The Life-Cycle Pattern of Collegiate GPA: Longitudinal Cohort Analysis and Grade Inflation

Wayne A. Grove and Tim Wasserman

Abstract: Individual semester-by-semester undergraduate grade point average for each of the eight semesters of the collegiate academic life cycle for five entire student cohorts for the classes of 1998, 1999, 2000, 2001, and 2002 at a large, private university in the northeast (N = 12,663) reveal a "check-mark" pattern: students' grades fell in the second semester, rose thereafter, and slumped in the last academic term. Attrition and participation in the Greek system explain over half of the longitudinal change in academic achievement. A comparison of the five cohorts of students indicates a rate of grade inflation comparable to that obtained for multischool studies covering the period 1960 to the late 1990s.

Key words: academic life-cycle economic, grade point average (GPA), Greek system, undergraduate education
JEL codes: A00, A22, D91, I21

Concerns about grade inflation across campuses in the United States have become a major news topic.[1] The public and university community's interest in grade inflation reflects both the general importance of higher education and of accurately assessing college student's academic achievement. Grades provide unique and important information to the student, the professor, the institution of higher education, prospective employers, graduate or professional school admissions, financial aid committees, and education researchers and policy makers.[2] Studies of grade inflation quantify, and perhaps explain, the causes of the average increase in grade point average (GPA) (Millman et al. 1983; Sabot and Wakeman-Linn 1991; and the literature review by Rosovsky and Hartley 2002). Such cross-section analysis conducted over time ignores an important institutional feature of collegiate academic assessment, namely its cohort-specific longitudinal nature. We examined the time-series dynamics of undergraduate students' grades over their academic life cycle, each semester from their freshman to senior years.[3]

We had three objectives in this study: (1) measure the life-cycle pattern of grades by cohort, (2) identify causes of that time-series pattern, and (3) calculate

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the grade inflation that occurred between cohort groups (rather than for annual cross-sectional data). We used a rich longitudinal database of 12,663 students from five entire cohorts of undergraduate students—the classes of 1998, 1999, 2000, 2001, and 2002—at a large, private university in the northeast (Carnegie Classification: Doctoral Research Universities II—Extensive). This study, intended to unpack some of the black box of collegiate grades, should interest three distinct communities. First, on the demand side, are those who use GPA data either in job recruitment, for admissions and financial aid in graduate and professional schools, or for education research and policymaking.[4] On the supply side, undergraduate college administrators influence the governance of the academic and social life on campus. Although concerns about grade inflation imply that GPAs constitute a less reliable measure of current achievement and predictor of future success,[5] identifying the variations of the life-cycle pattern of grades (i.e., for the typical student compared with students who concentrate in economics, those in other arts and sciences disciplines, or in other schools within the university) should help end users put particular students' scholastic performance in context. Administrators, for example, may find it useful to compare life-cycle GPA data with peer institutions to assess the direct and indirect effects of collegiate policies on undergraduate scholastic achievement. Direct effects consist of, for example, the procedures for dropping classes and retaking a course to improve the grade, whereas indirect effects include the regulation of the Greek system.[6]

THE LIFE CYCLE OF UNDERGRADUATE GRADE POINT AVERAGE

American universities and colleges almost universally assess student academic achievement by having professors assign letter or numerical grades that administrators convert into a grade point scale and then average to create an aggregate measure of academic success (Riley et al. 1994, Table D5, 56). A university student's GPA is typically measured on a scale of 0 to 4.[7] College grades reflect students' performance in a largely self-selected assortment of classes taught by a heterogeneous mix of faculty members in a collection of departments. In addition to its cross-section heterogeneity, GPA data are longitudinal in composition. The complicated composition of GPA data contrasts with the simple nature of nationally standardized exam scores.

