b>0.10</b>	0.30	<b>0.06</b>	0.23	<b>0.06</b>	0.23	<b>0.08</b>	0.27	<b>0.07</b>	0.26
Black	<b>0.02</b>	0.15	<b>0.10</b>	0.30	<b>0.04</b>	0.20	<b>0.05</b>	0.22	<b>0.04</b>	0.20	<b>0.06</b>	0.24	<b>0.05</b>	0.22	<b>0.08</b>	0.27
Female	<b>0.46</b>	0.50	<b>0.48</b>	0.50	<b>0.57</b>	0.49	<b>0.58</b>	0.49	<b>0.62</b>	0.48	<b>0.65</b>	0.48	<b>0.61</b>	0.49	<b>0.64</b>	0.48
Father's Ed < 12	<b>0.34</b>	0.48	<b>0.28</b>	0.45	<b>0.07</b>	0.26	<b>0.07</b>	0.26	<b>0.08</b>	0.28	<b>0.05</b>	0.22	<b>0.05</b>	0.22	<b>0.26</b>	0.44
12<Father's Ed<16	<b>0.42</b>	0.49	<b>0.28</b>	0.45	<b>0.33</b>	0.47	<b>0.33</b>	0.47	<b>0.35</b>	0.48	<b>0.35</b>	0.48	<b>0.32</b>	0.47	<b>0.22</b>	0.41
Father's Ed >=16	<b>0.24</b>	0.43	<b>0.44</b>	0.50	<b>0.60</b>	0.49	<b>0.60</b>	0.49	<b>0.57</b>	0.50	<b>0.60</b>	0.49	<b>0.62</b>	0.48	<b>0.52</b>	0.50
SAT Verbal	-	-	-	-	<b>570.92</b>	91.17	<b>596.23</b>	88.72	<b>583.01</b>	87.17	<b>588.67</b>	88.15	<b>603.54</b>	86.32	<b>566.94</b>	94.64
Public	-	-	-	-	<b>0.35</b>	0.48	<b>0.35</b>	0.48	<b>0.04</b>	0.20	<b>0.04</b>	0.20	<b>0.08</b>	0.26	<b>0.67</b>	0.47
Doc/Research	-	-	-	-	<b>0.56</b>	0.50	<b>0.56</b>	0.50	<b>0.35</b>	0.48	<b>0.35</b>	0.48	<b>0.60</b>	0.49	<b>0.53</b>	0.50
Masters	-	-	-	-	<b>0.27</b>	0.44	<b>0.27</b>	0.44	<b>0.40</b>	0.49	<b>0.40</b>	0.49	<b>0.27</b>	0.44	<b>0.38</b>	0.49
Bac/Lib Arts	-	-	-	-	<b>0.09</b>	0.29	<b>0.09</b>	0.29	<b>0.12</b>	0.32	<b>0.12</b>	0.32	<b>0.13</b>	0.34	<b>0.07</b>	0.26
Bac/Other	-	-	-	-	<b>0.06</b>	0.24	<b>0.06</b>	0.24	<b>0.13</b>	0.33	<b>0.13</b>	0.33	-	-	<b>0.02</b>	0.14
Obs	17986		1314		6094		17525		33278		40451		20071		3249	
Notes	Freshmen		All years		Seniors*		Seniors*		Seniors*		Seniors*		Seniors*		Fresh/Seniors	

\*The HERI datasets above include only "on time" seniors--that is, seniors who were also in their fourth year.

