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

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ABSTRACT

Using data from multiple datasets and five different time periods, we document and quantify 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 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 work choices or in the composition of students or schools. We explore the implications of this finding, focusing in particular on wage regressions and a recalculation of the college wage premium.

PRELIMINARY DRAFT

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. We argue that 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 class and studying, 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 post-secondary schooling, 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 plausibly signifies 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 conclude, for example, that recent increases in the wage premium for a year of college 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, with a particular emphasis on wage regressions and a recalculation of the college wage premium. 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."[1] 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

[1] Hersch and Merrow(2005), Bok(2005), Nathan (2005).

time-use choices by students within the same institution.[2] Astin, Keup, and Lindahl (2002), analyzing a consistent set of schools between 1989 and 1998, find that time spent studying fell by about .41 hours per week, after conditioning on changes in student characteristics. As with Kuh (1999), the analysis covers a brief time period—about a decade. Moreover, changes in study time were not the major focus of the analysis, and thus a number of potential econometric problems were not addressed (e.g., top-coding and distributional assumptions).

Evidence in the education literature is suggestive, but non-conclusive, and 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 Ehrenbeg and Sherman (1997), Orzsag, Orzsag, and Whitemore (2001), 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.

[2] 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," "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.

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 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 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.[3] 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, the intuitions of educators, and common sense—increased effort in college is associated with increased marginal product later in the lifecycle.

III. Data

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

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 Youth, 1979. An important data source, whose annual surveys of college students became available only recently, is 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 for the 6 samples and indicates how they 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[4], and institutional characteristics; 5) The 1961 survey was administered to Freshmen, the 1981 to Freshmen, Sophomores, Juniors, and Seniors, the HERI surveys to

[4] 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.

Seniors and the NSSE survey to Freshman 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 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)

The HERI surveys ask, "*During the past year, how much time did you spend during a typical week doing the following activiies?"* 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 1987, 1988, or 1989, and in one or more of the years 1995, 1996, or 1997.[5] There are 89 such schools. In section IV.B, we will compare across consistent sets of schools to infer changes in academic time investment between 1988 and 1996 and between 1996 and 2004. [6] 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.[7]

2003 (NSSE)

[5] 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.
[6] 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.
[7] We also drop schools for which there are less than 10 individual observations. Results change very little when these schools are included.

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 does not go back more than a few years in time. Thus, unlike the HERI 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.[8] (For this reason, we will avoid direct comparisons between NSSE and HERI data in Section IV.B.) 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. 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 study time measures across the different datasets 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

[8] Specifically, there are more bins and more of the bins refer to higher study times. Differences in the bin structure would cause us to expect higher study time responses in the NSSE survey, a pattern that is evident in Table 1.

for all samples.[9] In a first pass at the data, we asses the overall change in academic time investment between 1961 and 2004. 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. Study times, then, appear to have fallen dramatically between 1961 and 2004.

A primary concern is the representatives 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" schools 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 HERI data in 2004 and Project Talent data in 1961. Figure 2A shows study time CDFs (subtracted from 1) at common truncation point of 20 hours per week for these 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.[10] 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 2003 NSSE.

[9] 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.

[10] We do not know the institutional type in 1961, as this was before IPEDS data was collected.

There were 156 institutions in the 2003 NSSE that had data available in Project Talent.[11] A similar 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 here than mean study time, as it avoids the top-coding problem in the later samples. 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. Table 2 shows that median study time fell from 23.6 hours per week in the 1961 sample to 8.6 and 11.6 hours per week, respectively, in the full 2004 HERI 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.

[11] More precisely, these were institutions that had at least 10 observations in 1961 and 2003.

Statistics in Table 3 allow a detailed analysis of the representativeness of the post-2000 samples. 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 4 reveals steep declines in all three study time measures between 1961 and 2004 for schools 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 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 HERI Core in 1961 studying slightly more than students in the nation at large 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. Columns 4 and 5 indicate that study times for the 24 Core HERI schools in 2004 were almost identical to study times for the full sample of HERI schools in 2004. 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 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.[12] 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

[12] This should not be a major concern, as female students studied about the same as male students in 1961. (See Figure 6.)

that higher parental education is associated with higher study times in 2004 and female students studied more than males in 2004.[13] If anything, then, characteristics of HERI 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.) We display 2004 characteristics for all private four-year institutions in Table 3, Column 8. These do not differ greatly from characteristics for public schools. Moreover, the NSSE does 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.

Having investigated the representativeness of the later samples, we revisit Table 2 for a summary of findings. We add study time to class time to obtain 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. For 2003-2005, the estimate is between 22.9 and 26.1 hours per week.[14] Median time investment showed a very similar drop. In the 1960s, then, full-time college attendance entailed a time investment comparable to that of a full-time job. 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

[13] See Figures 4 and 6.
[14] 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.

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 parse out and evaluate these and other competing explanations.

B. Time Trend in Academic Time Use

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 bars of Figure 3 show median study time by full time students in 1961 and 1981, respectively. Project Talent respondents were freshman, 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 Figure 3. (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 differs from those in the 1961 and 1981 samples, the most rigorous approach is to refrain from drawing inferences about changes in study times 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 bars of Figure 3 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 bars of Figure 3 compare weekly study times in 1998 and 2004 for the HERI schools with data in both time periods.[15]

Figure 3 resembles Figure 2A, but offers substantial 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, Figure 3 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 of adjacent bars in Figure 3 derive strictly from student responses to similar or identical survey questions and response ranges.

C. Demographic Subsamples

Family background

More recent college-going cohorts may be drawn from a different segment of the ability distribution. If current students were drawn from higher in the ability distribution or were better prepared for college, one might expect lower study times even if standards had not fallen (because students might need less time and effort 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? Figure 4.A 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 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.

[15] We do not include NSSE statistics in Figure 3, as the NSSE contains different institutions from the HERI data and features a different set of allowed responses to the survey question. See footnote 8.

Figures 4.B and 4.C show a similar breakdown using the HERI Core schools and the NSSE schools, respectively, in 1961 and 2004 (or 2003). The HERI Core and NSSE schools were found in Section IV.A to be representative of all four-year colleges in 1961. Though data for these schools are not available in all time periods, Figures 4.B and 4.C demonstrate the robustness of the findings above to alternative sets of representative institutions. The trend across multiple time periods is not observable, but the overall change between 1961 and the 2000's for these representative institutions is observable. Figures 4.B and 4.C reveal the same pattern found in Figure 4.A. Study times declined for all parental endowment types.

Employment

The fraction of working students is .27, .43, .75, .78, .76 and .81 in the 1961, 1981, 1988, 1996(with 1988 available), 1996(with 2004 available) and full HERI 2004 samples, respectively. In more recent cohorts, then, 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?

When we disaggregate the data by hours worked in Figure 5.A, we find study time decreases 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*. Figures 5.B and 5.C repeat the exercise for HERI Core and NSSE schools with very similar results. Students in all work categories decreased study times, with non-working students exhibiting the steepest declines. Changes in hours worked by the college-going population do not appear to explain in any direct way the decline in study times. Rather, the evidence suggests that college has become less time-intensive for students in every category of work choice.

Gender

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. Figure 6.A. shows weekly study times, 1961-1981, 1988-1996, and 1996-2004, 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.[16]

Race

Figure 6.B depicts weekly study time trends by race. The 1961 sample contains no students who classified themselves as Hispanic, whereas the other samples do have Hispanic students. For simplicity of exposition, then, we do not include Hispanic students in Figure 6.B. Study times declined for all of these 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 students and Black students has narrowed, as effort choices of Black students have declined less than effort choices of White students.

SAT Score

Figure 6.C 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

[16] To save space in Figure 6, we do not show similar charts using HERI Core and NSSE schools. Findings for these samples duplicate the patterns in Figure 6.

data than SAT math data.) Figure 6.C 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.[17] Systematic changes in student composition by SAT score do not appear to explain the aggregate study-time trend.[18]

Major choice

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. Figure 7 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.

[17] The difference between the second and third bars for the high-ability group in Figure 6C may warrant some discussion. It does not represent an "increase" over time in study time, as both bars refer to study time in 1996. The effect is strictly compositional. The third bar characterizes 1996 study time for students in colleges that also had data available in 1988, whereas the fourth bar describes 1996 study time for students in colleges that also had data available in 2004.

[18] By this we mean that *absent a lowering of standards 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.

B. College Types

Does the downward study-time trend hold for all types of colleges? One might imagine that the most selective colleges, having become more selective as the size of their applicant pools rose, would buck the trend. For the 1988-1996 and 1996-2004 time periods, we have data at the institution level. In Figure 8.A, we disaggregate the data by college selectivity, as proxied by the average verbal SAT score for the students attending the college.[19] Study times fell for colleges of all different levels of selectivity. Four-year colleges differ along other dimensions, as well. Figure 8.B divides the sample by institution type according to Carnegie classification. We observed in Figure 2 that study times declined overall for all types of institutions. With one exception, declines in study time are also visible for all 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, Figure 8.C disaggregates by college size. 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.

D. 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 and institutional characteristics. Columns 1 and 2 of Table 4 summarize regressions on the pooled 1961 and 1981 samples.[20] The dependent variable is average study time and the regressor of interest is the 1981 dummy variable. Column 2 includes controls for all demographic characteristics listed in Table 1 and dummies for majors. Student's studied 4.7 hours less on average in 1981 than 1961. When

[19] These scores are self-reported in HERI. The figure uses cut-offs that create approximate terciles.
[20] In these regressions, weights were adjusted so that in the pooled dataset, the 1961 and 1981 samples had equal weight (i.e., weights summed to .5 for the 1961 observations and .5 for the 1981 observations.)