To determine how grades vary over the academic life cycle, we collected semester GPA data by student for eight semesters for the entire entering undergraduate classes of 1998, 1999, 2000, 2001, and 2002 at a large, private university in the northeast.[8] The average student from our sample graduated in 4.3 years (including 9 or 10 semesters of data in our analysis did not change the basic results). On average, each of those five entering classes comprised just less than 2,500 students in a total undergraduate population of 12,663 students (87,959 individual semester data points). Our sample excluded transfer-in students because they do not have the same scholastic life cycle as the entering class at the institution. The full population data (Figure 1) revealed a "check-mark" pattern of GPAs during students' academic life cycle for all entering students: GPAs declined by 0.1 points (3.4 percent) in the second semester, in what we call the

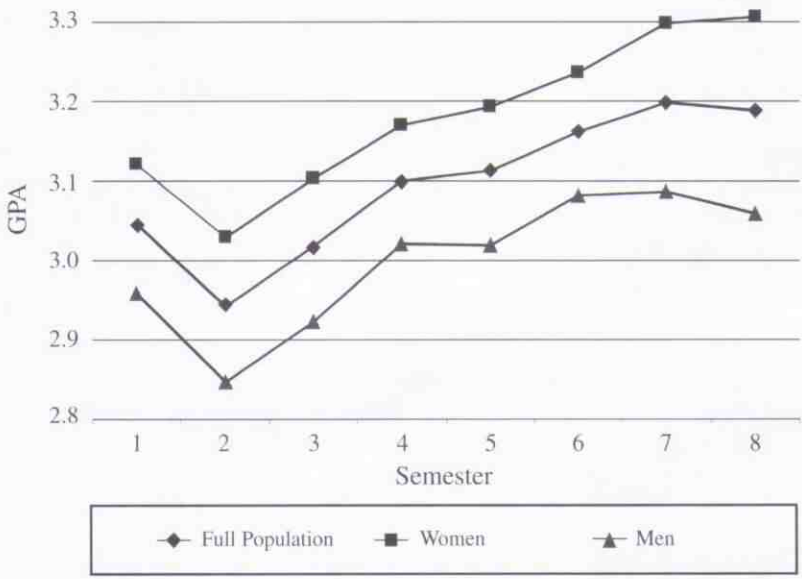

FIGURE 1. Semester grade point average (GPA) over the academic life cycle at a large, private university in the northeast (full population of classes of 1998–2002).

"freshman fall," and then continually increased by 0.26 points (8.7 percent) to a peak in first semester of the senior year. By the second semester sophomore year, students' grades exceed that of their initial semester and thereafter moved up so that seniors' grades exceed their first semester performance by 0.15 of a point (5 percent), the net achievement gain. Finally, academic achievement dipped slightly in the eighth academic term, what we describe as a senior slump. Although we know of no other studies with which to directly compare these results, Betts and Morell (1999) included year of college dummy variables in estimates of University of California, San Diego, students' GPAs and found grade increases over the life cycle roughly twice as large as our results.[9]

Female students distinguished themselves with consistently higher semester-by-semester academic performance (Figure 1). Students of both sexes apparently experienced similar life-cycle "shocks" through the junior year because the female-male gap remained consistent at about 0.17 of a GPA point. Women markedly improved their scholastic achievement during the senior year whereas male grades fell, increasing the gender grade gap to a quarter of a grade point. The senior slump, then, is a male phenomenon. This gender gap (a statistically significant difference at the .01 Type I error level) is three to four times larger than that reported by Betts and Morell (1999) for University of California, San Diego, students.[10]

Economics courses were among the most rigorous in the College of Arts and Sciences, and economics students (majors and minors) had among the lowest

life-cycle patterns of GPAs in that college. We determined disciplinary rigor according to the average grades in core, or gateway, courses (i.e., courses taken by the general undergraduate population). Average grades in core sociology courses, for example, exceeded the mean by more than one standard deviation, those in history were average, and those in math fell below the mean by more than one standard deviation.[11] Grades in gateway economics courses fell considerably below the mean, although not an entire standard deviation below.[12] An untested explanation for these differences might be the ease with which objective standards of measurement are used in economics and math compared with other disciplines.[13] Not surprising, economics students' life-cycle grades were among the lowest in the arts and sciences (Figure 2).[14] For comparative purposes, we display in Figure 2 the Arts and Sciences average and the life-cycle patterns for students majoring or minoring in policy studies (a high-grade discipline) and in