**Table 2**  
**Academic Time Use - Full Time Students**

	<b>Talent 1961</b>	<b>NLSY79 1981</b>	<b>HERI 1988</b>	<b>HERI 1996 (w/1988)</b>	<b>HERI 1996 (w/2004)</b>	<b>HERI 2004</b>	<b>HERI Core 2004 (w/1961)</b>	<b>NSSE 2003 (w/1961)</b>
	<b>1</b>	<b>2</b>	<b>3</b>	<b>4</b>	<b>5</b>	<b>6</b>	<b>7</b>	<b>8</b>
Median Study	23.62	16.63	11.71	11.09	10.10	8.55	8.52	11.81
Ave Study- Int. Coded*	24.43	19.75	12.64	12.13	11.38	9.94	9.94	13.42
Ave Study - Bin Midpts*	24.43	19.75	12.72	12.21	11.50	10.09	10.08	13.31
Median Class	-	14.85	14.68	14.12	14.01	12.67	12.46	-
Ave Class - Int. Coded*	-	15.84	14.41	14.12	13.83	12.63	12.43	-
Ave Class - Bin Midpts*	-	15.84	14.60	14.28	13.98	12.80	12.60	-
Ave. Academic Time**	40.26	35.59	27.32	26.49	25.48	22.89	22.68	26.11
Obs	17986	1314	6094	17525	33278	40451	20071	3249

\*for grouped data samples

\*\*Academic time is sum of study time and class time. Average 1981 class time used for 1961 class time, and HERI 2004 class time used for NSSE.

**Table 3**  
**Representativeness of Core Samples - Full Time Students**

	1961			2003-2004		
	All <sup>a</sup>	HERI Core	NSSE	All <sup>b</sup>	HERI Core	NSSE
<b>A. ALL</b>	1	2	3	4	5	6
Study (Med.,hrs/wk)	23.62	<b>24.54</b>	<b>23.70</b>	-	<b>8.52</b>	<b>11.81</b>
Study (Ave.,hrs/wk)	24.43	<b>25.79</b>	<b>24.71</b>	-	<b>10.08</b>	<b>13.31</b>
Study>20 hrs/wk	0.67	<b>0.74</b>	<b>0.68</b>	-	<b>0.10</b>	<b>0.20</b>
Not working	0.73	<b>0.66</b>	<b>0.74</b>	0.28	<b>0.20</b>	<b>0.45</b>
White	0.97	<b>0.99</b>	<b>0.98</b>	0.77	<b>0.78</b>	<b>0.82</b>
Asian	0.01	<b>0.00</b>	<b>0.01</b>	0.07	<b>0.08</b>	<b>0.07</b>
Black	0.02	<b>0.00</b>	<b>0.01</b>	0.11	<b>0.05</b>	<b>0.08</b>
Female	0.46	<b>0.26</b>	<b>0.45</b>	0.56	<b>0.61</b>	<b>0.64</b>
Father's Ed >=16	0.24	<b>0.27</b>	<b>0.26</b>	0.43	<b>0.62</b>	<b>0.52</b>
#Institutions	1214	<b>24</b>	<b>156</b>	1407	<b>24</b>	<b>156</b>
<b>B. Doctoral/Research<sup>c</sup></b>						
Study (Med.,hrs/wk)	24.27	<b>23.54</b>	<b>24.10</b>	-	<b>7.50</b>	<b>11.96</b>
Study (Ave.,hrs/wk)	25.22	<b>23.93</b>	<b>24.89</b>	-	<b>9.35</b>	<b>13.33</b>