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 3 through 5 of Table 4 summarize regressions on the pooled 1988-1996 sample. The model for Column 5 augments the demographic controls with institution level controls (as these are available in the HERI datasets but not the earlier samples). Students studied 1.9 hours less in 1996 than 1988, given the full set of controls—and, interestingly, the addition of controls increased the magnitude of the coefficient on the 1996 time dummy. Lastly, columns 6 through 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.

C. Study, Work, and Leisure

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 regression of Table 4, Column 2, the estimated magnitude of the year dummy rises by only .6 hrs. Removing the “hours worked” covariate from the Column 5 (1988-1996) and Column 8 (1996-2004) regressions leaves the coefficient on the time dummy virtually unaltered:

	1981	1996	2004
Time dummy (w/o "hrs work")	-3.75	-1.86	-1.38
Time dummy (with "hrs work")	-3.13	-1.85	-1.43

Students appear to have reduced study time, but only a very small portion of the reduction is associated with changes in hours worked. (See also Figure 5). Students appear then to have substituted largely into the excluded category—leisure.

In Table 5, 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 5 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 Figure 5). 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.

E. Discussion

Evidence indicates study times have fallen markedly since 1961. Colleges elicit less effort from students than they once did. Our preferred explanation is that standards have fallen. One possible alternative explanation is that instructors are better than they used to be, that course content is now communicated so effectively that students master it while studying less (and

attending less class). We cannot rule this out definitively, but note that it would require the continued introduction, decade by decade, of new modes of instruction that were extremely effective substitutes for student time and effort. [21] We know of no candidate pedagogies. Moreover, Bok(2000) finds no evidence of significant changes over time in pedagogical practices at four-year colleges. In recent years, professors have spent more than two-thirds of their instructional time lecturing to students, exactly as they did in earlier eras. [22] Further, our evidence indicates that study times are highest at institutions most oriented toward teaching—liberal arts colleges. It would seem that in institutions where teaching is most valued, instructors elicit higher study times, not lower study times.

In Section V, we will discuss possible explanations for the declining standards at post-secondary institutions. Post-secondary institutions may be responding to the reduced motivation of the college-going population. This, we argue, would still involve a lowering of standards—colleges responding to the desires of a more effort-averse population by making college less demanding.

V. IMPLICATIONS AND EXTENSIONS

A. Overview

In this section, we attempt briefly to make the case that the long-run trend in academic time investment by students, essentially undocumented prior to this study, may be one of the most important changes in post-secondary education to have occurred in the past half century. Much more research and attention have been devoted to changes over time in tuition and fees or in the gender, race, income, grade point averages, and entrance exam scores of the college-going population. But the study-time trend cuts across all demographics and would seem to require that researchers and educators rethink long-held assumptions. We argue that student time investment

[21] Internet usage, for example, does not explain the 1961-1981 declines.
[22] Pascarella and Terenzini (2005) as quoted in Bok(2005).

is fundamental to how colleges define themselves and their mission, and to how they attain credibility. Further, because time is the choice variable in models of human capital (and signaling), the time use trend is central to economists' understanding of human capital investment and production, and to their interpretation of wage equations and the evolving college wage premium. We begin with a discussion of several specific implications for economists, then comment briefly on the broader implications for educators and education policy.

B. Economic Implications

The Rising College Wage Premium

We begin with 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. Typically, the time measure used in these regressions is "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. One simple exercise we undertake is to calculate changes over time in the college wage premium after correcting for changes over time in time investment associated with a year of college.

For the calculations used to construct Figure 9, we follow a standard approach similar to Goldin & Katz (2001). We calculate the difference in mean log wage between workers with 12 years of schooling and workers with 16 years of schooling, decade by decade, for two age-experience groups. We divide the difference by 4 to estimate the wage gain associated with a year of college. We do not claim to estimate an internal rate of return, however, as our purpose is to illustrate a fundamental problem associated with the "years of college" measure under almost any reasonable set of assumptions about human capital production, opportunity costs, and internal rates of return, not simply those underlying the Mincer model (Heckman et al., 2005). In Figure 9, we look at 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 4.5 log points in 1980 to 11.7 log points in 2005. The calculations underlying the hatched line in Figure 6A take 1961 as the base year to account for changes in the "years of college" measure. In other words, wage premia depicted by the hatched line are the increases in wages associated with a college time investment equal to a "1961 year." 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 1961 and 1981 college time use data allow us to interpolate to estimate time use associated with a year of college in 1971. Workers with 10 years experience in 1990 are assumed to have attended college in the early 1980s and we use the 1981 college-time mean to approximate their time investment. Workers with 10 years experience in 2000 are assumed to have attended college in the early 1990s and 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 the 1996 time use measures to estimate their time investment. **[Data Appendix will display numerical results of the operations described above and details about construction of Figure 9]**. The hatched line in Figure 9A shows a much greater increase in the college wage premium than the standard calculation yields. While the solid line shows an increase of 7.2 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 increase of 14.1 log points. Increases over time in the wage premium for a year of college appear to be greatly underestimated by the traditional calculation. Figure 9B shows the same set of calculation for men with 20 years of experience. The same result holds for this age-experience group.

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. This would suggest that effects of skill-biased technological change (and/or other proposed explanatory mechanisms) may have been significantly larger than was previously imagined.

Rising Cost of College

A closely related topic is the rising cost of college. A number of researchers have documented and commented upon increases over time in college tuition costs (e.g., Bowen, 1967, Ehrenberg, 2000, and Barrow and Rouse, 2005). The National Center for Public Policy and Higher Education in its report in 2002 on the affordability of higher education documents rising tuition and offers the following assessment: "Our conclusion regarding the affordability of a college education is this: Americans are losing ground."[23]

To our knowledge, no research on changes over time in the affordability of college has accounted for declining time costs. We offer a back-of-the envelope calculation here to illustrate how accounting for falling time costs could alter conclusions dramatically. Average tuition and fees for four-year colleges for the 2003-2004 academic year amounted to $7,091. Tuition and fees, net of grants, averaged $5,558.[24] We estimate that the time cost of college fell from 40 hours per week to about 23-26 hours per week between 1961 and 2004. We estimate the average annual earnings of a high school graduate, aged 18-23, to be $20,982 (from March 2004 CPS.) If full-time enrollment consists of three 11-week quarters (exam weeks included), the potential earnings gain associated with a 15-17 hour per week reduction in time costs of full-time college attendance is between $4,660 and $5,659.[25] These estimates of cost savings are comparable in magnitude to

[23] "Losing Ground: A National Status Report on the Affordability of American Higher Education", The National Center for Public Policy and Higher Education, 2002, http://www.highereducation.org.
[24] Data are from National Center for Education Statistics, National Postsecondary Student Aid Study, as quoted in Barrow and Rouse, 2005.
[25] These figures are based on time savings of 15 hours per week and 17 hours per week, respectively, during 33/52 of a year. All calculations use 2003 dollars.

the **entire average net price for tuition and fees** in 2003-2004 ($5,558). Though we do not claim that any back-of-the-envelope calculation is definitive, the analysis above suggests that changes in time costs have powerful implications with respect to changes in the affordability of college.

The Wage Return to College Major

There is a large literature on the wage return to college majors.[26] The findings here relate in a direct way to this literature. We observe large differences in study times between majors. For example, Engineering students put in about twice the study time that business students do. Empirical work in this literature does not account for the large differences in time investment associated with different majors. James et al., for example, assert "…while sending your child to Harvard appears to be a good investment, sending him to your local state university to major in Engineering, to take lots of math, and preferably to attain a high GPA, is an even better private investment." Clearly, here, the authors abstract from the much higher opportunity cost of the Engineering major. Recent work (Arcidiaocono, 2004, and Hamermesh and Donald, 2004) attempts to account for ability bias associated with major choice, but even in this work, relative time costs are not considered. Accounting for widely differing opportunity costs by major may alter previous findings. Evidence on major-specific study times, we submit, allows economists to improve existing empirical work on major choice and the return to college major. This is a subject for future research.

Employment in College

Employment while in college has been studied by economists of higher education. The findings here may be of fundamental relevance to this body of work. Orzsag, Orzsag, and

[26] See Arcidiaocono(2004), Hammermesh and Donald(2004), James et al(1989), Grogger and Eide(1995), Loury(1997), Loury and Garman(1995).

Whitemore(2001) , Stinebrickner and Stinebrickner (2003), and others have documented a rise in the fraction of students who work while attending college full-time (or part-time). The explanation for this trend is unclear. We submit that the declining time cost of college, not yet addressed in the literature, may be a significant factor.

Wage Gap by Subgroup

Results here may also be relevant to studies of wage inequality by gender, race, or demographic subgroup. The gender wage gap, for example, may be larger than indicated by previous estimates. A "year" of college education represents a significantly greater time investment for women than for men. Standard estimates of the gender wage gap control for years of education. But failure to control for large differences by gender in time investment associated with a "year" of education may bias downward the estimated gap.

Explaining the Time Trend

The downward effort trend by students in post-secondary institutions would seem a puzzle for economists. We do not include a full-scale treatment of the subject here, but offer several possible causal channels that we hope to explore in future work.