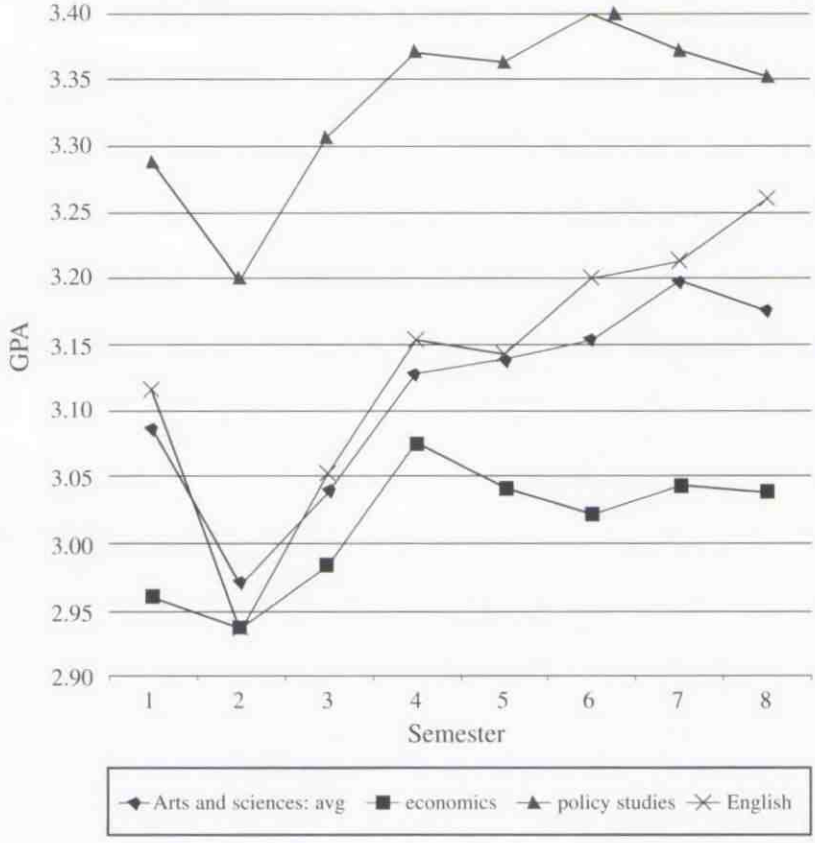

FIGURE 2. Life-cycle pattern of semester grade point average (GPA) by arts and science concentrators (full population of classes 1998–2002).

English (an average-grade discipline). Compared to the other concentrations and the college average, students concentrating in economics received lower and more consistent grades.

Finally, this university contains nine colleges with distinct academic programs that exhibit stark differences in life-cycle GPAs. Arts and sciences students comprised 31 percent of the student body for the classes of 1998 to 2002 compared with 17 percent for the visual and performing arts, 12 percent for communications, 11 percent for management, 9 percent for human services and health professions, 7 percent for engineering, 5 percent for information studies, 4 percent for education, and 3 percent for architecture. Students in all colleges experienced a freshman fall, but only those in engineering received grade declines greater than one standard deviation below average.[15] In two of the nine colleges within the university (education and information studies), students experienced an average net increase in grades to the senior year in excess of one standard deviation above the mean, whereas those in two others (engineering and communications) registered an average GPA increase of one standard deviation below the mean.[16] Thus, the life-cycle pattern of grades varied tremendously by college across the university, although students in seven of nine colleges exhibited the check-mark pattern of GPA (engineering and communications were the exceptions). The pattern for the College of Arts and Sciences most closely reflected that of the entire student body.

Thus, end users of GPA data, whether education researchers, job recruiters, or graduate school administrators, should understand the general pattern of life-cycle academic performance over time by departments and colleges to assess an individual's particular ability and achievement. Unlike the typical university student or the average business or arts and sciences major, economics students' grades, like those in other rigorous majors (e.g., math and schools such as engineering and communications) did not trend up markedly over time.

DECOMPOSING THE UNDERGRADUATE LIFE-CYCLE PATTERN OF GPA

Students presumably allocate their scarce time and effort to maximize their utility derived from different forms of knowledge, current consumption, and expected future income (Becker 1982). As such, many possible factors contribute to an explanation of the systematic fall, increase, and then dip in GPAs. The freshman fall might result from a reallocation of time and energy away from academics and toward social life once students have had a semester to acquire friendships and become involved in nonacademic campus activities. Over time, some combination of academic maturity and focus, learning-by-doing, and self-selection into areas of greater interest and aptitude and out of academically rigorous fields might account for the upperclass upswing, as well as the increasing immediacy of making the transition beyond college. Finally, job interviews might contribute to the senior slump. Of these and other possibilities, we employed a univariate analysis to evaluate the effect of two factors: student attrition and participation in the Greek system.