Study>20 hrs/wk	0.70	<b>0.68</b>	<b>0.69</b>	-	<b>0.09</b>	<b>0.19</b>
Not working	0.76	<b>0.66</b>	<b>0.77</b>	0.32	<b>0.21</b>	<b>0.49</b>
White	0.97	<b>0.99</b>	<b>0.98</b>	0.77	<b>0.74</b>	<b>0.82</b>
Asian	0.01	<b>0.00</b>	<b>0.01</b>	0.10	<b>0.09</b>	<b>0.08</b>
Black	0.01	<b>0.00</b>	<b>0.01</b>	0.11	<b>0.07</b>	<b>0.08</b>
Female	0.42	<b>0.16</b>	<b>0.41</b>	0.56	<b>0.59</b>	<b>0.62</b>
Father's Ed >=16	0.25	<b>0.21</b>	<b>0.27</b>	0.51	<b>0.58</b>	<b>0.56</b>
#Institutions	192	<b>6</b>	<b>52</b>	259	<b>6</b>	<b>52</b>
<b>C. Masters<sup>c</sup></b>						
Study (Med.,hrs/wk)	19.84	<b>24.26</b>	<b>20.62</b>	-	<b>9.20</b>	<b>10.75</b>
Study (Ave.,hrs/wk)	22.40	<b>25.21</b>	<b>23.44</b>	-	<b>10.42</b>	<b>12.71</b>
Study>20 hrs/wk	0.61	<b>0.76</b>	<b>0.64</b>	-	<b>0.09</b>	<b>0.18</b>
Not working	0.70	<b>0.56</b>	<b>0.73</b>	0.25	<b>0.16</b>	<b>0.41</b>
White	0.96	<b>1.00</b>	<b>0.97</b>	0.78	<b>0.83</b>	<b>0.81</b>
Asian	0.01	<b>0.00</b>	<b>0.01</b>	0.05	<b>0.07</b>	<b>0.07</b>
Black	0.04	<b>0.00</b>	<b>0.02</b>	0.11	<b>0.02</b>	<b>0.09</b>
Female	0.50	<b>0.36</b>	<b>0.49</b>	0.58	<b>0.67</b>	<b>0.69</b>
Father's Ed >=16	0.18	<b>0.28</b>	<b>0.21</b>	0.36	<b>0.61</b>	<b>0.44</b>
#Institutions	395	<b>10</b>	<b>62</b>	605	<b>10</b>	<b>62</b>
<b>D. Bac/Liberal Arts<sup>c</sup></b>						
Study (Med.,hrs/wk)	29.07	<b>29.41</b>	<b>28.50</b>	-	<b>11.56</b>	<b>15.22</b>
Study (Ave.,hrs/wk)	28.96	<b>30.40</b>	<b>29.11</b>	-	<b>12.71</b>	<b>16.38</b>
Study>20 hrs/wk	0.79	<b>0.83</b>	<b>0.81</b>	-	<b>0.17</b>	<b>0.31</b>
Not working	0.74	<b>0.79</b>	<b>0.69</b>	0.26	<b>0.26</b>	<b>0.41</b>
White	0.97	<b>0.98</b>	<b>0.99</b>	0.82	<b>0.88</b>	<b>0.88</b>
Asian	0.00	<b>0.02</b>	<b>0.01</b>	0.07	<b>0.05</b>	<b>0.06</b>
Black	0.02	<b>0.00</b>	<b>0.00</b>	0.10	<b>0.03</b>	<b>0.03</b>
Female	0.47	<b>0.35</b>	<b>0.50</b>	0.59	<b>0.59</b>	<b>0.62</b>
Father's Ed >=16	0.39	<b>0.37</b>	<b>0.41</b>	0.52	<b>0.79</b>	<b>0.70</b>
#Institutions	170	<b>8</b>	<b>30</b>	223	<b>8</b>	<b>30</b>