The 1970s marked the introduction of student course evaluations, and the use of this instrument 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.[27]

Student evaluations of instructors are an obvious mechanism, but we note that other types of student empowerment could have similar effects. Increased competition among colleges increases the pressure on administrators to cater to student preferences. There exists evidence that high school seniors have been studying less and less over time.[28] If the college-going population has become more effort-averse, as this evidence would suggest, then colleges that attempt to maintain standards for current cohorts could suffer high attrition or lose market share.

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 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, it would seem, that colleges face a growing incentive to cater to the leisure preferences of students.

There remains the question of why students' demand for leisure would 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 incomes lead to lower study times: In cross-section, higher parental income is associated with higher study times.

B. Education Policy

[27] 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.
[28] Trend reported in *The American Freshman 40 Year Trends*, Higher Education Research Center, UCLA.

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.[29] Given concerns about rising tuition, it could be argued that a decrease in the time cost of college increases access. 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 time to be a primary input to education production. Indeed, a "unit" of course material is often **defined** precisely by the student time investment needed to master it. 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 on the part of a student, or the equivalent." The University of California, then, expects full-time students to spend at least 24 hours a week studying outside of class.[30] Similar expectations about study times apply to four-year colleges, in general.[31] In reality, it would appear 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 an input, the magnitude of the decrease over time in academic time investment is worth knowing. Dramatic declines in this input may signify declines in human capital production. Moreover, if the trend continues—and students earn course credits for smaller and smaller time investments—then at some point the credibility of a university system itself comes into question.

Student time use data may also offer important clues for policymakers interested in effort elicitation. Engineering majors, for example, have experienced much smaller declines in study

[29] Stiglitz (1975).
[30] A "unit" corresponds to one hour of class time. The regulation dictates that two hours study time outside class accompany every hour in class. Full-time attendance in the University of California system is defined as a minimum of 12 units per quarter. This yields 24 hours per week study time.
[31] See, for example, Kuh(1999).

times than are visible in other majors. It may be possible to look to engineering disciplines for policies and practices that better maintain academic engagement.

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 take this to be a new stylized fact with far-ranging implications for economists. We conclude, for example, that recent increases in the wage premium for a year of college may have been underestimated. Findings are also relevant to economic studies of college affordability, the return to college major, employment while in college, and studies of wage inequality by race and gender. Lastly, the decline in academic time investment by full-time college students would seem a puzzle in its own right that warrants continued research.

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APPENDIX A

(DATA APPENDIX) To be added.

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)[32] 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.

[32] 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 1961 (National Sample)		NLSY79 1981 (National Sample)		HERI 1988 (40 schools)		HERI 1996 (1988 avail) (40 schools)		HERI 1996 (2004 avail) (89 schools)		HERI 2004 (89 schools)		NSSE 2003 (156 schools)	
	Mean	**St. Dev.**	**Mean**	**St. Dev.**	**Mean**	**St. Dev.**	**Mean**	**St. Dev.**	**Mean**	**St. Dev.**	**Mean**	**St. Dev.**	**Mean**	**St. Dev.**
Study (hrs/wk)	**24.43**	13.44	**19.75**	14.59	-	-	-	-	-	-	-	-	-	-
Study>20 hrs/wk	**0.673**	0.469	**0.442**	0.497	**0.173**	0.378	**0.166**	0.372	**0.143**	0.350	**0.101**	0.301	**0.198**	0.399
Study>16 hrs/wk	**0.723**	0.448	**0.539**	0.499	**0.336**	0.472	**0.320**	0.467	**0.282**	0.450	**0.212**	0.409	**0.344**	0.475
Study<5 hrs/wk	**0.067**	0.250	**0.138**	0.345	**0.167**	0.373	**0.218**	0.413	**0.243**	0.429	**0.323**	0.468	**0.186**	0.389
Class (hrs/wk)	-	-	**15.84**	7.61	-	-	-	-	-	-	-	-	-	-
Class>20 hrs/wk	-	-	**0.193**	0.395	**0.138**	0.345	**0.156**	0.363	**0.155**	0.362	**0.098**	0.297	-	-
Class>16 hrs/wk	-	-	**0.379**	0.485	**0.443**	0.497	**0.404**	0.491	**0.405**	0.491	**0.309**	0.462	-	-
Class<5 hrs/wk	-	-	**0.075**	0.263	**0.078**	0.268	**0.084**	0.277	**0.109**	0.312	**0.114**	0.318	-	-
Work (hrs/wk)	**4.12**	8.48	**8.25**	11.63	-	-	-	-	-	-	-	-	-	-
Work >20 hrs/wk	**0.05**	0.22	**0.15**	0.36	**0.15**	0.36	**0.22**	0.41	**0.17**	0.37	**0.18**	0.39	**0.09**	0.28
Work <20 hrs/wk	**0.22**	0.41	**0.28**	0.45	**0.60**	0.49	**0.56**	0.50	**0.59**	0.49	**0.62**	0.48	**0.46**	0.50
Not working	**0.73**	0.44	**0.57**	0.49	**0.25**	0.43	**0.22**	0.41	**0.24**	0.43	**0.19**	0.40	**0.45**	0.50
White	**0.96**	0.20	**0.74**	0.44	**0.86**	0.34	**0.74**	0.44	**0.81**	0.39	**0.80**	0.40	**0.82**	0.38
Asian	**0.01**	0.10	**0.01**	0.11	**0.06**	0.24	**0.10**	0.30	**0.06**	0.23	**0.06**	0.23	**0.07**	0.26
Black	**0.02**	0.15	**0.10**	0.30	**0.04**	0.20	**0.05**	0.22	**0.04**	0.20	**0.06**	0.24	**0.08**	0.27
Female	**0.46**	0.50	**0.48**	0.50	**0.57**	0.49	**0.58**	0.49	**0.62**	0.48	**0.65**	0.48	**0.64**	0.48
Father's Ed < 12	**0.34**	0.48	**0.28**	0.45	**0.07**	0.26	**0.07**	0.26	**0.08**	0.28	**0.05**	0.22	**0.26**	0.44
12< Father's Ed<16	**0.42**	0.49	**0.28**	0.45	**0.33**	0.47	**0.33**	0.47	**0.35**	0.48	**0.35**	0.48	**0.22**	0.41
Father's Ed >=16	**0.24**	0.43	**0.44**	0.50	**0.60**	0.49	**0.60**	0.49	**0.57**	0.50	**0.60**	0.49	**0.52**	0.50
SAT Verbal	-	-	-	-	**570.92**	91.17	**596.23**	88.72	**583.01**	87.17	**588.67**	88.15	**566.94**	94.64
Public	-	-	-	-	**0.35**	0.48	**0.35**	0.48	**0.04**	0.20	**0.04**	0.20	**0.67**	0.47
Doc/Research	-	-	-	-	**0.56**	0.50	**0.56**	0.50	**0.35**	0.48	**0.35**	0.48	**0.53**	0.50
Masters	-	-	-	-	**0.27**	0.44	**0.27**	0.44	**0.40**	0.49	**0.40**	0.49	**0.38**	0.49
Bac/Lib Arts	-	-	-	-	**0.09**	0.29	**0.09**	0.29	**0.12**	0.32	**0.12**	0.32	**0.07**	0.26
Bac/Other	-	-	-	-	**0.06**	0.24	**0.06**	0.24	**0.13**	0.33	**0.13**	0.33	**0.02**	0.14
Obs	17986		1314		6094		17525		33278		40451		3249	
Notes	Freshmen		All years		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

	1961	1981	1988	1996 (1988 avail)	1996 (2004 avail)	2004	2003 NSSE
Median Study (hrs/wk)	23.62	16.63	11.71	11.09	10.10	8.55	11.81
Ave Study (hrs/wk) - Int. Coded*	24.43	19.75	12.64	12.13	11.38	9.94	13.42
Ave Study (hrs/wk) - Bin Midpts*	24.43	19.75	12.72	12.21	11.50	10.09	13.31
Median Class (hrs/wk)	-	14.85	14.68	14.12	14.01	12.67	-
Ave Class (hrs/wk) - Int. Coded*	-	15.84	14.41	14.12	13.83	12.63	-
Ave Class (hrs/wk) - Bin Midpts*	-	15.84	14.60	14.28	13.98	12.80	-
Obs	21257	1314	6094	17525	33278	40451	3249