The Role of Attrition

Institutional graduation rates have fallen steadily from 1983 to 2001 for four-year institutions of higher education: from 59.5 to 55.1 percent for private schools and from 52.2 to 41.9 percent for public schools (Postsecondary Education Opportunity 2002). For our university, most attrition occurred in the freshman year and resulted from students transferring out of the school, rather than dropping out. All told, 22 percent of the entering classes of 1998 to 2002 did not graduate.

To measure the effect of attrition on the life-cycle pattern of GPAs, we compared the semester-by-semester GPA performance of four sample populations.[17] The full population of matriculated students each semester had the lowest life-cycle GPA curve. Eliminating dropouts caused the biggest upward shift in average grades by 2 percent (0.05 of a GPA point) during the freshman year when most students who would leave college did. Removing transfer-out students, in addition to dropouts, shifted the life-cycle grade curve up but by only half as much as omitting dropouts.[18] Finally, when considering only those students who continuously enrolled for eight semesters, the same life-cycle GPA pattern remained, although it was, on average, 1.5 percent higher (0.05 point) than that of the full population and flatter.

Comparing the GPA of all entering students with those who completed eight semesters, 8 percent of the first to second semester fall in grades resulted from the poor performance of students who ultimately dropped out of school or transferred elsewhere. Attrition played a much greater role in the rise of academic achievement after the second semester of college coursework, accounting for over 40 percent of the total. Thus, the survivorship bias magnified the dramatic fall and rise of student academic achievement over the college years but did not cause the check-mark pattern of grades. Attrition shifted up economics students' semester grades over time by an insignificant amount (0.02 point; less than 1 percent).

The Role of the Greek System

Several studies have established a negative effect of fraternity and sorority membership upon general academic achievement (Pike and Askew 1990; Pascarella et al. 1996) and upon performance in principles of economics courses (Durden and Ellis 1995).[19] As freshmen, students at this university could not join fraternities or sororities in their first semester at college but could do so, and most who would did, during the second semester.[20] The Greek system offers an institutionalized version of the freshman fall as a reallocation of time and energy away from academics and toward social life after students have had a semester to get to know each other.

Greek and non-Greek student GPA data compared to the overall average certainly suggested that the institutional feature of fraternities and sororities contributed to the decline in second semester grades (Figure 3). Greek members experienced an almost four-times greater first to second semester GPA decline than did other students, almost 0.23 of a point versus 0.06 of a point for non-Greeks—a remarkable difference in means that is statistically significant at the 0.01 level. Whereas non-Greeks achieved a net GPA upperclass upswing (from the first

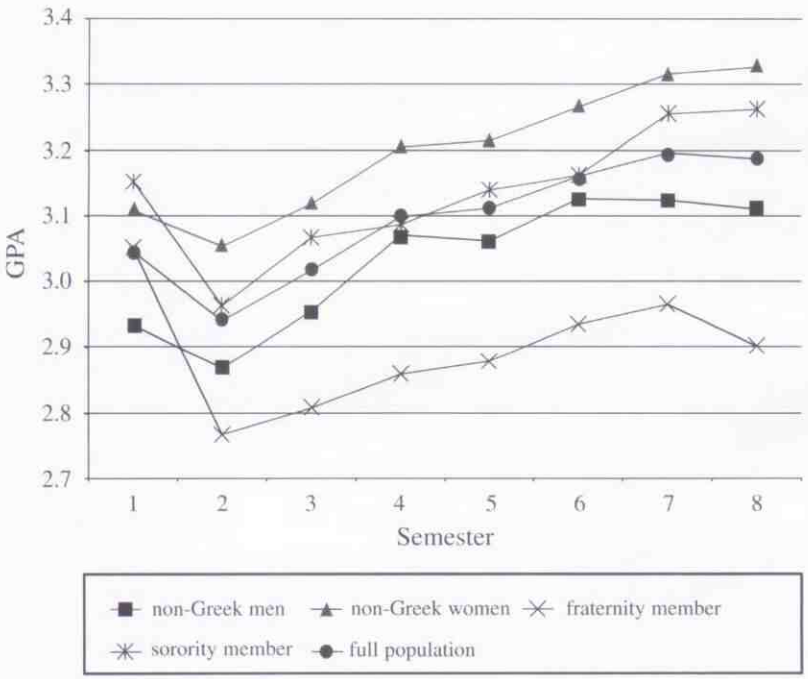

FIGURE 3. Life-cycle pattern of semester grade point average (GPA) according to participation in the Greek System (full population of classes 1998–2002).