<sup>a</sup>Source for Column 1: Project Talent.

<sup>b</sup>Source for Column 4: NPSAS 2004, Online Data Cutting Tool. (No national study times available)

<sup>c</sup>Based on 2000 Carnegie Code. Bac/other category not shown.

**Table 4**  
**Median Study Time - Full Time Students by Subgroup**

		Talent 1961	NLSY79 1981	HERI 1988	HERI 1996 (w/1988)	HERI 1996 (w/2004)	HERI 2004
		1	2	3	4	5	6
<b>All</b>		23.62	16.63	11.71	11.09	10.10	8.55
<b>Father's Ed</b>	No College	21.62	14.94	7.92	7.49	6.52	5.58
	Some College	23.66	15.87	11.28	9.97	9.44	7.99
	College Grad	24.33	17.13	12.09	11.04	10.84	9.17
<b>Employment</b>	Not Working	24.22	18.75	12.85	12.43	11.23	9.17
	Work <20	20.96	17.16	11.82	10.86	10.33	8.83
	Work >20	17.57	11.26	9.55	10.43	8.94	7.04
<b>Gender</b>	Male	23.75	16.43	11.78	10.56	9.41	7.46
	Female	23.49	16.57	11.66	11.44	10.49	9.07
<b>Race</b>	White	24.15	16.45	11.73	11.42	10.28	8.72
	Asian	24.50	17.59	12.53	10.42	10.18	9.36
	Black	19.27	15.59	9.58	8.99	8.01	6.88
<b>SAT</b>	SAT verbal<540	-	-	11.44	9.71	8.74	7.16
	SAT verbal 540-620	-	-	11.56	10.12	9.85	8.41
	SAT verbal>620	-	-	12.63	10.52	11.55	9.91
<b>Major</b>	Business	19.78	14.26	10.20	9.84	8.47	6.65
	Education	24.08	14.18	11.40	10.14	9.83	8.65
	Engineering	26.47	20.78	17.83	14.85	16.55	14.94
	Biology	24.30	21.69	14.34	12.55	12.40	10.81
	Phys Sciences	24.80	20.66	13.54	11.91	12.25	11.37
	Letters	24.05	15.33	12.04	11.46	11.09	9.43
	Social Sciences	24.55	17.42	10.60	10.59	9.96	8.39
	Health	26.92	16.36	12.92	9.35	9.56	9.78
<b>Selectivity (College)</b>	Ave SAT vrb<550	-	-	10.15	9.39	8.65	6.95
	Ave SAT vrb 550-600	-	-	11.97	10.18	9.91	8.55
	Ave SAT vrb>600	-	-	12.73	12.63	13.00	11.47
<b>Type (College)</b>	Doc/Res	-	-	11.50	11.03	9.52	7.69
	Masters	-	-	11.15	10.13	9.99	8.41
	Bac - Lib Arts	-	-	13.26	13.94	13.00	11.08
	Bac - Other	-	-	11.85	10.09	9.90	9.13
<b>Size (College)</b>	<2500	-	-	11.68	11.33	10.33	9.10
	2500-7500	-	-	11.51	10.82	10.73	8.81
	>7500	-	-	11.81	11.17	9.56	7.96

**Table 5**  
**Study Time - Time Trends with Demographic and Institution-level Controls**

Dependent Var.	1961 - 1981			1988-1996			1996-2004		
	Hrs	Hrs	Hrs	Hrs	Hrs	Hrs	Hrs	Hrs	
	Study	Study	Study	Study	Study	Study	Study	Study	
	1	2	3	4	5	6	7	8	9
1981	-4.67*** (.497)	-3.75*** (.83)	-3.13*** (.832)	-	-	-	-	-	-
1996	-	-	-	-.513*** (.187)	-2.07** (.805)	-2.03** (.811)	-	-	-
2004	-	-	-	-	-	-	-1.41*** (.0973)	-1.37*** (.0915)	-1.43*** (.0908)
Work (hrs)	-	-	-.202*** (.0242)	-	-	-.0396*** (.0106)	-	-	-.0506*** (.00566)
Female	-	.232 (.519)	.0422 (.513)	-	.801*** (.189)	.833*** (.189)	-	1.45*** (.102)	1.5*** (.101)
Black	-	-.714 (.974)	-.62 (.975)	-	-1.3*** (.459)	-1.26*** (.469)	-	-1.06*** (.213)	-.988*** (.212)
Asian	-	2.99 (4.06)	3.32 (3.84)	-	-1.3*** (.47)	-1.31*** (.468)	-	.132 (.194)	.0841 (.195)
Hisp	-	.737 (2.28)	1.4 (2.17)	-	-1.12** (.549)	-1.02* (.545)	-	-.754*** (.25)	-.71*** (.245)
Father Some Col.	-	.642** (.251)	.519** (.249)	-	.0401 (.498)	.0569 (.5)	-	.552** (.236)	.498** (.236)
Father Col. Grad	-	1.86*** (.298)	1.51*** (.298)	-	.213 (.486)	.147 (.487)	-	1.27*** (.232)	1.11*** (.231)
SAT (100s)	-	-	-	-	-.0441 (.0356)	-.0464 (.0356)	-	-.000167 (.00021)	-.00029 (.00021)
Major Dummies	-	X	X	-	X	X	-	X	X
SAT (sch -100s)	-	-	-	-	.0186*** (.00228)	.0175*** (.00229)	-	1.12*** (.0804)	1.03*** (.0786)
Obs	19300	19300	19300	23619	23619	23619	73729	73729	73729

Standard errors in parantheses. All regressions include dummy variables for missing data. Weights adjusted so that in the pooled dataset, earlier and later samples had equal weight (e.g., weights summed to .5 for 1961 and .5 for 1981 observations.)