*for grouped data samples

Table 3
Representativeness of Core Samples - Full Time Students

	1961			2003-2004			2004	
	All	**HERI Core**	**NSSE**	HERI All	**HERI Core**	**NSSE**	All[a]	Private[a]
A. ALL	**1**	**2**	**3**	**4**	**5**	**6**	**7**	**8**
Study (Med.,hrs/wk)	23.62	**24.54**	**23.70**	8.55	**8.52**	**11.81**	-	-
Study (Ave.,hrs/wk)	24.43	**25.79**	**24.71**	10.09	**10.08**	**13.31**	-	-
Study>20 hrs/wk	0.67	**0.74**	**0.68**	0.10	**0.10**	**0.20**	-	-
Not working	0.73	**0.66**	**0.74**	0.18	**0.20**	**0.45**	0.28	0.27
White	0.97	**0.99**	**0.98**	0.80	**0.78**	**0.82**	0.77	0.78
Asian	0.01	**0.00**	**0.01**	0.06	**0.08**	**0.07**	0.07	0.06
Black	0.02	**0.00**	**0.01**	0.06	**0.05**	**0.08**	0.11	0.12
Female	0.46	**0.26**	**0.45**	0.65	**0.61**	**0.64**	0.56	0.57
Father's Ed >=16	0.24	**0.27**	**0.26**	0.60	**0.62**	**0.52**	0.43	0.47
#Institutions	1214	**24**	**156**	89	**24**	**156**	1407	877
B. Doctoral/Research[b]								
Study (Med.,hrs/wk)	24.27	**23.54**	**24.10**	7.69	**7.50**	**11.96**	-	-
Study (Ave.,hrs/wk)	25.22	**23.93**	**24.89**	9.45	**9.35**	**13.33**	-	-
Study>20 hrs/wk	0.70	**0.68**	**0.69**	0.09	**0.09**	**0.19**	-	-
Not working	0.76	**0.66**	**0.77**	0.21	**0.21**	**0.49**	0.32	0.33
White	0.97	**0.99**	**0.98**	0.74	**0.74**	**0.82**	0.77	0.77
Asian	0.01	**0.00**	**0.01**	0.08	**0.09**	**0.08**	0.10	0.12
Black	0.01	**0.00**	**0.01**	0.07	**0.07**	**0.08**	0.11	0.08
Female	0.42	**0.16**	**0.41**	0.59	**0.59**	**0.62**	0.56	0.53
Father's Ed >=16	0.25	**0.21**	**0.27**	0.59	**0.58**	**0.56**	0.51	0.65
#Institutions	192	**6**	**52**	8	**6**	**52**	259	91
C. Masters[b]								
Study (Med.,hrs/wk)	19.84	**24.26**	**20.62**	8.41	**9.20**	**10.75**	-	-
Study (Ave.,hrs/wk)	22.40	**25.21**	**23.44**	9.86	**10.42**	**12.71**	-	-
Study>20 hrs/wk	0.61	**0.76**	**0.64**	0.09	**0.09**	**0.18**	-	-
Not working	0.70	**0.56**	**0.73**	0.16	**0.16**	**0.41**	0.25	0.25
White	0.96	**1.00**	**0.97**	0.81	**0.83**	**0.81**	0.78	0.81
Asian	0.01	**0.00**	**0.01**	0.05	**0.07**	**0.07**	0.05	0.05
Black	0.04	**0.00**	**0.02**	0.06	**0.02**	**0.09**	0.11	0.10
Female	0.50	**0.36**	**0.49**	0.70	**0.67**	**0.69**	0.58	0.59
Father's Ed >=16	0.18	**0.28**	**0.21**	0.57	**0.61**	**0.44**	0.36	0.40
#Institutions	395	**10**	**62**	35	**10**	**62**	605	322
D. Bac/Liberal Arts[b]								
Study (Med.,hrs/wk)	29.07	**29.41**	**28.50**	11.08	**11.56**	**15.22**	-	-
Study (Ave.,hrs/wk)	28.96	**30.40**	**29.11**	12.31	**12.71**	**16.38**	-	-
Study>20 hrs/wk	0.79	**0.83**	**0.81**	0.16	**0.17**	**0.31**	-	-
Not working	0.74	**0.79**	**0.69**	0.24	**0.26**	**0.41**	0.26	0.24
White	0.97	**0.98**	**0.99**	0.88	**0.88**	**0.88**	0.82	0.83
Asian	0.00	**0.02**	**0.01**	0.05	**0.05**	**0.06**	0.07	0.04
Black	0.02	**0.00**	**0.00**	0.04	**0.03**	**0.03**	0.10	0.11
Female	0.47	**0.35**	**0.50**	0.60	**0.59**	**0.62**	0.59	0.59
Father's Ed >=16	0.39	**0.37**	**0.41**	0.74	**0.79**	**0.70**	0.52	0.53
#Institutions	170	**8**	**30**	20	**8**	**30**	223	198

[a]Source for Columns 7 and 8: NPSAS 2004, Online Data Cutting Tool. (Based on full-time students at four-year institutions.)

[b]No IPEDS data vailable in 1961. Classifications for 1961 based on 2000 Carnegie Code (for institutions that existed in 2000.) "Bac/Other" category is omitted (to save space) but is available form authors upon request.

Table 4
Study Time - Time Trends with Demographic and Institution-level Controls

	1961 - 1981		1988-1996			1996-2004		
Dependent Var.	Hrs Study 1	Hrs Study 2	Hrs Study 3	Hrs Study 4	Hrs Study 5	Hrs Study 6	Hrs Study 7	Hrs Study 8
1981	-4.67***	-3.13***						
	(.497)	(.832)						
1996			-.513***	-1.79**	-1.85**			
			(.187)	(.819)	(.808)			
2004						-1.41***	-1.44***	-1.43***
						(.0973)	(.0914)	(.0906)
Work (hrs)		-.202***		-.0492***	-.0296***		-.0578***	-.0389***
		(.0242)		(.0106)	(.0108)		(.00572)	(.0058)
Female		.0422		.742***	.872***		1.45***	1.46***
		(.513)		(.186)	(.189)		(.102)	(.101)
Black		-.62		-1.65***	-1.26***		-1.22***	-.969***
		(.975)		(.477)	(.483)		(.215)	(.211)
Asian		3.32		-1.09**	-.814*		.116	.387**
		(3.84)		(.462)	(.463)		(.196)	(.196)
Hisp		1.4		-.801	-.644		-.725***	-.497**
		(2.17)		(.546)	(.541)		(.251)	(.246)
Father HS Grad		.519**		.178	.0587		.572**	.323
		(.249)		(.5)	(.502)		(.236)	(.233)
Father Col. Grad		1.51***		.479	.168		1.35***	.885***
		(.298)		(.484)	(.49)		(.231)	(.229)
SAT				-.000383	-.000896**		-.0000791	-.000073
				(.000357)	(.000384)		(.00021)	(.000217)
Major Dummies		X						
SAT (sch -100s)					.0175***			.0079***
					(.00269)			(.000734)
Public					.0421			1.03***
					(.28)			(.376)
Doc/Res					-1.74***			0
					(.478)			(0)
Masters					-2.25***			-.237
					(.487)			(.232)
Bac/Lib					-1.34***			1.01***
					(.442)			(.268)
Bac/Other					-2.2***			.0861
					(.528)			(.271)
Enrollment (1000s)					-.0473***			-.0836***
					(.0145)			(.0139)
Obs	19300	19300	23619	23619	23619	73729	73729	73729

Standard errors in parantheses.

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

Table 5
Academics, Work, and Leisure

	1961-1981		1988-1996		1996-2004		NSSE 2003
Class[a]	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

[a]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

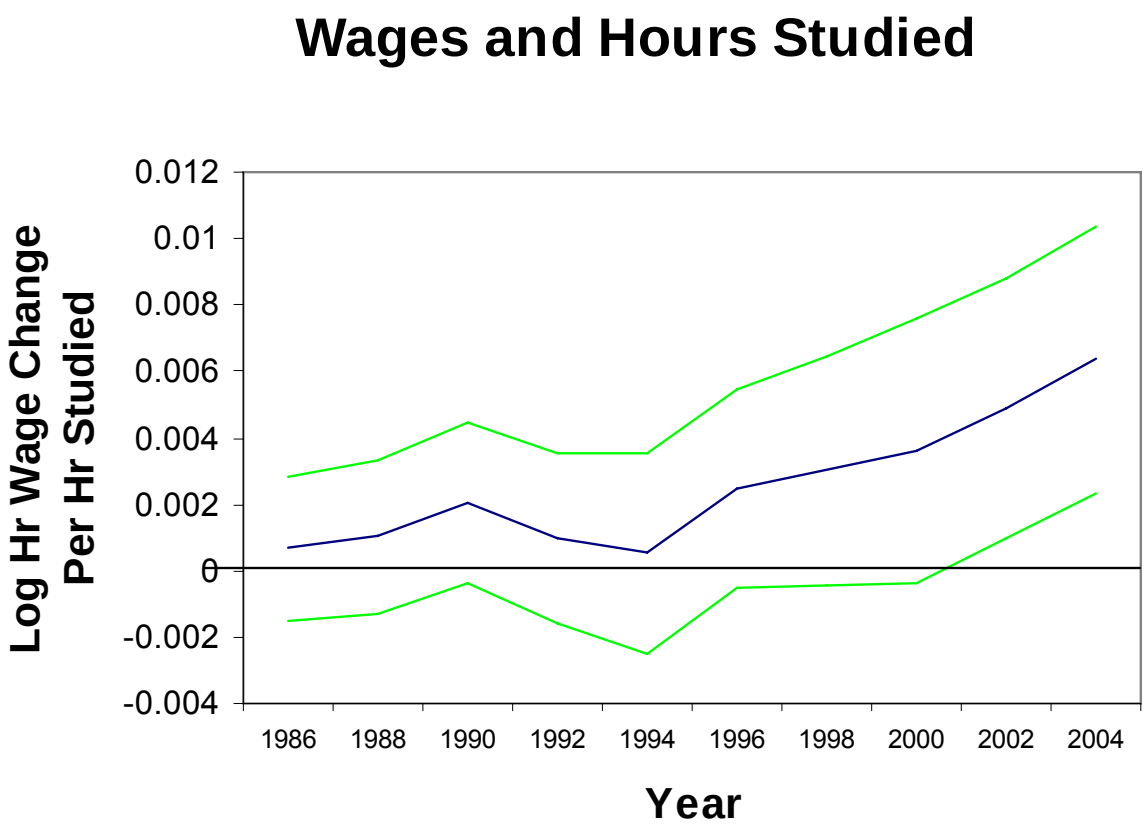
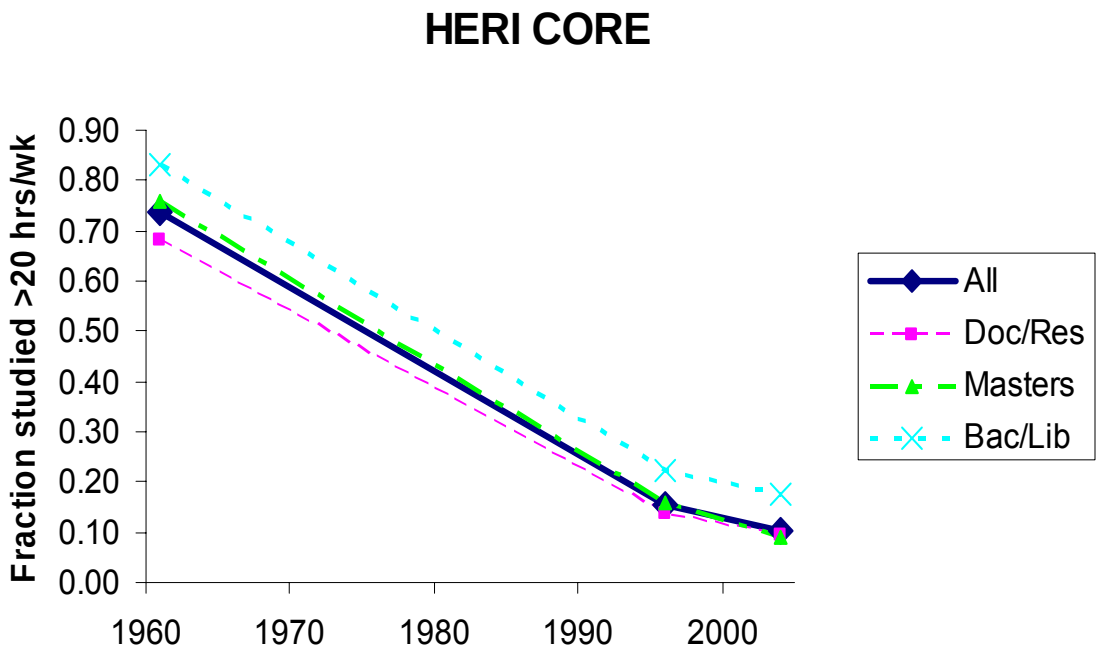