semester) of 0.2 point, members of the Greek system, in aggregate, experienced a decline. Participation in the Greek system affected the life-cycle performance of economics students in a comparable fashion. A small portion of students concentrating in economics (a quarter) initially performed better than average but, upon joining the Greek system, earned grades, on average, 0.15 of a grade point below the other concentrators.[21] With or without the Greek system, economics students did not mirror the general check-mark pattern of GPAs over time.

Academic achievement in the Greek system was sharply divided by gender. Fraternity members experienced a 0.28 point freshman fall compared with 0.19 for sorority members (the means were significantly different at the 0.01 level).[22] Thereafter, a pronounced gender divide emerged as sorority members increased their net semester grades by 0.1 point by senior year whereas fraternity members' grades fell by a comparable amount. Furthermore, Greek women improved their grades in the final college semester whereas Greek men performed worse.[23] In sum, the Greek system, with only 25 percent of the entering student population, accounted for over half the decline in academic achievement during the first and final semesters and little of the improvement in performance in between. Note that this deleterious role of the Greek system represents lower bound estimates

because our data only indicated students who joined the Greek system, not those who rushed, or participated in the membership selection process. Some of the non-Greek second semester decline in grades presumably resulted from those who rushed but did not subsequently join fraternities or sororities.[24]

COMPARISON WITH AN INSTITUTION OF HIGHER EDUCATION WITHOUT A GREEK SYSTEM

To further investigate the role of fraternity or sorority membership on the academic life-cycle pattern of scholastic achievement, we obtained cohort data for the class of 2000 from an institution of higher education without a Greek system, a small, private liberal arts college in the northeast (Carnegie Classification "Master's Colleges and Universities I/II"; $N = 468$). A comparison of semester-by-semester GPA for the full population of initially matriculating students and of students who completed college in both schools revealed a stark contrast. Students in the non-Greek-system school experienced no freshman fall, no senior slump, and a much more robust increase in grades in between. This comparison merely raised the larger question about the role of the Greek system across schools and the differences in academic achievement by type of institution of higher education—tasks beyond the scope of this study. Among other things, core course requirements were more uniform at the non-Greek school. Although students at the non-Greek school exhibited absolute life-cycle GPA gains three sizes larger than undergraduates in the Greek university, attrition affected both comparably (a one-third compression of semester grades over time).

COHORT GRADE INFLATION

Grade inflation can be defined as an upward shift in the grade point average of students over an extended period of time without a corresponding increase in student academic ability.[25] Unlike price inflation, where the value of the monetary unit can rise indefinitely, grades have an upper limit of an A. In contrast to existing studies that examine the annual cross-section increases in GPAs, we analyzed grade inflation among our five undergraduate cohorts. An econometric test of the relationship between average semester GPAs from freshman to senior year indicated that the class of 2002 received grades 0.11 of a grade point higher than did the class of 1998, a 3.5 percent increase, statistically significant at the .01 level.[26]

Of the many grade inflation studies published in the last three decades, two time-series studies provide useful comparisons with our results. Juola (1980) found a 0.432 grade point rise from 1960 to 1974 for 180 colleges with graduate programs. Kuh and Hu (1999) identified an average college GPA increase of 0.27 of a grade point at all institutional types from 1984–87 to 1995–1997. Both studies revealed annual grade increases of 0.024 of a grade point, or a third of a letter grade in a dozen years.[27] Our estimates indicated an average cohort rate of grade inflation of 0.022 of a grade point for the classes of 1998

to 2002, a surprisingly similar result to that obtained for multi-school studies of the 1960 to late 1990s period.[28]