\* significant at 10%; \*\* significant at 5%; \*\*\* significant at 1%

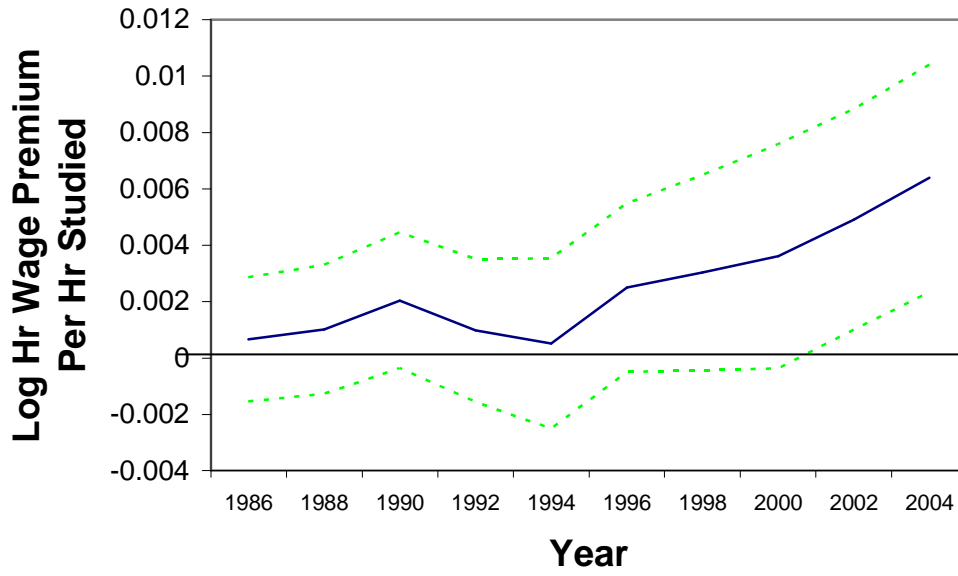
**Table 6**  
**Academics, Work, and Leisure**

	<b>1961-1981</b>		<b>1988-1996</b>		<b>1996-2004</b>		<b>NSSE 2003</b>
Class <sup>a</sup>	15.8	15.8	14.6	14.3	14.0	12.8	12.8
Study	24.4	19.8	12.7	12.2	11.5	10.1	13.3
Work	4.1	8.3	10.4	11.5	12.1	11.0	6.0
Leisure	123.7	124.2	130.2	130.0	130.4	134.1	135.9

<sup>a</sup>Average 1981 class time used for 1961 class time, and HERI 2004 class time used for NSSE. (Class time measure is absent in Project Talent and NSSE.)

Figure 1

## Wages and Hours Studied



Dotted lines show 95% confidence intervals. See Appendix A for additional notes on construction.