Wages and Hours Studied
Log Hr Wage Change Per Hr Studied
0.012
0.01
0.008
0.006
0.004
0.002
0
-0.002
-0.004
1986
1988
1990
1992
1994
1996
1998
2000
2002
2004
Year

Figure 2

A.


HERI CORE
Fraction studied >20 hrs/wk
0.90
0.80
0.70
0.60
0.50
0.40
0.30
0.20
0.10
0.00
1960
1970
1980
1990
2000
All
Doc/Res
Masters
Bac/Lib

B.

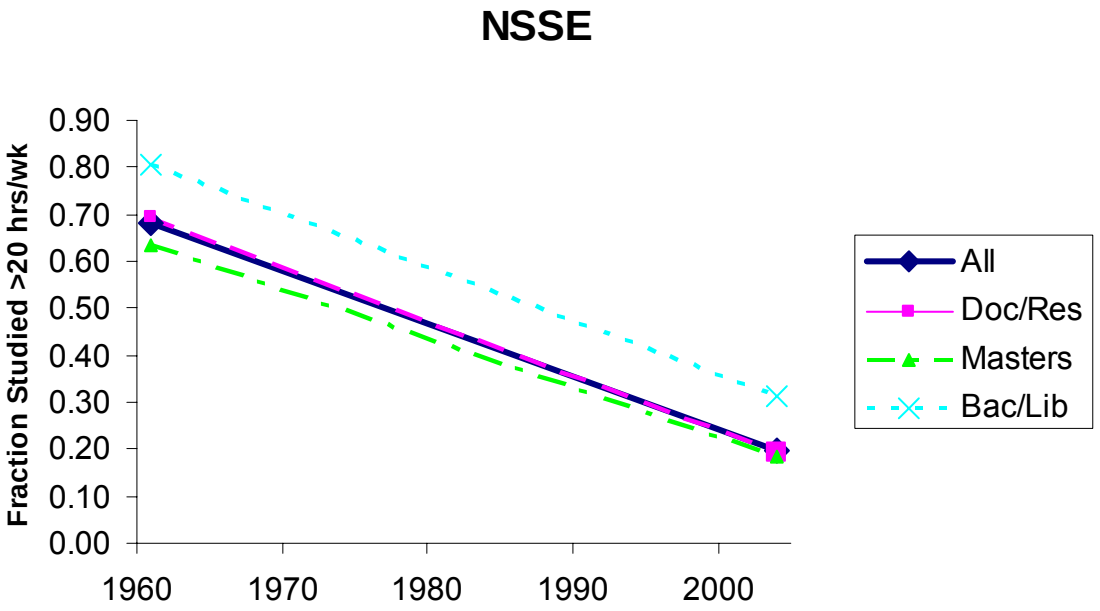

NSSE
Fraction Studied >20 hrs/wk
0.90
0.80
0.70
0.60
0.50
0.40
0.30
0.20
0.10
0.00
1960
1970
1980
1990
2000
All
Doc/Res
Masters
Bac/Lib

Figure 3

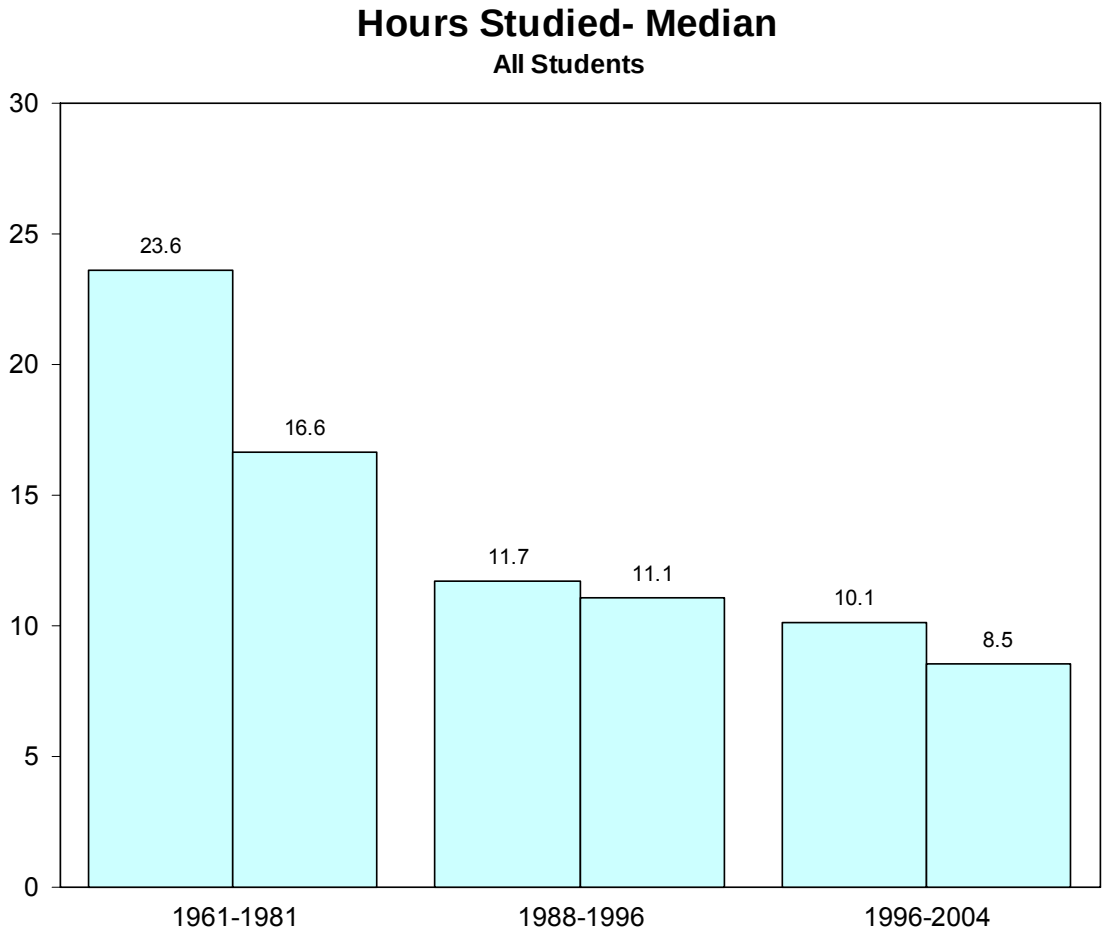
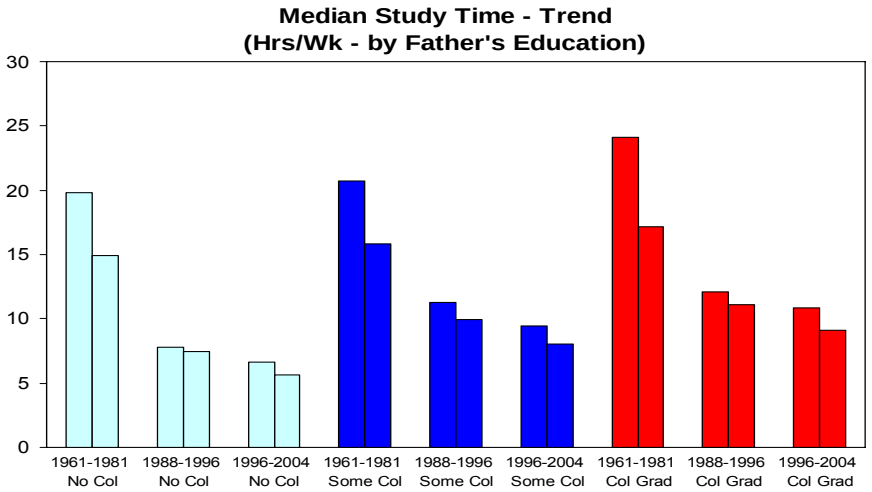
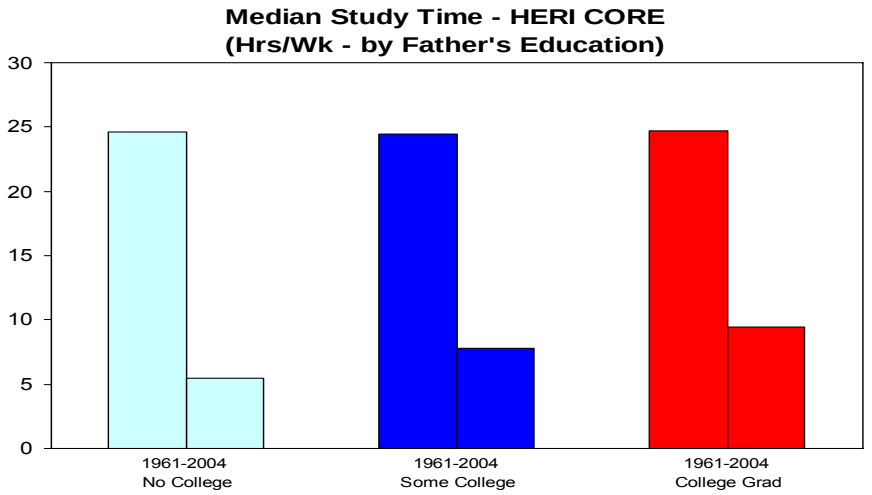