CONCLUSIONS AND IMPLICATIONS

Longitudinal cohort data for undergraduate students in the classes of 1998 to 2002 at the university revealed a striking check-mark pattern of GPAs over their eight-semester academic life cycle: grades fell sharply in the second semester, rose thereafter to a peak in the first half of the senior year before slumping in the final term. Two factors account for most of this variation. First, attrition, the survivorship bias, explains over 40 percent of the net rise in academic performance up to the final semester. Second, Greek system membership accounted for over half of the freshman fall in academic performance (when the rush and pledging occurred), although thereafter only fraternity members, not those in sororities, registered sharply below average grade improvements. Cohort data for an institution of higher education without fraternities or sororities did not reveal the deleterious grade outcomes that we found to be associated with the Greek system. Jointly controlling for attrition and the Greek system shifted up and flattened the life-cycle check-mark pattern of GPAs but did not eliminate it. Economics courses were among the most rigorous of the core courses in the College of Arts and Sciences and economics majors received below average life-cycle grades and exhibited less GPA volatility than others. Finally, we found rates of grade inflation for our cohorts comparable to annual time-series estimates since 1960.

We have offered an initial description and explanation of the determinants of student scholastic achievement over their college years based on univariate analysis. Formally modeling this behavior, empirically testing the alternative explanations, and replicating our methodology will determine the representativeness or idiosyncratic nature of our conclusions based on these datasets. We have not investigated the role played by student learning-by-doing and maturity or by self-selection into easier courses, those of greater interest, or those that better match student aptitude. Variations in life-cycle patterns between schools might result from differences, for example, in core or first and second year required courses, grading conventions, standards and rules, and the regulation of the Greek system.[29] Although our strong negative findings regarding the effect of participation in the Greek system upon academic achievement mirror the conclusions of the few scholarly works on the subject, little is known about the relationship between membership in fraternities and sororities and grades across campuses in the United States or about the effect of differences in institutional regulations.[30]

What implications does the life-cycle pattern of collegiate grades have for the assessment of student learning? Clearly, it suggests that dummy variables be included to control for students' year of study and for participation in the Greek system.[31] Should dropout and transfer students be purged from data sets to account for attrition? In a related study, we found that doing so reduced estimated treatment effects of student learning by 14 percent, a small but meaningful amount.[32] Scholars interested in characteristics like reliability and persistence may find measures of GPA variability useful. Declining institutional graduation

rates imply a more pronounced GPA life-cycle pattern and offer a systematic explanation for variations across time and space (for example, higher-quality schools have less attrition).[33] Our findings will be of interest to the students, parents, and taxpayers of the 15 states with large-scale college merit-based scholarships that are awarded to high-achieving high school students.[34] Because those programs require a minimum university GPA, freshman will have a systematically more difficult time qualifying for free university tuition than will seniors.[35] Similarly, membership in a sorority but especially in a fraternity will cause some portion of merit scholars to lose their tuition-free benefits.[36] Finally, Cornwell, Kyung, and Mustard (2002) and Blinder and Ganderton (2002) show that merit-based scholarships encourage students to take easier and fewer courses in order to maintain the minimum required GPA, incentives that will systematically shift up the life-cycle pattern of collegiate grades.

NOTES

1. A Nexus-Lexus keyword search of "grade inflation," conducted on February 20, 2003, identified 125 articles about the topic published in the last two years. For a summary of the literature, controversy, causes, consequences, and suggested corrective recommendations, see Rosovsky and Hartley (2002).
2. Loury and Garman (1995), for example, found that weekly earnings of white men in the National Longitudinal Study of the High School Class of 1972 was predicted to rise by 10.0 percent and by 28.7 percent for black men, with a one-point increase in college GPA, controlling for college selectivity, the person's SAT score, and family background. For other studies that find a positive and significant relationship between college GPA and earnings, see Jones and Jackson (1990), Filer (1983), and Wise (1975).
3. Note that the average student in our sample graduated in 4.3 years and including 9 or 10 semesters instead did not change our basic results. Many studies include the year of college study as a control variable which implies some life-cycle influence. For example, Betts and Morell (1999) include dummy variables for years 2, 3, 4, and 5. The life-cycle pattern of GPA addressed here is part of a broader inquiry into the use of academic-ability control variables in college student assessment (Grove and Wasserman 2004a) because GPA can be calculated in a variety of ways according to (1) time period (e.g., by semester, year, or cumulative), (2) levels of aggregation (e.g., thirds of a letter grade or whole letter grades), and (3) courses included (e.g., semester GPA, semester GPA minus the economics grade). For a study of the implications of measuring GPA with different levels of aggregation (e.g., numerical grades, thirds of a letter grade, whole letters) for assessments of student learning, see Wasserman and Grove (2004).
4. Analysis of undergraduate assessment relies heavily on GPA data as both the measure of academic success scholars wish to explain (i.e., the dependent variable) and as the principal available control measure of a student's academic accomplishment in college (i.e., an independent variable). Graduate and professional school admissions and financial aid decisionmakers typically consider candidates based on a standardized test score, college grades, and letters of recommendation. Although standardized exam scores assess a particular type of knowledge or academic ability, semester-by-semester college grades in a variety of subjects over a four-year period or more reveal considerable information about a student's persistence, hard work, and reliability, in addition to his or her scholastic aptitude—precisely the type of personal characteristic information essential to success in those advanced degree programs and in graduate students' capacities as teaching and research assistants.
5. The point that grade inflation diminishes its usefulness has been made by Millman et al. (1983), Sabot and Wakeman-Linn (1991), and Rosovsky and Hartley (2002). Despite the concern of a diminished role for grades in recruitment, Rosovsky and Hartley note that they "found no large body of writing in which, for example, employers or graduate schools complain about lack of information because of inflated grades" (p. 12). In fact, they cite only a single study: the percentage of Fortune 500 Human Resources Officers in 1978, 1985, and 1995 who wanted college grades included in an applicant's resume fell from 37.5 percent to 20 percent over those three years (Spinks and Wells 1999).