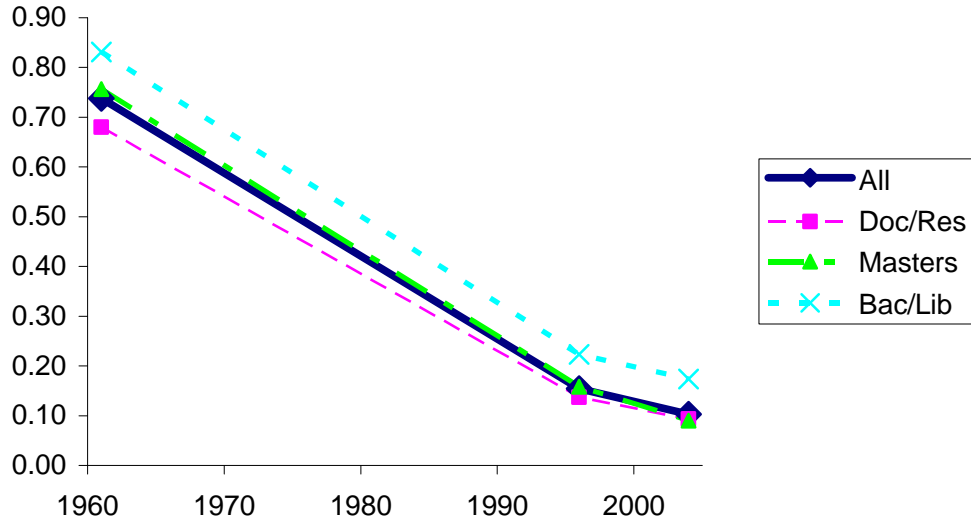


Figure 2

A.

### HERI CORE COLLEGES

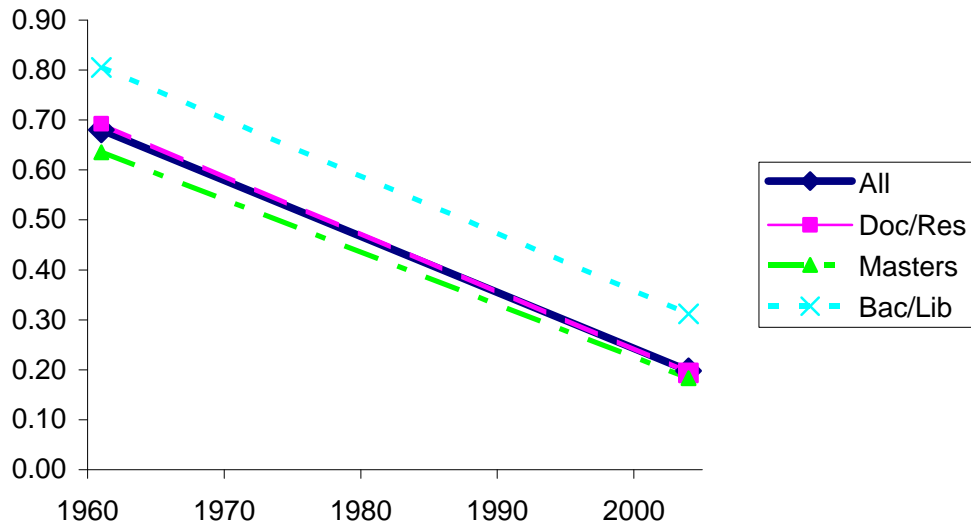
Fraction of Students Studying > 20 hrs/wk



B.

### NSSE COLLEGES

Fraction of Students Studying > 20 hrs/wk



See Appendix A for notes on construction.