Hours Studied- Median
All Students
30
25
20
15
10
5
0
23.6
16.6
11.7
11.1
10.1
8.5
1961-1981
1988-1996
1996-2004

Figure 4

A.


Median Study Time - Trend
(Hrs/Wk - by Father's Education)
30
25
20
15
10
5
0
1961-1981 No Col
1988-1996 No Col
1996-2004 No Col
1961-1981 Some Col
1988-1996 Some Col
1996-2004 Some Col
1961-1981 Col Grad
1988-1996 Col Grad
1996-2004 Col Grad

B.


Median Study Time - HERI CORE
(Hrs/Wk - by Father's Education)
30
25
20
15
10
5
0
1961-2004 No College
1961-2004 Some College
1961-2004 College Grad

C.

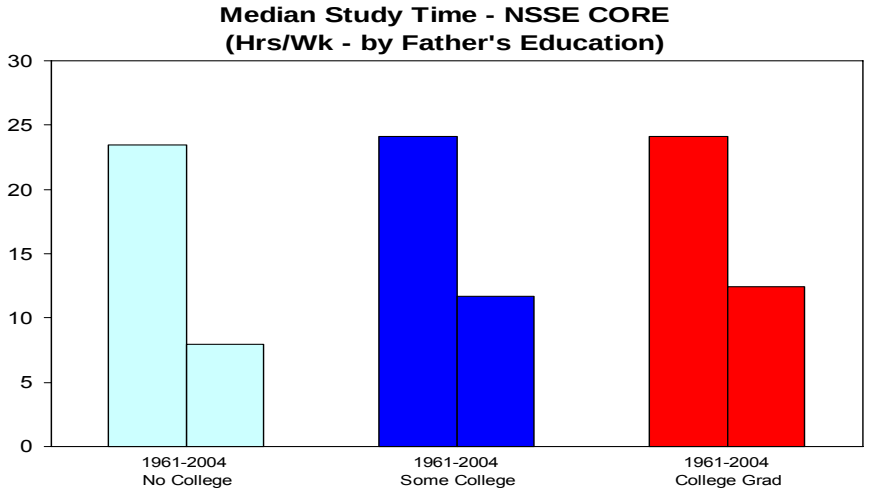
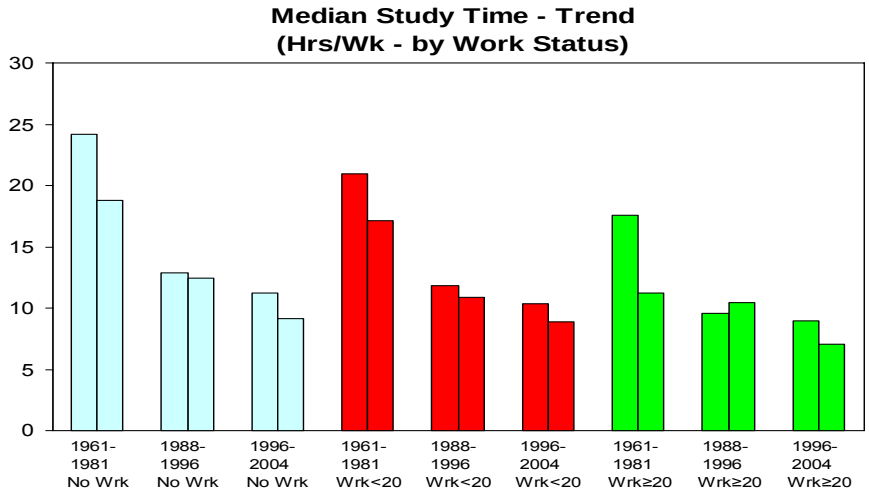
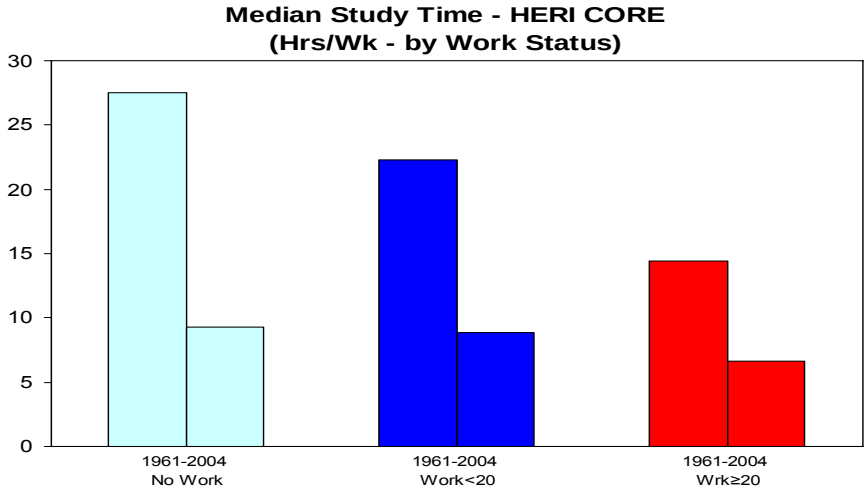

Median Study Time - NSSE CORE
(Hrs/Wk - by Father's Education)
30
25
20
15
10
5
0
1961-2004 No College
1961-2004 Some College
1961-2004 College Grad

Figure 5

A.


Median Study Time - Trend
(Hrs/Wk - by Work Status)
30
25
20
15
10
5
0
1961-1981 No Wrk
1988-1996 No Wrk
1996-2004 No Wrk
1961-1981 Wrk<20
1988-1996 Wrk<20
1996-2004 Wrk<20
1961-1981 Wrk≥20
1988-1996 Wrk≥20
1996-2004 Wrk≥20

B.


Median Study Time - HERI CORE
(Hrs/Wk - by Work Status)
30
25
20
15
10
5
0
1961-2004 No Work
1961-2004 Work<20
1961-2004 Wrk≥20

C.