6. For example, according to Riley et al. (1994), 86 percent of institutions allowed students to repeat courses to better their grades, and the majority (but not all) of these included only the most recent or highest grade in the student's cumulative GPA. Great variation existed between institutions on the time period at which grade changes were no longer allowed and on deadlines for students to drop courses without the enrollment appearing on the permanent academic record.
7. The typical grading scale and that used at both schools in our study is as follows: F, 0; D, 1; C-, 1.667; C, 2.0; C+, 2.333; up to A, 4.0.
8. At the university in the northeast, 60 percent of annually entering freshmen graduate in four years (by August of the fourth year, the federal and New York state defining cutoff), 10 percent more graduate by August of the fifth year, and an additional 1 to 2 percent by August of the sixth year. Time-to-graduation is approximately 4.3 years. For an indication of the general interest in the time-to-graduation topic, see the recent *The Wall Street Journal* article by Berstein (2002).
9. Betts and Morell (1999, Table 1, 276–77) report that sophomore grades did not differ from those in the first year but that third year grades were 0.3 of a GPA point higher, fourth year grades 0.37 of a point higher, and fifth year grades 0.27 of a point higher.
10. Betts and Morell (1999, 275) report a 0.06 point difference by sex.
11. Other high grading core subjects included the five foreign languages, policy studies, and women's studies. Other low-grading subjects included earth science, math, fine arts, and chemistry.
12. The mean overall core grade was a 3.0 with a standard deviation of 0.29, and the economics mean was 2.8.
13. Wilson (1999) makes this point regarding grade inflation in the humanities as opposed to the natural sciences.
14. There were three exceptions to consistency between the level of rigor of core courses and concentrators' grades: both chemistry and math had low core grades but higher than average concentrator GPAs, whereas sociology gateway courses were very high but concentrators received lower than average life-cycle grades. A systematic version of this relationship would analyze the effect of a discipline's level of difficulty on the extent of GPA change over the academic life cycle.
15. The mean freshman fall was –0.1 point with a standard deviation of 0.07. The freshman fall for human services was –0.24 and for engineering was –0.19. Similarly, seniors slumped in only three schools: arts and sciences, architecture, and information studies; only in the latter two colleges, though, did the decrease exceed the average fall by more than one standard deviation. The mean senior slump was –0.01 point and the standard deviation was 0.06. The senior slump for architecture was –0.11 and for information studies, 0.1.
16. The mean net upperclass upswing was 0.17 point, and the standard deviation was 0.12: for information studies, 0.35; for education, 0.34; for public communications, 0.01; and for engineering –0.01.
17. Students who enrolled in college but did not graduate either dropped out of school altogether or transferred to another institution of higher education. For the purposes of our study, we define a *student to have dropped* out of the institution if he or she had originally matriculated into a degree program but subsequently failed to enroll in a given semester, had not enrolled since (therefore ending progress toward a degree), and had not received a degree to date. Institutional records identify two categories of dropouts: those who left because of academic deficiencies (i.e., unacceptable GPA and/or progress) or because of university action (e.g., expulsion related to student misconduct). Other nonreturning students, though, are not identified as either transferees to another institution of higher education or drop outs from higher education altogether. We categorize *transfer-out* students as nonreturning undergraduates who voluntarily left school in good standing.
18. Although a few of the students with the highest GPAs transfer elsewhere, most of those who change institutions appear not to be the best students, that is, students transferring to be closer to home or to an institution that is a better fit.
19. Pascarella et al. (1996), for example, used data from the National Study of Student Learning, conducted at 18 four-year colleges, and found that the cognitive development of fraternity men lags that of nonmembers after the first year, controlling for initial differences in precollege ability, motivation, age, and the selectivity of the college attended. Durden and Ellis (1995, 344) found that Greek participation reduced grades by about 2 points on a 100 point scale.
20. For freshman year spring rush, all men must have at least a 2.25 GPA and women at least a 2.3 GPA, whereas for sophomore pledges average grades must be at least 2.0.
21. Non-Greek economics students experienced no freshman fall and a small net gain in academic achievement over time (0.05 point).
22. Note that Greek members earned higher grades than non-Greeks in their first term of study. Perhaps this reflects students of higher than average academic potential whose priorities become focused on participation in the Greek system. Alternatively, might those students have devoted