Figure 3

Graduate Admissions Exam Scores, 1965-1999

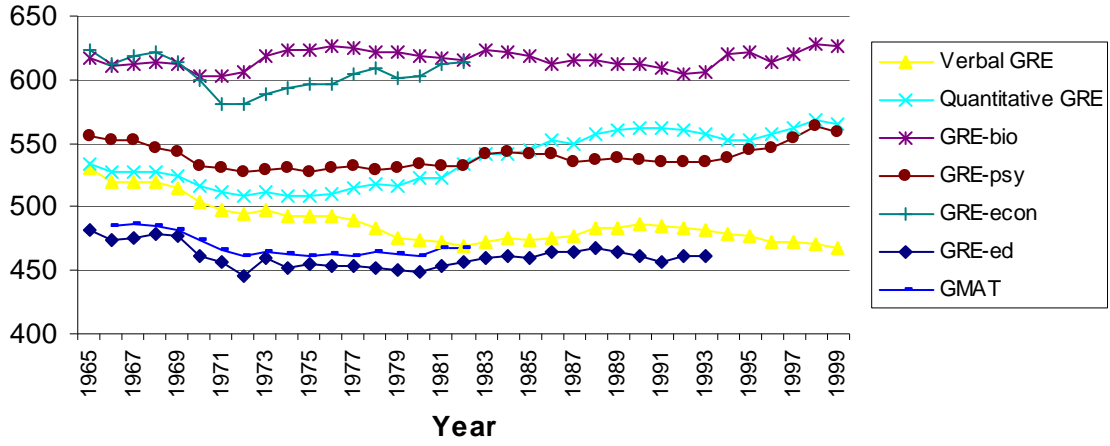
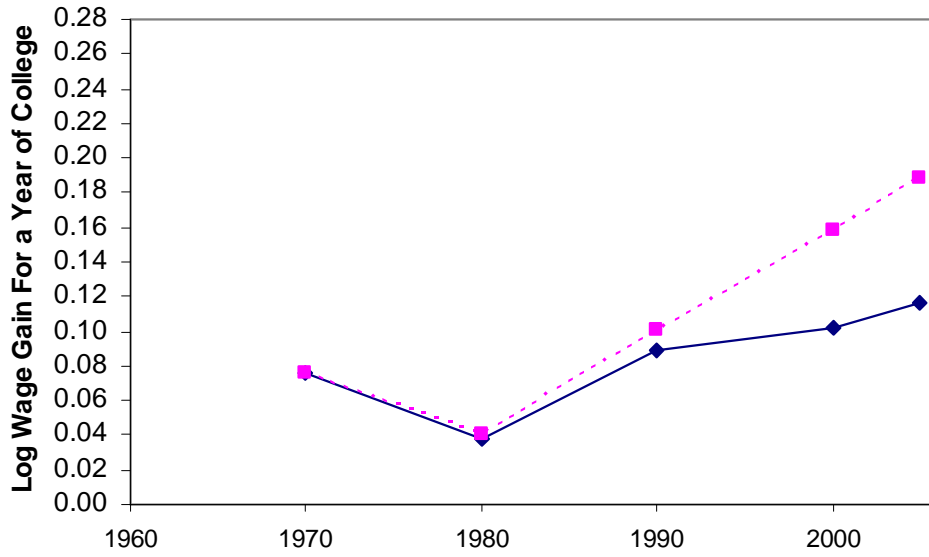


Figure 4

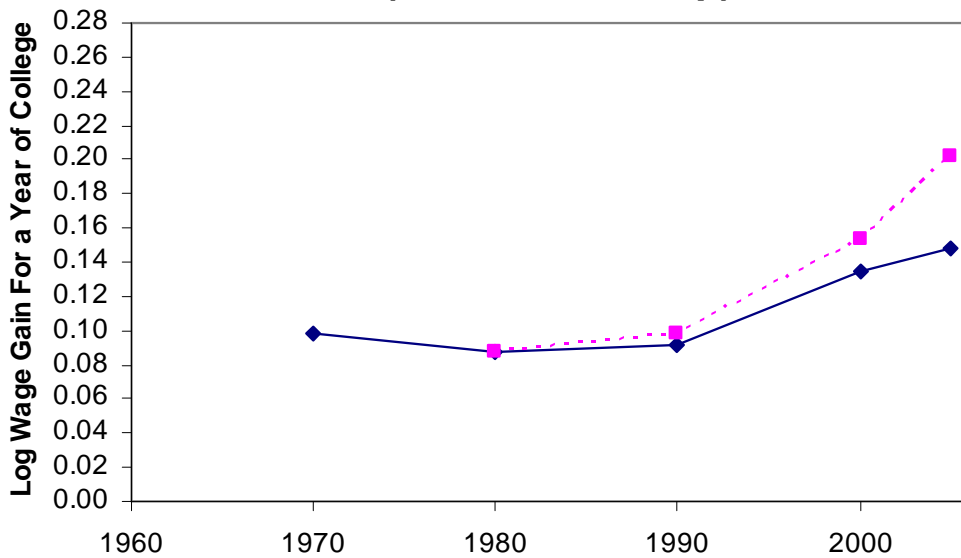
A.

### College Wage Premia 1970-2005 (Men, 10 Yrs Exp)



B.

### College Wage Premia 1970-2005 (Men, 20 Yrs Exp)



See Appendix A for notes on construction.