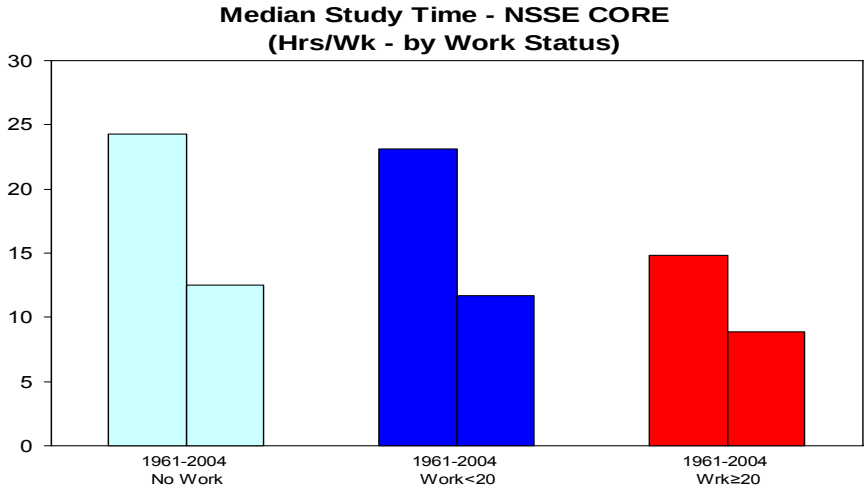
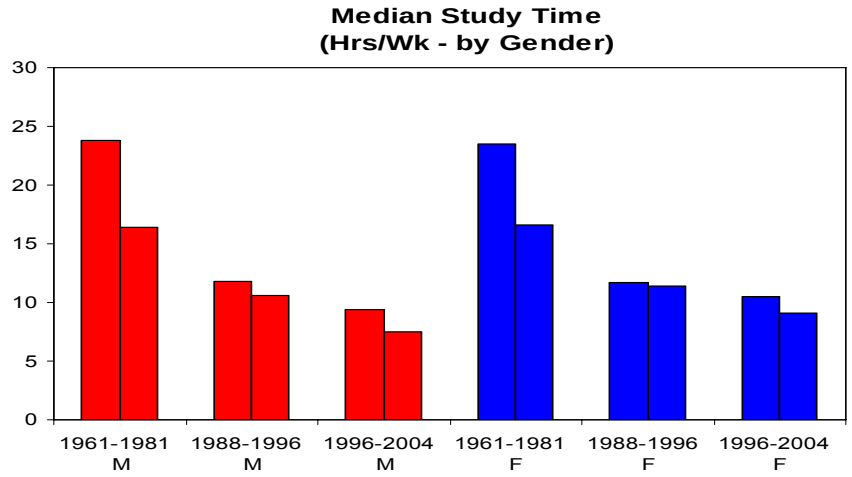
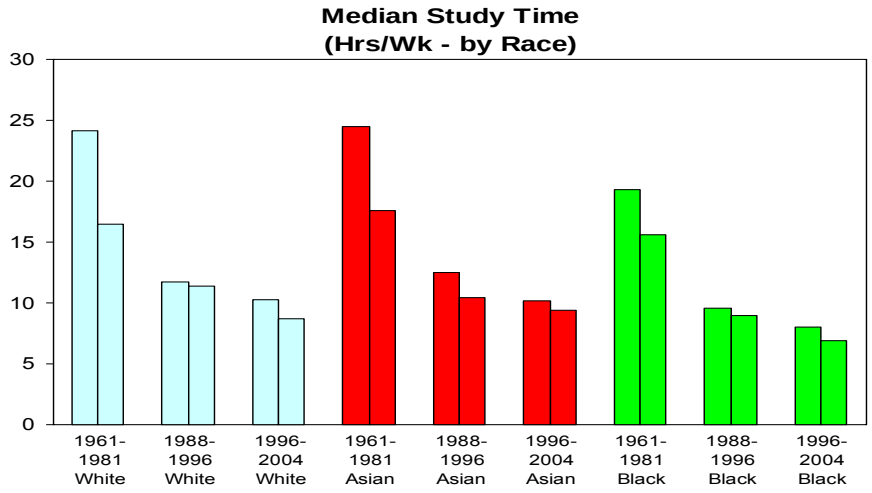

Median Study Time - NSSE CORE
(Hrs/Wk - by Work Status)
30
25
20
15
10
5
0
1961-2004 No Work
1961-2004 Work<20
1961-2004 Wrk≥20

Figure 6

A.


Median Study Time
(Hrs/Wk - by Gender)
30
25
20
15
10
5
0
1961-1981 M
1988-1996 M
1996-2004 M
1961-1981 F
1988-1996 F
1996-2004 F

B.


Median Study Time
(Hrs/Wk - by Race)
30
25
20
15
10
5
0
1961-1981 White
1988-1996 White
1996-2004 White
1961-1981 Asian
1988-1996 Asian
1996-2004 Asian
1961-1981 Black
1988-1996 Black
1996-2004 Black

C.

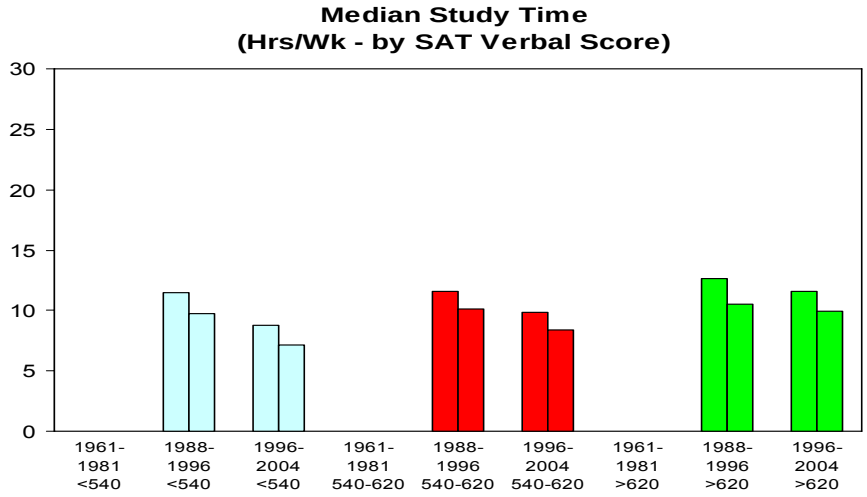

Median Study Time
(Hrs/Wk - by SAT Verbal Score)
30
25
20
15
10
5
0
1961-1981 <540
1988-1996 <540
1996-2004 <540
1961-1981 540-620
1988-1996 540-620
1996-2004 540-620
1961-1981 >620
1988-1996 >620
1996-2004 >620

Figure 7

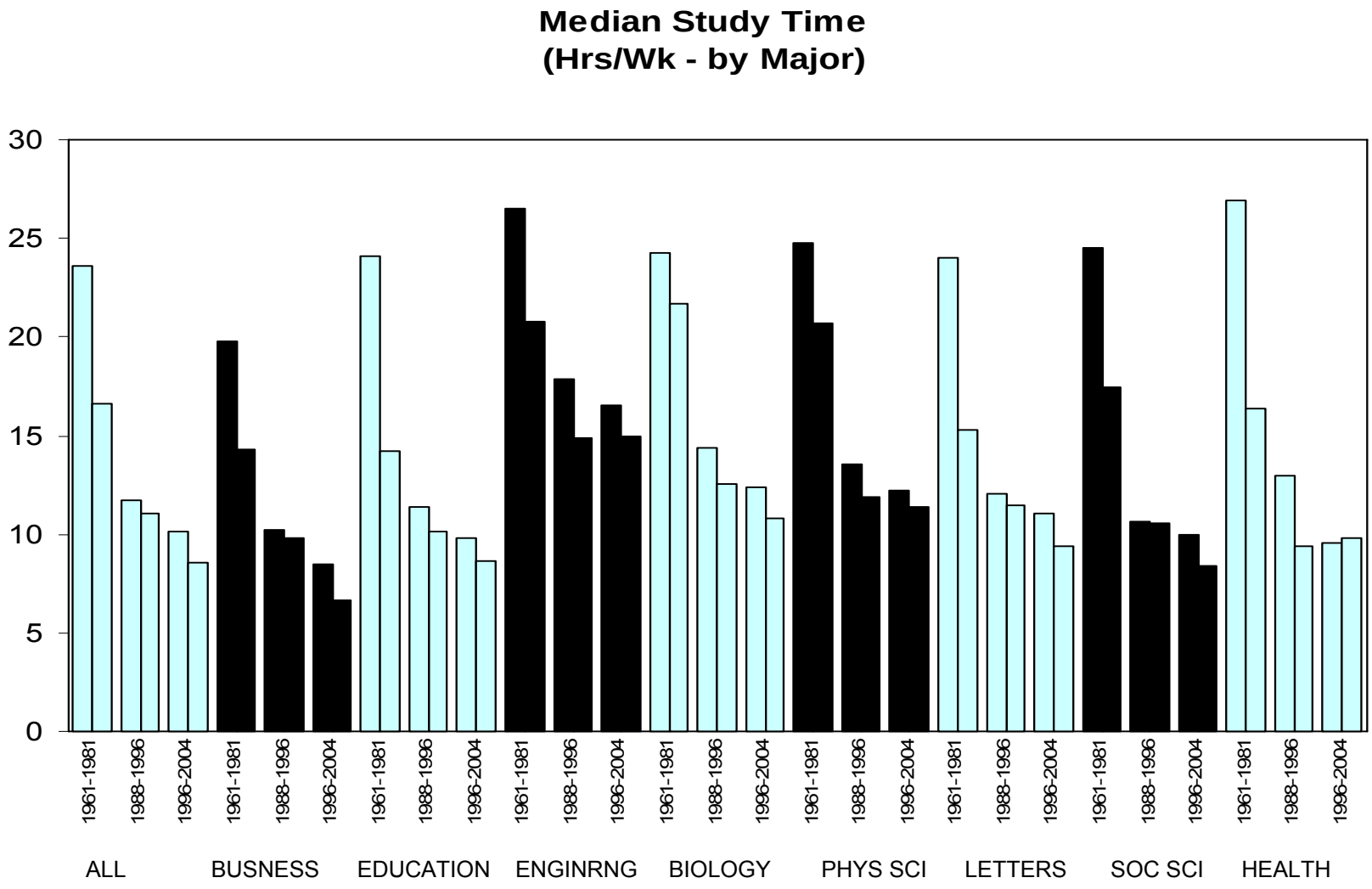
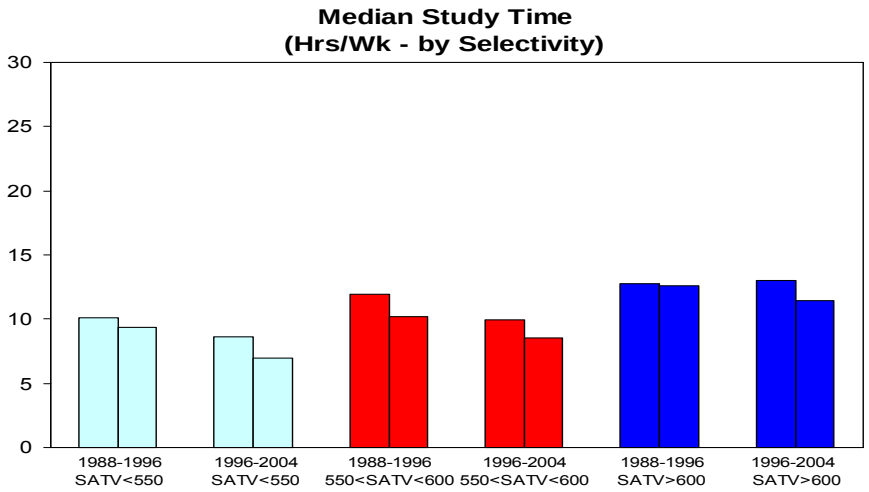
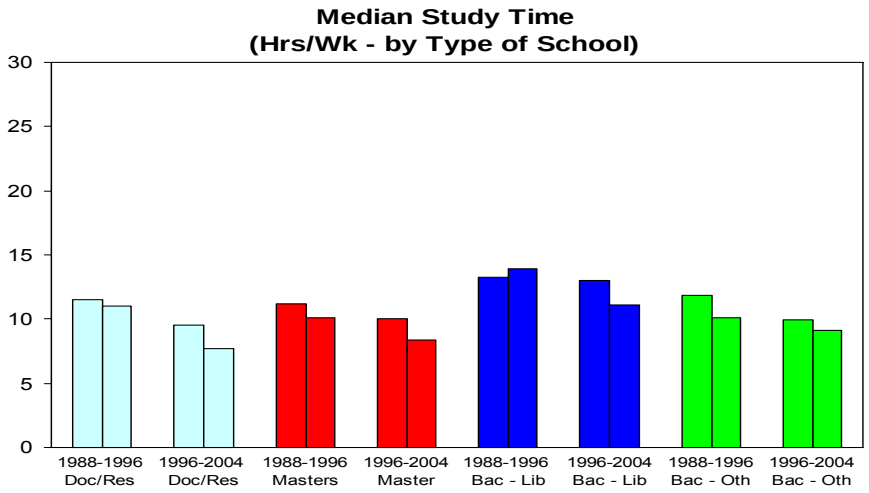