themselves to their studies either to improve their credentials in the selection process or in anticipation of lower grades in subsequent semesters?

23. Note that non-Greek senior grades exceed Greek's initial semester performance. The mean absolute change in Greek and non-Greek men and women are statistically significantly different at the .01 level, except for the performance of women in the last semester.
24. Either they (1) withdrew from the pledge process at some point prior to the selection process, (2) were not asked to join, or (3) turned down such an offer.
25. No notable differences exist between the high school GPA and SAT scores of our five cohorts.
26. In the model, we tested posits that $SemGPA_{i,t} = \beta_0 + \beta_1 t_i + \beta_2 t^2_i + \beta_3 t^3_i + \beta_4 Cohort1999 + \beta_5 Cohort2000 + \beta_6 Cohort2001 + \beta_7 Cohort2002 + \epsilon$; t = semesters 1 to 8, and i = cohort group 1 to 5 ($N = 40$; Adj $R^2 = 0.85$). We did not include a dummy variable for 1998 cohort. The 2002 cohort dummy coefficient is 0.11 (standard error = 0.019; t value = 5.77).
27. In contrast to the sharp rise in grades from 1960 to 1974, Juola (1980) reported that GPA leveled off from 1974 to 1978. Thus, a grade increase of a 0.432 grade point over 18 years equals 0.024 grade point per annum. For Kuh and Hu (1999), 0.27 divided by 11 years is a yearly increase of 0.024.
28. A grade point gain of 0.11 divided by 5 equals 0.022, remarkably close to the above estimates of 0.024.
29. See Riley et al. (1994) for a summary of the differences in grading policies.
30. A countervailing benefit of the Greek system is higher graduation rates. Several colleges have banned Greek organizations, namely Bowdoin College, Colby College, Waynesburg College, and Williams College.
31. In their study of the GPA determinants of over 5,000 undergraduates at the University of California, San Diego, Betts and Morell (1999) included dummy variables for years 2, 3, 4, and 5 but not for participation in the Greek system. Approximately 10 percent of the undergraduate men and women belong to residential Greek organizations, a much smaller portion of the student body than is true of the school used in this article.
32. The study uses data from a natural experiment (Grove and Wasserman 2004b).
33. Total graduation rates have declined since the early 1980s to 2001, from 57 to 51 percent and for public institutions of higher education from 52 to 41 percent (Postsecondary Education Opportunity 2002, 1).
34. For information about Georgia's HOPE program and similar programs in other states, see the Cornwell-Mustard HOPE Scholarship Page at http://www.terry.uga.edu/hope/.
35. Cornwell, Lee, and Mustard (2002) are especially interested in the unintended consequence of the program in terms of encouraging students to strategically select courses to raise their grades, another potential cause of grade inflation.
36. For example, in Georgia where one of the most ambitious merit-based college financial aid program exists, 16 percent of men belong to fraternities and 21 percent of women to sororities on the Athens campus. At other campuses in the Georgia system, participation varied from 3 to 20 percent for men and 3 to 15 percent for women (according to Peterson's College Database, accessed in March 2003).

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