Median Study Time
(Hrs/Wk - by Major)
30
25
20
15
10
5
0
1961-1981
1988-1996
1996-2004
ALL
BUSNESS
EDUCATION
ENGINRNG
BIOLOGY
PHYS SCI
LETTERS
SOC SCI
HEALTH

Figure 8

A.


Median Study Time
(Hrs/Wk - by Selectivity)
30
25
20
15
10
5
0
1988-1996 SATV<550
1996-2004 SATV<550
1988-1996 550<SATV<600
1996-2004 550<SATV<600
1988-1996 SATV>600
1996-2004 SATV>600

B.


Median Study Time
(Hrs/Wk - by Type of School)
30
25
20
15
10
5
0
1988-1996 Doc/Res
1996-2004 Doc/Res
1988-1996 Masters
1996-2004 Master
1988-1996 Bac - Lib
1996-2004 Bac - Lib
1988-1996 Bac - Oth
1996-2004 Bac - Oth

C.

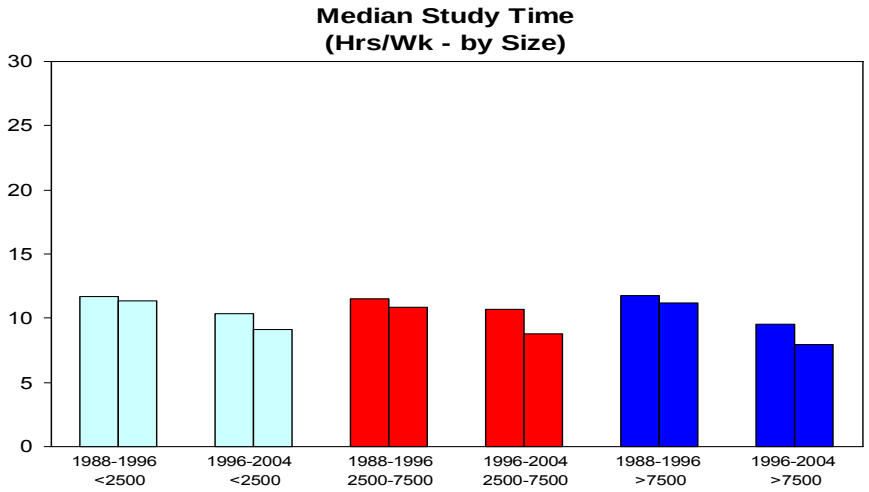
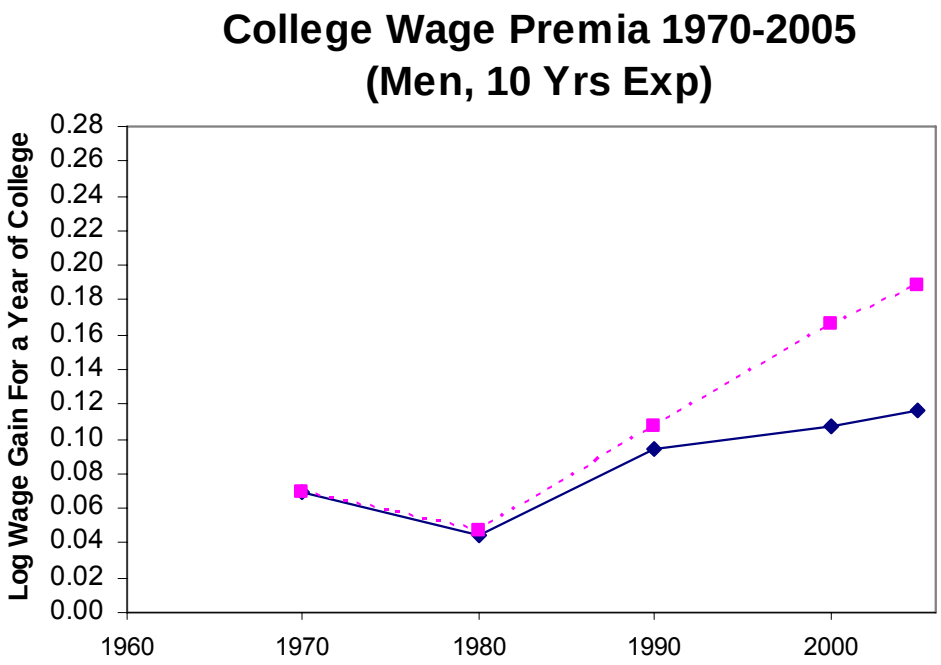
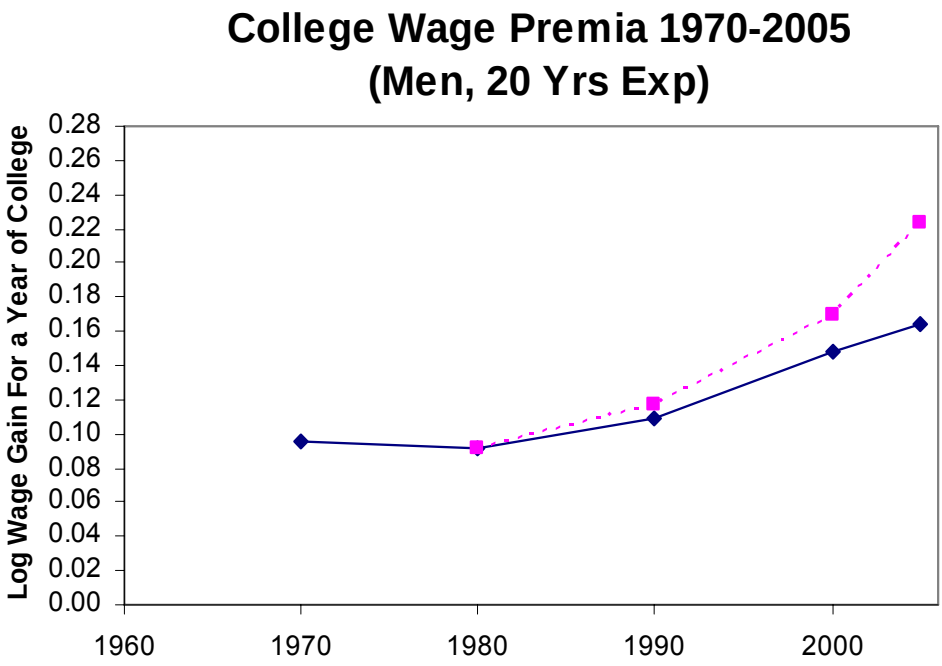

Median Study Time
(Hrs/Wk - by Size)
30
25
20
15
10
5
0
1988-1996 <2500
1996-2004 <2500
1988-1996 2500-7500
1996-2004 2500-7500
1988-1996 >7500
1996-2004 >7500

Figure 9

A.


College Wage Premia 1970-2005
(Men, 10 Yrs Exp)
Log Wage Gain For a Year of College
0.28
0.26
0.24
0.22
0.20
0.18
0.16
0.14
0.12
0.10
0.08
0.06
0.04
0.02
0.00
1960
1970
1980
1990
2000

B.


College Wage Premia 1970-2005
(Men, 20 Yrs Exp)
Log Wage Gain For a Year of College
0.28
0.26
0.24
0.22
0.20
0.18
0.16
0.14
0.12
0.10
0.08
0.06
0.04
0.02
0.00
1960
1970
1980
1990
2000